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FINAL SITE INSPECTION WORK PLAN AT UXO 19 NSWC INDIAN HEAD MD
9/1/2009
CH2MHILL

Final

Site Inspection Work Plan
for
Igniter Area - UXO 19

Naval Support Facility Indian Head
Indian Head, Maryland

Contract Task Order 0012

September 2009

Prepared for

Department of the Navy
Naval Facilities Engineering Command
Washington

Under the

LANTDIV CLEAN 1000 Program
Contract N62470-08-D-1000

Prepared by

Chantilly, Virginia

Executive Summary

Naval Support Facility Indian Head (NSF-IH) is in the process of investigating closed ranges following the Comprehensive Environmental Response, Compensation and Liability Act investigation process. As part of this process, a Preliminary Assessment (PA) was completed by Malcolm Pirnie in 2005. The next step in the investigation process is to conduct a Site Inspection (SI), based on the recommendations in the PA. This Work Plan presents the objectives, scope, and procedures for conducting an SI at Igniter Area - UXO 19, located at NSF-IH in Indian Head, Maryland. The SI consists of a munitions and explosives of concern (MEC) and a munitions constituents (MC) investigation. This document was prepared under the U.S. Department of the Navy, Naval Facilities Engineering Command Washington Comprehensive Long-term Environmental Action, Navy Contract Number N62470-08-D-1000, Contract Task Order 0012.

The PA reported that the approximately 0.01-acre site is offshore along a wooded and marshy area in a small promontory known as "Thieves Point" on the Main Installation. A small pile of igniters was found by Base personnel at the site during an extremely low tide in 1996 or 1997. Based on descriptions, the igniters were assumed to be electric primers or electrically primed rifle cartridges approximately .50 caliber in size. Furthermore, the igniters were suspected to be M2 and/or M60 time blasting fuse igniters. In March 2004, additional ordnance items were observed by Base personnel along the shoreline during a low tide event. These items appeared to be MK 1 MOD 1 or MK 2 MOD 0 float signals, and a 250-, 500-, or 750-pound old-style bomb.

Several of the igniters were reportedly picked up and disposed of, but it is unknown if the disposal of the remaining igniters occurred. The origin of the igniters, dates of use, or date of disposal were unknown. As part of the PA, a site visit was conducted in June 2003, but igniters were not observed and there were no indications of MEC because the site was covered with water. Based on the information collected during and presented in the PA, the site was categorized as a MEC Area. The PA also documented that MC associated with the site include lead styphnate, the filler material used in M2 and M60 igniters, and smoke composition, the filler material used in MK 1 and MK 2 float signals. Because the type of old-style bomb found could not be identified, the associated MC was unknown. The PA recommended further investigation for MEC and MC.

During a site visit on November 25, 2008, munitions-related items were observed scattered along the shoreline and in the water. As a result, the size of the area proposed for MEC and MC investigation has increased to approximately 0.14 acre to ensure that the entire potentially affected area is investigated. Because the presence of MEC has been confirmed at this site during the November 2008 site visit, the objectives of the SI are:

- Identify and document the types and locations of MEC items along the land and shoreline up to the low tide water line in Mattawoman Creek
- Determine if target analyte list (TAL) metals/cyanide/mercury, perchlorate, and explosives (including nitroguanidine, nitrocellulose, and nitroglycerine) are present in the sediment along the shoreline

The MEC investigation will involve unexploded ordnance (UXO) technicians identifying and documenting observed MEC items on land and the shoreline up to the low tide water line of Mattawoman Creek. The potential presence of MEC in Mattawoman Creek will be addressed separately through a geophysical investigation and is not included in this Work Plan. Information on the MEC items that will be recorded will include: a record of their type by function, possible nomenclature, lengths, widths, diameters, and markings. A photograph will be taken of each MEC item using a ruler and photo number. The location of each MEC item will be recorded using a global positioning system unit and also recorded in a Portable Data Assistant and a field notebook.

The MC investigation will consist of the collection of four sediment samples from 0 to 6 inches below the sediment surface along the shoreline in Mattawoman Creek. The proposed sediment sample locations may be relocated and biased around the identified MEC/igniter items. The samples will be analyzed for TAL metals/cyanide/mercury, perchlorate, and explosives (including nitroguanidine, nitrocellulose, and nitroglycerine). Anomaly avoidance will be conducted by a UXO technician during field activities because of the presence of MEC.

The results of the SI will be presented in a report for use by the Indian Head Installation Restoration Team to make a management decision about the path forward for the Igniter Area. The three possible management decisions are as follows: (1) perform a removal action, which could be a TCRA or NTCRA, based on the types of MEC present to remove MEC from the site; (2) perform a remedial investigation and/or other investigation as warranted, based on the presence of MC in the sediment; and (3) remove the site from further study and recommend NFA, based on the absence of MC in the sediment.

Contents

Appendices

Figures (Figures are located at the end of each section.)

Abbreviations and Acronyms

DQO	data quality objective
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
GPS	global positioning system
HASP	Health and Safety Plan
IDWMP	Investigation Derived Waste Management Plan
IHIRT	Indian Head Installation Restoration Team
MC	munitions constituents
MDE	Maryland Department of the Environment
MEC	munitions and explosives of concern
msl	mean sea level
NAVFAC	Naval Facilities Engineering Command
Navy	U.S. Department of the Navy
NFA	no further action
NSF-IH	Naval Support Facility Indian Head
NTCRA	non-time-critical removal action
PA	Preliminary Assessment
PDA	Portable Data Assistant
PM	Project Manager
QAPP	Quality Assurance Project Plan
SAP	Sampling and Analysis Plan
SI	Site Inspection
SUXOS	Senior Unexploded Ordnance Supervisor
TAL	target analyte list
TCRA	time-critical removal action
UFP-SAP	Uniform Federal Policy–Sampling and Analysis Plan
UXO	unexploded ordnance

SECTION 1

Introduction

Naval Support Facility Indian Head (NSF-IH) is in the process of investigating closed ranges following the Comprehensive Environmental Response, Compensation and Liability Act investigation process. As part of this process, a Preliminary Assessment (PA) was completed by Malcolm Pirnie in 2005. The next step in the investigation process is to conduct a Site Inspection (SI), based on the recommendations in the PA.

This Work Plan presents the objectives, scope, and procedures for conducting an SI at Igniter Area - UXO 19, located at NSF-IH in Indian Head, Maryland (Figure 1-1). This document was prepared under the U.S. Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC) Washington Comprehensive Long-term Environmental Action, Navy, Contract Number N62470-08-D-1000, Contract Task Order 0012. This Work Plan was developed using background information contained in *Final Water Area Munitions Study, Naval District Washington, Indian Head, Maryland* (Malcolm Pirnie, 2005).

1.1 Base Setting

NSF-IH is a Navy facility in northwestern Charles County, Maryland, approximately 25 miles southwest of Washington, DC. The facility consists of two tracts of land: the Main Installation on the Cornwallis Neck Peninsula, and the Stump Neck Annex, across Mattawoman Creek (Figure 1-1).

The Main Installation contains approximately 2,500 acres and is bounded by the Potomac River to the northwest, west, and south; Mattawoman Creek to the south and east; and the town of Indian Head to the northeast. Included as part of the main area are Marsh Island and Thoroughfare Island, which are located in Mattawoman Creek. Elevations range from sea level to approximately 125 feet above mean sea level (msl).

The Stump Neck Annex contains approximately 1,084 acres and is bounded by Mattawoman Creek to the northeast, the Potomac River to the northwest, and Chicamuxen Creek to the south-southwest. Elevations range from sea level to approximately 10 feet above msl.

Both the Main Installation (Cornwallis Neck Peninsula) and the Stump Neck Annex are on the National Priorities List. The Main Installation and Stump Neck Annex are separated by Mattawoman Creek (noncontiguous), have separate U.S. Environmental Protection Agency (EPA) identification numbers, and perform dissimilar operations.

1.2 Site Description

The PA reported that the Igniter Area is offshore along a wooded and marshy area in a small promontory known as “Thieves Point” on the Main Installation (Figure 1-2). The site is approximately 0.01 acre in size (approximately 20 feet by 20 feet). The promontory is a

wetland and considered a species protection area. There was one structure nearby, Building 1451, which was formerly used for storage and was vacant at the time of the PA.

The PA reported that a small pile of igniters was found by Base personnel at the site during an extremely low tide in 1996 or 1997. Based on descriptions, the igniters were assumed to be electric primers or electrically primed rifle cartridges approximately .50 caliber in size. Furthermore, the igniters were suspected to be M2 and/or M60 time blasting fuse igniters. The PA reported that in March 2004, additional ordnance items were observed by Base personnel along the shoreline during a low tide event. These items appeared to be MK 1 MOD 1 or MK 2 MOD 0 float signals, and a 250-, 500-, or 750-pound old-style bomb.

Several of the igniters were reportedly picked up and disposed of, but it is unknown if the disposal of the remaining igniters occurred. The origin of the igniters, dates of use, or date of disposal were unknown. Interviews with former employees indicated that the igniters may have come from the Cast Plant. As part of the PA, a site visit was conducted in June 2003. The PA noted that igniters were not observed and there were no indications of munitions and explosives of concern (MEC) because the site was covered with water.

Based on the information collected during and presented in the PA, the site was categorized as a MEC Area. The PA also documented that munitions constituents (MC) associated with the site include lead styphnate, the filler material used in M2 and M60 igniters, and smoke composition, the filler material used in MK 1 and MK 2 float signals. Because the type of old-style bomb found could not be identified, the associated MC was unknown. The PA recommended further investigation for MEC and MC.

On November 25, 2008, the Navy and CH2M HILL conducted a site visit. Building 1451 has been demolished since the PA was conducted. Igniters were not observed; however, munitions-related items, dead wood, and other debris were scattered not only at the Igniter Area, but also along an approximately 300-foot stretch of the land, shoreline, and shallow water. As a result, MEC and MC investigations will be conducted in a larger area, encompassing approximately 0.14 acre (300 feet along the shoreline by 20 feet of land), to examine the entire area where MEC-related items were observed.

1.3 Project Objectives

Because MEC items were observed during the November 2008 site visit, the presence of MEC has been confirmed. Therefore, the objectives of the SI are:

- Identify and document the types and locations of MEC items along the land and shoreline up to the low tide water line in Mattawoman Creek
- Determine if TAL metals/cyanide/mercury, perchlorate, and explosives (including nitroguanidine, nitrocellulose, and nitroglycerine) are present in the sediment along the shoreline

These objectives will be accomplished through the investigation approaches for MEC and MC outlined in Sections 2 and 3, respectively. The SI investigation methods, findings, and recommendations will be presented in an SI report for Indian Head Installation Restoration

Team (IHIRT) review. The report will provide the basis for making one of the following management decisions for the site:

- Perform a removal action, which could be a time-critical removal action (TCRA) or non-time-critical removal action (NTCRA) based on the types of MEC present
- Perform a remedial investigation and/or other investigation as warranted based on the presence of MC in the sediment
- Remove the site from further study and recommend no further action based on the absence of MC in the sediment

1.4 Project Organization

CH2M HILL will perform the SI with support from the Navy. The Navy Remedial Project Manager at NAVFAC Washington will be Mr. Joe Rail.

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The secondary contact at NAVFAC Washington will be Mr. Nathan Delong.

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The CH2M HILL project manager (PM) will be Dr. Margaret Kasim. The project organization chart is shown on Figure 1-3.

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1.5 Work Plan Organization

The remainder of this Work Plan is divided into the following sections:

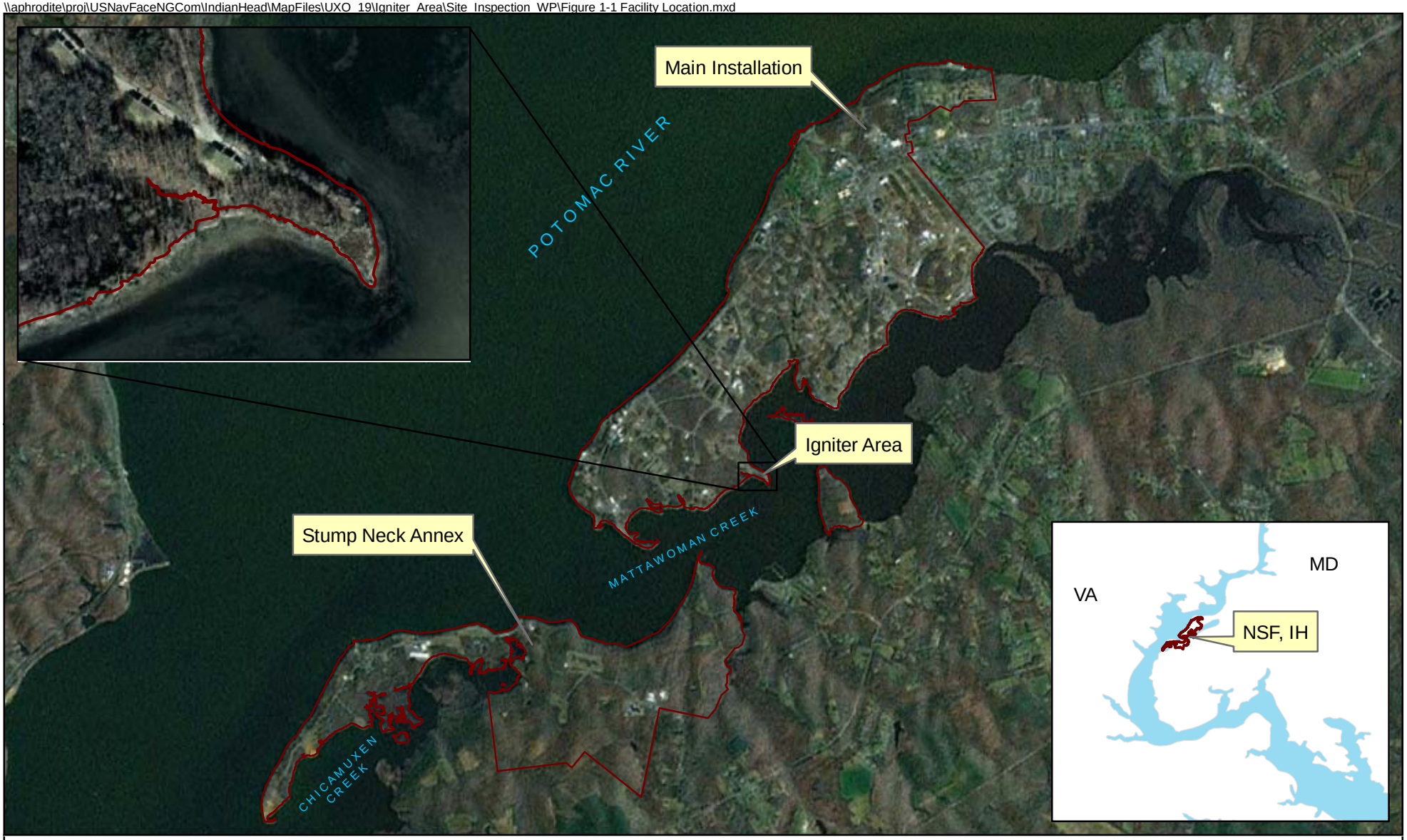
Section 2—Munitions and Explosives of Concern Investigation; describes procedures for implementing the MEC investigation portion of the SI.

Section 3—Munitions Constituents Investigation; describes procedures for implementing the MC investigation portion of the SI.

Section 4—References; lists all documents cited in the Work Plan.

Figures are provided at the end of each section. Appendices follow the References section.

\\aphrodite\proj\USNavFaceNGCom\IndianHead\MapFiles\UXO_19\Igniter_Area\Site_Inspection_WP\Figure 1-1 Facility Location.mxd



Legend

Installation Boundary

N

0 2,300 4,600 9,200 Feet

Figure 1-1
Facility Location
Site Inspection Work Plan for Igniter Area - UXO 19
NSF-IH, Indian Head, Maryland

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\\aphrodite\proj\USNavFaceNGCom\IndianHead\MapFiles\UXO_19\Igniter_Area\Site_Inspection_WP\Figure 1-2 Site Map.mxd

Legend

- Proposed Site Inspection Area
- Igniter Area Boundary in the Preliminary Assessment
- Buildings
- Installation Boundary

N

0 75 150 300 Feet

Figure 1-2
Site Map
Site Inspection Work Plan for Igniter Area - UXO 19
NSF-IH, Indian Head, Maryland

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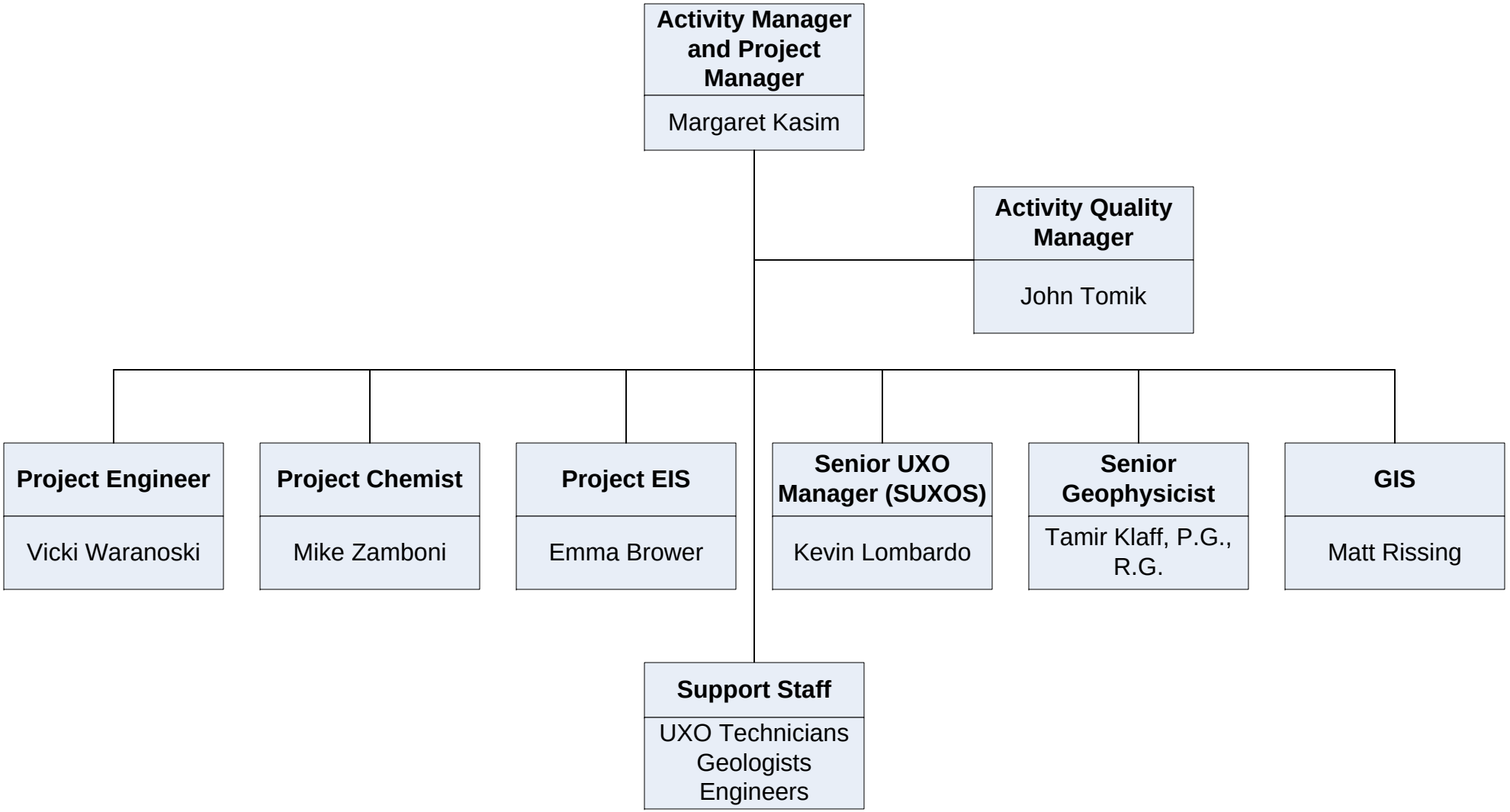

Figure 1-3
Project Organization Chart
Site Inspection Work Plan for Igniter Area - UXO 19 & Site 17 Shoreline
NSF-IH, Indian Head, Maryland

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SECTION 2

Munitions and Explosives of Concern Investigation

General field methodologies for performing the MEC identification and documentation are described in this section. Several plans have been prepared in support of this scope and are provided as Appendix A (MEC Accident Prevention Plan) and Appendix B (MEC Project Quality Control Plan). CH2M HILL has prepared a Health and Safety Plan (HASP) specific to this investigation that will be followed during the field activities (Appendix C). Field methodologies will be performed in accordance with CH2M HILL's standard operating procedures, provided in Appendix D.

2.1 Field Activities

2.1.1 Mobilization/Demobilization

Mobilization will be coordinated with the Navy and will include staking out the area for identifying munitions items, which is approximately 300 feet of shoreline by 20 feet of land (Figure 2-1). Because the Igniter Area is along a shoreline and no intrusive activities will be taking place during the MEC investigation, utility clearance will not be performed. Access to the site will be evaluated before field activity begins. All security and access requirements specific to the Base will be followed. Demobilization will consist of making sure that the site is left in its condition prior to mobilization.

2.1.2 Personnel

UXO personnel assigned to this project will be qualified and certified in accordance with NAVSEAINST 8020.9B, Ammunition and Explosives Personnel Qualification and Certification Program; terms outlined by the U.S. Department of Labor Employment Standards Administration Wage Hour Division for UXO Personnel; and DDESB TP-18, Minimum Qualifications for UXO Technicians and Personnel. For this investigation, two CH2M HILL UXO technicians, a UXO Technician III and UXO Technician II, will conduct the visual inspection, identification, and documentation of ordnance items. A Senior Unexploded Ordnance Supervisor (SUXOS), UXO Quality Control Supervisor, and UXO Safety Officer may be required.

Before mobilization, CH2M HILL field personnel will review this Work Plan to ensure that the scope is executed, and health and safety protocols are adhered to as outlined herein. In addition, they will participate in a pre-operational operation readiness review meeting to go over project scope, roles, responsibilities, and health and safety procedures.

2.1.3 MEC Items Inspection

Before beginning the identification and documentation of MEC items, the UXO technicians will test the global positioning system (GPS) equipment to ensure that it is functioning as

designed. The UXO technicians will inspect any observed MEC items measuring 2 inches by 2 inches and larger surface metallic items on land and along the shoreline to the water's edge at low tide. Items smaller than 2 inches by 2 inches will be noted if military munitions remnant. Consequently, use of a flotation device or diving is not required for this scope of work. MEC investigation in the water will be conducted separately through a geophysical investigation. Specific tasks for this scope of work are as follows:

1. Identify all MEC items as "type by function"
2. Measure the dimensions such as length, width, and diameter by sections and major breaks in diameter to determine the measurements for the delivery, fuzing, and filler elements of each item
3. Document, if available, nomenclature of and markings on each item
4. Identify, if possible, the condition of the item; for example, it could be categorized as discarded functional, UXO, functioned as designed, or unknown
5. Obtain the horizontal location (northing and easting coordinates) for each item with a portable GPS unit, which has an accuracy in the range of one meter to three meters. The horizontal locations will be referenced to the 1983 North American datum
6. Photograph the item and maintain a photographic log
7. Document all information in a field notebook and Portable Data Assistant (PDA) device

CH2M HILL's UXO technicians will not handle any MEC items observed at the site. The Navy will be informed of these items for proper handling and disposal.

2.2 Data Quality Objectives

Data quality objectives (DQOs) are pre-established goals that help monitor and assess the progress of the project. They provide the benchmarks against which the quality of fieldwork and the quality of resulting analytical data are evaluated.

DQOs specify the data type, quality, quantity, and how data are used to support project decisions. Data gathered during the MEC investigation will be used to assess the types and locations of MEC at the site.

The site-specific DQOs presented below were developed following the seven-step process outlined in EPA's *Data Quality Objectives Process for Hazardous Waste Site Investigations* (EPA, 2000).

2.2.1 Step 1: State the Problem

Because facility operations may have resulted in MEC being released into the environment, an SI will be performed at the Igniter Area to aid in site management decisions. The management team consists of representatives of the Navy, EPA, and the Maryland Department of the Environment (MDE).

2.2.2 Step 2: Identify the Decision

The objective of the SI is to determine the presence or absence of MEC at the Igniter Area. The presence of MEC, however, was confirmed during the November 25, 2008 site visit. Therefore, the data that will be collected during this investigation will be about the types, locations, and quantities of MEC items. The collected information will be used by the Navy, EPA, and MDE to evaluate current site conditions and assess future action alternatives.

2.2.3 Step 3: Identify Inputs to the Decision

Current information on the site consists of data collected during the PA and a site visit conducted in November 2008. The information about MEC types, locations, and quantities collected during the SI will be used to define the areas on land and on the shoreline up to the low tide water line where MEC is present.

2.2.4 Step 4: Define the Boundaries of the Study

In the PA, the Igniter Area investigated encompassed approximately 0.01 acre—an area about 20 feet by 20 feet offshore from the now-demolished Building 1451. During the November 2008 site visit, munitions items were observed scattered on land and along the shoreline and in the shallow water. Based on these findings, the size of the investigation area has been increased to about 0.14 acre. Figure 2-1 shows the x (20 feet), y (300 feet) boundaries of the proposed investigation area. The actual extent of the area to be investigated will be determined in the field, based on factors such as accessibility and visual observations.

2.2.5 Step 5: Develop a Decision Rule

Following the collection of information during the SI, the following decisions will be made:

- Identify and recommend the area on land and along the shoreline up to the low tide water line for either a TCRA and/or NTCRA to address the presence of MEC.
- Perform a geophysical survey beyond the low tide water line in Mattawoman Creek to assess the nature and lateral extent of MEC for a possible removal action in the creek.

2.2.6 Step 6: Specify Limits on Decision Errors

Decision errors are minimal to nonexistent because the investigation consists of the identification and documentation of MEC items greater than or equal to 4 inches by 5 inches in size. Items smaller than 4 inches by 5 inches will be noted if military munitions relegated. The locations of items will be surveyed with a GPS and documented in a field notebook and a PDA. This will reduce errors in the conceptual site model and current site understanding.

2.2.7 Step 7: Optimize the Design

This investigation is part of an overall phased approach to data collection that is designed to ensure that all appropriate data are collected for management decisions by the IHIRT. The data collection and evaluation process presented in this Work Plan are part of the optimization process.

2.3 Documentation

All field information will be documented in handheld PDA devices and/or field notebooks in accordance with the standard operating procedure, *Preparing Field Log Books,* in Appendix D.

2.4 Data Evaluation

Field data collected during the MEC investigation will be used to identify the types, quantities, and locations of MEC items.

2.5 MEC Management and Contingency Plan

As part of the daily safety briefing, CH2M HILL UXO field personnel will be informed that observed MEC items shall not be disturbed. If a MEC item is found, the observer will notify the SUXOS who will inspect the item with another UXO technician. If the item is confirmed as MEC, it will be properly documented as discussed in Section 2.3. And the end of each working day, the SUXOS will notify the CH2M HILL PM of identified MEC items, sizes, and relative locations. The CH2M HILL PM in turn will notify the Navy Remedial Project Manager.

\\aphrodite\proj\USNavFaceNGCom\IndianHead\MapFiles\UXO_19\Igniter_Area\Site_Inspection_WP\Figure 2-1 Proposed Site Inspection Area.mxd

Note:
1. Site inspection consists of MEC and MC
2. Site inspection area is approximately 20 feet by 300 feet
3. The proposeed sample locations are equidistant along the shoreline. Based on the results from the MEC investigation, the proposed sediment sample locations may be revised. Sediment sample locations will be biased around identified MEC/igniter items.

Legend
- Proposed Sediment Sample Locations
- Proposed Site Inspection Area
- Igniter Area Boundary in the Preliminary Assessment
- Buildings
- Installation Boundary

N

0 75 150 300
Feet

Figure 2-1
Proposed Site Inspection Area
Site Inspection Work Plan for Igniter Area - UXO 19
NSF-IH, Indian Head, Maryland

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SECTION 3

Munitions Constituents Investigation

The MC investigation will consist of collecting four sediment samples along the shoreline at the site. Because of the collection of environmental media, the format for presenting information on the sampling and analysis protocol will follow the Uniform Federal Policy-Sampling and Analysis Plan (UFP-SAP) (IDQTF, 2005). The UFP-SAP is provided in Appendix E. The UFP-SAP contains the Field Sampling Plan (FSP), the Quality Assurance Project Plan (QAPP), and the Investigation-Derived Waste Management Plan (IDWMP). The Health and Safety Plan is provided in Appendix C.

3.1 Field Sampling Plan

Refer to Worksheets 21 and 22 in the UFP-SAP for information regarding the FSP for the Igniter Area. Sediment samples will be collected from 0 to 6 inches below the sediment surface along the shoreline with a disposal hand trowel.

3.2 Quality Assurance Project Plan

Refer to Worksheets 12, 15, 19, 20, 23, 24, 25, 26, 27, 28, 29, 30, 34, 35, and 36 in the UFP-SAP for information regarding the QAPP for the Igniter Area.

3.3 Investigation-Derived Waste Management Plan

Refer to Worksheet 14 in the UFP-SAP for information regarding the IDWMP for the Igniter Area.

3.4 Reporting

An SI report will be prepared, which will summarize the background, objectives, methods, and results of both the MEC and MC investigations. It will also include recommendations for the site. The IHIRT will use the information in the SI report to make a management decision for the path forward for the Igniter Area.

SECTION 4

References

EPA. 2000. *Data Quality Objectives Process for Hazardous Waste Site Investigations. EPA QA/G-4HW.*

IDQTF. 2005. *Uniform Federal Policy for Quality Assurance Project Plans: Evaluating, Assessing, and Documenting Environmental Data Collection and Use Programs. Part 1: UFP-QAPP Manual. Version 1.*

Malcolm Pirnie. 2005. *Final Water Area Munitions Study, Naval District Washington, Indian Head, Maryland.*

Appendix A
MEC Accident Prevention Plan

Final

Accident Prevention Plan
Site Inspection for Igniter Area - UXO 19

Naval Support Facility Indian Head
Indian Head, Maryland

Contract Task Order 0012

September 2009

Department of the Navy
Naval Facilities Engineering Command
Washington

Under the

NAVFAC CLEAN 1000 Program
Contract N62470-08-D-1000

Prepared by

Chantilly, Virginia

Contents

Acronyms and Abbreviations

ANSI	American National Standards Institute
APP	Accident Prevention Plan
ASTM	American Society for testing and Materials
CFR	Code of Federal Regulation
CIH	Certified Industrial Hygienist
CPR	cardiopulmonary resuscitation
CSP	Certified Safety Professional
EH&S	Environmental Health and Safety
H&S	Health and Safety
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSM	Health & Safety Manager
HSP	Health and Safety Plan
IAQ	Indoor Air Quality
NIOSH	National Institute for Occupational Health
OSHA	Occupational Safety and Health Administration
PPE	personal protective equipment
PTSP	Pre-Task Safety Plan
RHSM	Regional Health and Safety Manager
RPM	Remedial Project Manager
SHSO	Site Health and Safety Officer
STAC	Safety Task Analysis Card
SWO	Safe Work Observation
TBD	to be determined

SECTION 1

Signature Sheets

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Margaret Kasim, Ph.D., Project Manger

Plan Approval:

Name: Mark Orman
Title: ESH Operations Manager, NER Environmental Services
Company: CH2MHILL Inc.
Telephone: 414-847-0597

Signature: _____
Mark Orman CSP, CHMM, ARM

SECTION 2

Background Information

Background information for this project is detailed in the Health and Safety Plan (HSP), Section 1.1, Introduction as well as the project specific Work Plan, for which this Accident Prevention Plan (APP) and Health and Safety Plan (HSP) is an integral component of.

SECTION 3

Statement of Safety and Health Policy

3.1 Objective

To provide a Safe Work Place for all employees by developing and administering an overall Environmental Health and Safety (EH&S) Program. To establish written policies and procedures that serve as vehicles through which the program will be implemented.

3.2 Purpose

The purpose of this Accident Prevention Plan (APP), in conjunction with the project Health and Safety Plan (HSP) is to define the policies, procedures and requirements that must be implemented for the NAVY CLEAN Program projects and to also establish the responsibilities requirements for management, supervisors, employees, and subcontractors that may participate in the execution of the program projects. It is the intent of this APP and HSP to address applicable requirements set forth by 29 CFR 191029 29 CFR 1926, EM 385 1-1, Appendix A and CH2MHILL policies and procedures incorporated by reference, herein.

3.3 CH2MHILL Goals

The health and safety goal of the CH2MHILL program is to eliminate workplace accidents, gain worker acceptance through cooperation and training, and provide our clients with a responsible, well-trained, safety-oriented work force.

CH2MHILL considers safety the highest priority during work at all project sites and its business offices and has established a goal of **zero incidents.** Projects will be conducted in a manner which minimizes the probability of near misses, injury, illness, equipment/property damage.

3.4 Primary Environmental Health and Safety Program Functions

The primary functions of the Environmental H&S program are to:

- Define the health and safety responsibilities of CH2MHILL personnel.
- Administer the medical surveillance program.
- Prepare the site safety plans.
- Provide safety training/maintaining training records.
- Provide safety procedures and protocols to be used at project sites, shops, and offices.
- Conduct accident investigations and maintaining records.

- Verify OSHA compliance under 29 CFR 1910 and 29 CFR 1926 and EM 385 1-1, as applicable to executable contract work.
- Provide guidance and assistance with preparation of safety protocols for specific tasks.
- Promote safety and health consciousness within the company.
- Designate the functional organization of safety committees to serve corporate and project specific safety and health program needs.

3.5 Safety Organization and Responsibility

With CH2MHILL, the safety and protection of employees, clients, and the community is the first priority. This concern for safety is not restricted to field operations but extends to laboratories, the offices, and treatment facilities. If an activity or condition is unsafe, the task will not proceed until the situation is corrected.

The **Program Manager** is the primary operational safety official for the Navy CLEAN Program at CH2MHILL and has overall responsibility for ensuring that program participants adhere to the H&S policies and procedures.

The **Health and Safety Manager** (HSM) administers the safety program for CH2MHILL and reports directly to the Program Manager with regard to Navy CLEAN program matters. The HSM, or his designee, is responsible to support and assist program staff in executing the HSSE policies and procedures. The HSM also maintains secondary reporting to the Deputy Program Manager.

The **Site Health and Safety Officer** (SHSO) is responsible for administration and enforcement of the safety procedures and protocols on project sites. The SHSO is the primary safety official at the working level. The responsibility for safety is delegated and shared by project managers, alternate site safety officers, and subcontractors' supervisors. At a minimum, the SHSO must perform, or otherwise supervise the performance of, the following:

- Motivate employees and supervisors of subcontractors to adhere to CH2MHILL's safety policy in each work situation.
- Schedule, organize, and lead preparatory phase meetings prior to all activities relevant to definable features of work and have a working knowledge of the safe procedure for all jobs and tasks under their supervision. When in doubt, seek assistance prior to initiating a task. This is the only acceptable manner in which to perform the task. If the task cannot be accomplished safely, it will not be attempted.
- Explain the safety procedure involved with a task to each employee and check frequently to see that the employee understands and works as instructed.
- Allocate sufficient time for the training and coaching of all employees to insure that everyone knows the correct procedure for safely accomplishing required tasks. New employees will not be allowed to perform any work until required training is completed.

- Immediately correct unsafe conditions that involve CH2MHILL employees or subcontractors.
- Ensure that employees are outfitted with and wear personal protective equipment as specified by this plan, the HASP, EM 385-1-1, and other CH2MHILL procedures.
- Set a good safety example.
- Obtain the cooperation of employees and sub-contractors. Sub-contractor safety performance records will be verified prior to contract award and will be continually monitored during operations.
- Report all accidents, near misses and property damage in accordance with the Incident Management and Reporting Procedure.

Every Employee, regardless of job title, shares the responsibility for safety and should report any unsafe work condition without fear of reprisal. It is imperative that employees observe the following minimum requirements in order to achieve a safe and healthy workplace:

- Each employee must be familiar with this Accident Prevention Plan and the general safety rules herein.
- Each employee will practice safe procedures and follow all safety rules and regulations for the successful completion of any job task.
- All employees will wear the necessary personal protective equipment required for the job or task as specified by this plan, EM385-1-1, and other CH2MHILL procedures.
- The employee will notify the immediate supervisor of any potential hazard or unsafe work practice that could result in injury or destruction of property.
- The employee will report all accidents to an immediate supervisor regardless of whether injury or property damage resulted. This includes all near misses (accidents without injury or damage). This requirement serves to bring unsafe conditions to the attention of management.
- Each employee will be subject to contraband search for safety purposes and for the safety of fellow employees.
- Violations of published safety policies and procedures may be cause for disciplinary actions up to and including dismissal.
- All employees who are taking prescribed medications that could affect work performance or might alter the manner in which they could be treated in an emergency will so advise their supervisor prior to beginning work.

3.6 Regulator Compliance Policy

The policy of CH2MHILL is to comply with all federal, state, local, and client regulations. It is the responsibility of all personnel to perform all work in full compliance with appropriate

regulations. Safety and health personnel will immediately bring any condition regarding safety and health compliance to the attention of supervisory operating personnel.

CH2MHILL will endeavor to ensure regulatory compliance by all of its subcontractors, including, safety records, OSHA training, and medical surveillance, as applicable.

3.7 CH2MHILL Medical Surveillance

All employees who perform work at hazardous waste sites or perform emergency response will be subject to the CH2MHILL medical surveillance program. This program conforms to the requirements established by 29 CFR 1910.120/1926.65 (f) Medical surveillance and is titled SOP HSE-113, Medical Surveillance.

3.8 CH2MHILL Position Statement on Modified Work

CH2MHILL will attempt to eliminate all accidents through strict compliance with OSHA regulations and CH2MHILL H&S procedures, as well as supervisor and employee safety training, safety audits, and constant attention to safety. Should employee be injured or become ill in the course of and arising from his employment, CH2MHILL will attempt to provide modified work. Modified work ("light duty") will be made available in order to bring the injured employee back to the work environment, for the benefit of the employee and the company, whenever medically appropriate.

Employees are expected to return to modified work when medically capable. The work assigned to the injured employee will meet the restrictions set forth by the treating and/or company physician. Examples of modified work include but are not limited to office work and light shop work.

3.9 Field Safety Inspections

Weekly safety inspections will be made of the work area/workers and documented on Safe Work Observation forms (SWOs). The inspection will be made by the Site Superintendent/ Supervisor, Field Team Lead, (herein after as individual responsible for site operations) and/or the SHSO, or other designated CH2MHILL representative. These inspections are in addition to the daily inspections to be held by these individuals and designated crew leaders. Discrepancies found during inspections will be corrected as soon as practicable. Serious safety violations will be corrected immediately. Inspection records (SWOs) will be maintained in project files, and sent to regional HSSE for tracking.

Additionally, the CH2MHILL HSM or designated representative may make periodic unannounced inspections of work sites on their own discretion or at the request of an employee, supervisor, manager, or client.

3.10 First Aid

Each facility and work location must be evaluated to determine the potential requirement for medical emergencies. At a minimum, an industrial first-aid kit will be provided. An

adequate number of employees with current certification in first aid and cardiopulmonary resuscitation (CPR) will be maintained on the project sites.

The SSHO will ensure that emergency medical attention is readily available. For emergency response and remediation operations, the SSHO will establish the requirement for medical emergency response and identify an emergency medical facility with chemical contamination trauma capability. If site conditions require, a subcontract emergency medical technician (EMT) and/or the availability of ambulance service on site will be implemented.

Medical Support requirements are also defined by section 9.2.6 of this APP.

3.11 Review of Health and Safety Statistics

A designated representative from CH2MHILL will review and tabulate safety statistics as necessary:

- Workers' Compensation Experience Modification Ratings
- OSHA 300A forms

3.12 Specific Written Safety Procedures/Permits

In order to provide a safe work place and communicate specific work requirements for regulatory compliance, specific tasks are incorporated by reference to this procedure. These procedures deal with specific areas such as confined space, hot work, lock out tag out, etc.

All CH2MHILL personnel who may be subject to these procedures will receive appropriate training and will be held accountable for compliance with procedure requirements.

3.13 State, OSHA, and Other Regulations

Where state regulations differ from federal regulation cited in this plan, the more stringent regulation will apply.

3.14 Changes

Any user of this plan is welcome to recommend changes. Changes normally result from finding errors, regulatory changes, equipment modification, new equipment purchases, and changes to operation procedures or site conditions. The format for making a recommended change is:

Submit a written recommendation to the CH2MHILL HSM via your immediate supervisor (overall CH2MHILL Project Manager). The CH2MHILL HSM will review the recommendation.

After review, the CH2MHILL HSM will determine if the suggestions should be included as an amendment or new procedure in this plan. Changes to this plan will be distributed immediately upon approval.

SECTION 4

Responsibilities and Lines of Authorities

Any CH2MHILL on-site employee will have the authority to intervene and suspend work in the interest of safety policy compliance; however, following intervention, the SHSO must be contacted immediately. The SHSO will contact the Project Manager and the Regional Health and Safety Manager (RHSM).

- Mark Orman CH2MHILL RHSM
- Margaret Kasim CH2MHILL Project Manger
- TBD CH2MHILL Site Health and Safety Officer

Safety responsibilities, accountability and lines of authority are further discussed in Section 3.2 of the HSP, Project Safety Responsibilities.

4.1 Employee Competency

Employee competency, as defined by 29 CFR 1926.32(f) and for areas of executable contract work for which an employee has responsibility for, shall be established by the appropriate employer only. Competency shall be determined by employee training, total work experience, professional certification and/or educational degrees. It is the opinion of CH2MHILL HILL that the above professionals are competent in their areas of expertise with regard to the management, field execution of the contract work, or in the implementation of CH2MHILL site specific or program health & safety requirements, as applicable. Executable on-site contract work, for which there is a requirement for a competent person to oversee, will not be conducted unless a competent person is available on-site.

Employee training records are available at corporate offices, by electronic means and maintained on the project site. Depending on the size of the project crew and because of work crew dynamics and scheduling, provision of hard copy employee training and medical surveillance records within the content of this APP or HSP is impractical. CH2MHILL HILL endeavors to maintain these documents on site for review and can be provided to government officials for verification upon request.

In addition to the above, the CH2MHILL HILL HSM is a Certified Safety Professional (CSP) and meets established qualification and training criteria requirements and exhibits sufficient knowledge in health, safety and/or industrial hygiene matters to act as the responsible program official in the oversight of the CH2MHILL Health and Safety Program.

4.2 Pretask Safety and Health Analysis

Requirements for completing Pre-Task Safety and Health Analysis for performing on-site work must be, at a minimum, in accordance with sections 10.1 and 10.2 of the HSP.

4.3 Lines of Authority

Safety responsibilities, accountability and lines of authority are discussed in Section 3.2 of the HSP and 3.5, 4.0 and 4.5 of this APP. The CH2MHILL Chain of Command and Incident Reporting Process for this project are included in sections 10.3 and 10.7 of the HSP.

4.4 Non Compliance with Safety Requirements

All project personnel have the authority to stop work if it is their judgment serious injury could result from continued activity. The individual responsible for site operations or SHSO will be notified immediately if this becomes necessary. To protect the health and safety of all personnel, employees that knowingly disregard safety policies/procedures may be subject to disciplinary actions up to and including termination.

4.5 Managers and Supervisors Safety Accountability

It is the duty of the first line supervisor to motivate employees to adhere to CH2M HILL's safety policy and procedures in each work environment. A first line supervisor, for these purposes, is defined as that person designated to give immediate onsite supervision to personnel involved in a task.

All manager and supervisors will have complete knowledge of the safe procedure for all jobs and tasks under their supervision. When in doubt, they will seek assistance of the HSM, or other authorized program safety professional, prior to initiating a task. This is the only acceptable manner in which to perform the task. If the task cannot be accomplished safely, it will not be attempted.

Managers and Supervisors will:

- Explain the safety procedure involved with a task to each employee and check frequently to see that the employee understands and works as instructed.
- Allocate sufficient time for the training and coaching of all employees to ensure that everyone knows the correct procedure for safely accomplishing required tasks.
- Prevent new employees from performing any tasks until required training is completed.
- Immediately correct unsafe conditions, which involve CH2MHILL employees or contractors.
- Ensure that the employees are outfitted with and wear personal protective equipment as specified by this APP, site-specific health and safety plan, other CH2MHILL procedures or as directed by the HSM, Project Manager, SSHO.
- Set a good safety example.
- Obtain the cooperation of employees and contractors.
- Provide a safe work environment for employees and contractors.

- Confirm contractor safety performance records have been verified prior to contract award and monitor contractor performance during operations.
- Report all accidents, near misses and property damage in accordance with the Incident Management and Reporting Procedure.

Establish a safety culture, using the elements of the CH2MHILL Safety Improvement process, which promotes awareness, encourages participation and recognizes excellence.

4.6 CH2MHILL "Employee" Responsibility Requirements

Each employee is responsible for their personal safety as well as the safety of others in the area and is expected to participate fully in the ***Safety Improvement Process,*** particularly the Loss Prevention Observation (LPO) process. The employee must use all equipment provided in an appropriate and responsible manner as directed by the SSHO. All CH2MHILL personnel will follow the policies set forth in the CH2MHILL Health and Safety Plan. Site personnel concerned with any aspect of health and safety will bring it to the attention of the Project Manager or SSHO. All project personnel have the authority to stop work, if it is their judgment that serious injury could result from continued activity. The individual responsible for site operations or SSHO will be notified immediately if this becomes necessary. Personnel that knowingly disregard safety policies/procedures may be subject to disciplinary actions in accordance with their employer's established procedure.

SECTION 5

Subcontractors and Suppliers

5.1 Subcontractor/Supplier Coordination and Control

CH2MHILL subcontractors should be screened for safety performance and compliance with federal alcohol and drug testing requirements prior to being issued any contract for site work. CH2MHILL subcontractors will comply with the requirements for site safety as outlined in CH2MHILL health and safety procedures.

Full identification of all subcontractors that are or may be required to successfully execute this contract may not be fully detailed at the time that Health and Safety documents are prepared for submission or implementation. Because of the potentially dynamic and evolving nature of contract requirements and resultant project scheduling at many points during the project evolution, only partial identification of potential subcontractors who may be selected for our projects is likely. To this end, continuously updating and amending this APP or HSP with potentially selected, newly selected, or approved subcontractors would not be practical or cost effective for all parties concerned.

CH2MHILL maintains an extensive and detailed process for subcontractor procurement with the Federal Acquisition Regulations (FAR) as the primary driver. The subcontractor selection is based on scope of work pricing, qualifications, safety performance and best value evaluations

5.2 Subcontractor/Supplier Safety Responsibilities

All subcontractor employees are subject to the same training and medical surveillance requirements as CH2MHILL personnel depending on job activity. All activities involving the potential for exposure to hazardous waste materials will require medical and training certification as mandated by 29 CFR 1910.120. All subcontractor personnel will be required to sign in daily and be required to attend a daily meeting discussing operations and safety issues. All CH2MHILL employees and subcontractors will jointly complete a Pre-Task Safety Plan (PTSP) or individually complete a Safety Task Analysis Card (STAC) prior to the start of work at the site. Subcontractors will submit Activity Analyses for their work activities to the CH2MHILL SHSO or HSM for review prior to start of work. The subcontractor reports directly to the CH2MHILL Project Manager, herein referred to as Project Manager. The CH2MHILL Project Manager may designate subcontractor reportability to the CH2MHILL individual responsible for site operations. All incidents involving subcontractor employees will be reported to the CH2MHILL individual responsible for site operations and a copy of the subcontractor's injury/illness report will be submitted to the CH2MHILL Project Manager and HSM, as soon as possible, but no later than 24 hours.

CH2MHILL subcontractors are required to sign off and comply with all requirements of the CH2MHILL Site-Specific HSP, which includes this Accident Prevention Plan (APP). Plans to

address specific hazards may be added to the APP during the course of work. CH2MHILL subcontractors will be required to sign off and comply with any such supplemental plans. Subcontractors not in compliance will be immediately dismissed from the site. Subcontractors will only be allowed on MEC sites when supervised by the appropriate UXO tech crew.

Suppliers delivering various materials to the project site or providing equipment and equipment maintenance will comply with all rules and regulations specified by the owner. Supplier personnel will not be permitted into contaminated areas unless training and medical surveillance is in accordance with 29 CFR 1910.120. Contractors will not ride on tractors, forklifts or similar vehicles unless specific seats are provided. They will follow Facility hot work rules if hot work is required for vehicle or equipment maintenance. Operators of mobile equipment on site must observe all traffic rules such as speed limits and right-of-ways of pedestrians. Suppliers will only be allowed on MEC sites when supervised by the appropriate UXO tech crew.

SECTION 6

Training

CH2MHILL engages in environmental remediation, construction, and other services, and endeavors to comply with the numerous health and safety training requirements, mandated by governmental agencies, clients, and internal policies.

Personnel will be provided sufficient training to execute their jobs in a safe and healthy manner.

Direct supervisors are responsible to determine the training requirements of a task and ensure employees have the necessary training to complete the task safely. H&S personnel will assist with this determination and training.

Designated employer personnel and/or electronic databases will facilitate in maintain training records and applicable experience documentation. Where it is identified that an employee does not have sufficient training or experience to perform and assigned task, then every effort will be provide to appropriate employee with the necessary training or to replace the employee with an alternate who does have the proper training and experience until such time it is determined that the employee has the requisite criteria.

Employee training records are available at corporate offices, by electronic means and maintained on the project site. Depending on the size of the project crew, provision of hard copy employee records within the content of this APP or HSP would be impractical, but must be maintained on-site and will be provided to government officials for verification upon request.

6.1 Safety Indoctrination Subjects

Outlines of the site safety orientation for CH2MHILL and subcontractor personnel and visitors are provided in Section 1.0, 2.0, 4.0, and 9.0 of the HSP.

General topics of the site safety orientation for CH2MHILL and subcontractor personnel and visitors:

- MEC safety, staying with and obeying the UXO techs.
- Indian Head Facility Safety Rules: Areas where cell phones and radio transmissions are not allowed, facility speed limits, other base specific safety requirements.
- Boating safety for working on water
- Vegetation clearance safety, including detailed discussion of chain saw operation safety, tree felling and limbing safety, machete safety, and brush cutting safety.
- Biological controls (poison ivy is still a risk even if the leaves are gone), ticks, bees, wasps, feral dogs, mosquito bites.

- Cold stress
- Chemical hazards expected, and on which sites.

6.2 Mandatory Training and Certifications

Mandatory training and certifications are discussed in Sections 3.1 (CH2M HILL Employee Medical Surveillance and Training) and 3.3 (Field Team Chain of Command and Communication Procedures) of the HSP, Training Requirements.

All personnel entering an exclusion zone will be trained in the provisions of this Accident Prevention Plan and be required to sign the Accident Prevention Plan. All personnel entering an MEC exclusion zone will be supervised by a UXO tech and review and sign the MEC Management and Contingency Plan. UXO techs are required to have training and certifications as stated in the MEC Management and Contingency Plan.

6.3 Supervisory and Employee Safety Meetings

The CH2MHILL SHSO will conduct daily safety meetings at the start of each work shift for on site personnel and will require subcontractors to follow similar meeting procedures or participate in the CH2MHILL daily safety meetings.

SECTION 7

Safety and Health Inspections

The CH2MHILL Project Manager, individual responsible for site operations or/and the SSHO are required to perform site inspections using the designated checklists that are included herein by reference or are contained in referenced SOPs. The inspection will be made by the Project Manager, Field Team Lead, (herein after as individual responsible for site operations) and/or the SSHO, or other designated CH2MHILL representative. Discrepancies found during inspections will be corrected as soon as practicable and documented in the Loss Prevention Observation form (**Attachment 5** of the HSP). Serious inconsistencies will be corrected immediately. Inspections that identify Imminent Danger or Immediately Dangerous to Life and Health situations will require that work is immediately stopped and personnel are removed from the work area until the situation is abated, corrected or controlled to a non-hazardous condition.

The Individual Responsible for Site Operations or SSHO is responsible for conducting and preparing reports of daily inspections of work processes, site conditions, equipment conditions and submitting them for the project record, as necessary. Corrective actions resulting from identified discrepancies identified in inspections processes, will be reviewed with the Project Manager and implemented, as necessary. Copies of these reports are maintained on file at the project locations.

The CH2MHILL HSM or his designated representative may periodically conduct site visits and perform Site Safety Assessments. Additionally, the CH2MHILL HSM or designated representative may make periodic unannounced inspections of work sites at their own discretion or at the request of an employee, supervisor, manager, or client. Any discrepancies which are identified as part of these inspection processes will be addressed with the project manager overall, or may be corrected in the field if minor in nature.

As required, CH2MHILL's safety equipment will comply with appropriate OSHA, National Institute for Occupational Safety and Health (NIOSH), American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), and U.S. Coast Guard or other recognized certification organizations.

SECTION 8

Accident Reporting and Investigation

8.1 Accident Investigation

All accidents, injuries, illnesses, Near Misses will be investigated by the SSHO or other authorized H&S program designate. Upon completion of such investigations, investigation reports shall be provided to the Project Manager for review and circulation to CH2MHILL program stakeholders (HSM, Program/Deputy Program Manager, other potential CH2MHILL stakeholder interests).

The CH2MHILL HSM or authorized designee will investigate all incidents and accidents. Such accidents include, but may not be limited to those accidents, injuries or illness to the following:

- A fatal injury
- A hospitalization of three (3) or more people resulting from a single occurrence
- A weight handling equipment incidents
- A permanent total disability
- A permanent partial disability
- Property damage
- Spill
- Near Miss

The CH2MHILL HSM also request that a specific written accident investigation be conducted in case of an unusual or serious injury or accident. In general accident, injury, illness and property damage incidents with be performed in accordance with the requirements in section 10.4 of the HSP.

8.2 Exposure Data (Man-hours Worked)

The CH2MHILL HSM with assistance from designated CH2MHILL personnel tracks and maintains incident records as to Federal reporting requirements (OSHA 300 Log), as applicable to the incident.

8.3 Accident Investigations, Reports, and Logs

Incident investigations for CH2MHILL shall be in accordance with section 10.4 of the HSP. The CH2MHILL HSM, or his designee, conducts accident/incident investigations. Incident investigation reports are completed by the SSHO or other authorized designee and will be reviewed and acknowledged by the Project Manager. The report must be submitted to the Project Manager and HSM, as soon as possible, but no longer than 24 hours.

8.4 Immediate Notification of Major Incidents

CH2MHILL will immediately notify the Base contact/Navy RPM/ROICC/EIT of any major incident, including injury, fire, equipment/ property damage and environmental incident. A full report will be provided within 48 hours. Procedures to be followed in response to any project incident are detailed in the, Section 9.7, Incident Notification and Reporting,.

SECTION 9

Plans Required by the Safety Manual

9.1 Layout Plans

Site Layout Plans, drawings or sketches are included in the project specific Work Plan, for which this APP and HSP are an integral components of.

9.2 Emergency Response Plans

The emergency response preparedness and procedures are included in Section 9.0 of the HSP.

9.2.1 Procedures and Tests

It is the intention of the project team to verify that emergency response processes are in place and capable of being executed, prior to the start of field assignments. Pre-Emergency Planning procedures for this project are included in section 9.1 of the HSP. However, because response to medical or fire emergencies will be by government facility installation personnel or even by outside public responders, it may be impractical and disruptive to the "primary mission" of these responders to perform procedural response testing. Where this is the case, the designated responsible party shall verify that emergency services are available for response that contact information is appropriate and responders have knowledge of how to access to anticipated work areas.

9.2.2 Spill Plans

Spill prevention shall be conducted in accordance with the information identified in section 7.0 of the HSP, Project Hazards - Spill Containment Procedures.

9.2.3 Firefighting Plan

CH2MHILL personnel are not considered Firefighting Organizations. Only "small fires" that are containable by the use of first response fire protection equipment may be controlled by CH2MHILL personnel. All other response shall be considered "fire fighting" measures and shall be conducted by facility provided or public agency firefighting teams.

9.2.4 Posting of Emergency Telephone Numbers

Emergency contact numbers appropriate to project operations are included on page 5 of the HSP and referred to as the Emergency Contact List. Where temporary construction facilities are established at the project site, this Emergency Contact List shall be posted in a conspicuous location. Where temporary construction facilities are not allowed or provided, the list shall be available for quick reference by the individual(s) responsible for site operations and location shall also be made known to other site personnel.

9.2.5 Man overboard / Abandon Ship

(Reserved)

9.2.6 Medical Support

Medical support shall be in accordance with section 9.4 of the HSP. Location and direction to medical support facilities shall be posted in a conspicuous location where temporary construction facilities are established at the project site. Where temporary construction facilities are not allowed or provided, the list shall be available for quick reference by the individual(s) responsible for site operations and location shall also be made known to other site other personnel.

In addition, the project shall be outfitted with first aid kits of suitable size and quality (i.e. contents) to meet health and safety requirements on on-site first aid or CPR response. Personnel protective devices shall be provided such that universal precautions against Bloodborne Pathogens can be exercised while administering CPR or first aid. Eye wash stations, either portable or stationary, will be available.

An effective means of communication and to summon transportation of injured workers to medical treatment facilities. Communication devices shall be tested in the area of use to assure functionality.

When a medical facility or physician is not accessible within five (5) minutes of an injury to a group of two (2) or more employees for the treatment of injuries, at least two (2) employees on each shift shall be qualified to administer first-aid and CPR.

9.3 Plan for prevention of Alcohol and Drug Abuse

CH2MHILL substance abuse program is in accordance with section 2.2.3 of the HSP and the CH2M HILL Drug Free Workplace SOP.

9.4 Site Sanitation Plan

Toilet facilities on construction sites shall be provided as follows:

Minimum Toilet Facilities at Construction Sites

Number of Personnel	Number of Toilets
20 or fewer	One (1)
20 or greater	One (1) toilet seat and One (1) urinal per 40 workers
Greater than 200	One (1) toilet seat and One (1) urinal per 50 workers.

The above requirements do not apply to mobile crews or to normally unattended work locations if employees working at these locations have transportation immediately available to nearby toilet facilities. Separate toilet rooms for each sex need not be provided if toilet

rooms can only be occupied by one person at a time, can be locked from the inside, and contain at least one toilet seat.

Toilet facilities shall be constructed so that the occupants are protected against weather and falling objects; all cracks shall be sealed, and the door shall be tight-fitting, self-closing, and capable of being latched. Adequate ventilation shall be provided and all windows and vents shall be screened. Toilet facilities shall be constructed so that the interior is lighted. Provisions for routinely servicing and cleaning all toilets and disposing of the sewage shall be established before placing toilet facilities into operation. The method of sewage disposal and the placement location selected shall be in accordance with Federal, state, and local health regulations.

Washing facilities shall be provided at toilet facilities and as needed to maintain healthful and sanitary conditions. Each washing facility shall be maintained in a sanitary condition and provided with water (either hot and cold running water or tepid running water), soap, and individual means of drying. If it is not practical to provide running water, hand sanitizers may be used as a substitute. Washing facilities shall be in close proximity to the worksite.

Trash and garbage generated by the normal operation of site operations.

9.5 Access and Haul Road Plan

Site Access and Haul road delineations are included in the project specific Work Plan as applicable, for which this APP and HSP are an integral components of.

9.6 Respiratory Protection Plan

(Reserved)

9.7 Hazard Control Program

The CH2MHILL hazard control program is defined by the entire contents of the HSP and APP, as well as documents included by reference.

9.8 Hazard Communication Program

The Site-Specific Hazard Communication information is included in Section 2.2.5 of the HSP, Project Hazards – Hazard Communication. Hazard Communication awareness training can be accomplished by using the Chemical-Specific Training & Project-Specific Chemical Product Hazard Communication Forms contained in Attachment 3 of the HSP. MSDS information associated with this project is not included herein, for submission, due to the volume of information necessary. It is the intent of the project to compile this information for inclusion in the hardcopy version of the HSP used for implementation on the project site.

9.9 Process Safety Management

(Reserved)

9.10 Lead Abatement Plan

(Reserved)

9.11 Asbestos Abatement Plan

(Reserved)

9.12 Radiation Safety Program

The radiation exposure control measures shall be conducted in accordance with the information identified in section 2.4 Project Hazards – Radiological Hazards and Controls and section 5 Air Monitoring, of the HSP as applicable.

9.13 Abrasive Blasting

(Reserved)

9.14 Heat/Cold Stress Monitoring Program

The heat/cold stress monitoring program shall be conducted in accordance with the information identified in sections 2.2.8 and 2.2.9 of the HSP, Project Hazards - Heat Stress Monitoring and Cold Stress Monitoring, as applicable.

9.15 Crystalline Silica Monitoring Plan

(Reserved)

9.16 Night Operations Lighting Plan

No night operations will be conducted for the execution of this project.

9.17 Fire Prevention Plan

Fire prevention shall be conducted in accordance with the information identified in section 2.1.3 of the HSP, Project Hazards - Fire Prevention.

9.18 Wild Land Fire Management Plan

(Reserved)

9.19 Hazardous Energy Control Plan

(Reserved)

9.20 Critical Lift Plan

(Reserved)

9.21 Contingency for Severe Weather Plan

(Reserved)

9.22 Float Plan

The Float Plan shall be written following section 2.1.1 Project Hazards – Boating Safety, of the HSP.

9.23 Site Specific Fall Protection and Prevention Plan

(Reserved)

9.24 Demolition Plan

(Reserved)

9.25 Excavation/Trenching Plan

(Reserved)

9.26 Emergency Rescue (Tunneling)

(Reserved)

9.27 Underground Construction Fire Prevention and Protection Plan

(Reserved)

9.28 Compressed Air Plan

(Reserved)

9.29 Formwork Shoring and Removal Plan

(Reserved)

9.30 Precast Concrete Plan

(Reserved)

9.31 Lift Slab Plans

(Reserved)

9.32 Steel Erection Plans

(Reserved)

9.33 Site Safety and Health Plan (Hazwoper)

A Site Specific HSP for Hazwoper operations is a comprehensive document contained in sections 1.0-11.0 of the HSP and its attachments.

9.34 Blasting Safety Plan

(Reserved)

9.35 Diving Plan

(Reserved)

9.36 Confined Space Program

(Reserved)

SECTION 10

Risk Management Process

A detail of identified project specific hazards and hazard control measures are identified in section 2 of the HSP. A detailed Activity Hazard Analyses for each major phases or work are included in **Attachment 5** of the HSP.

Appendix B
MEC Project Quality Control Plan

Final

MEC Project Quality Control Plan
Site Inspection for Igniter Area - UXO 19

Naval Support Facility Indian Head
Indian Head, Maryland

Contract Task Order 0012

September 2009

Prepared for

Department of the Navy
Naval Facilities Engineering Command
Washington

Under the

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Prepared by

CH2MHILL

Chantilly, Virginia

Introduction

This Quality Control Plan (QCP) describes the QC approach and procedures for the Igniter Area project. The requirements and systems established in this QCP are relevant and applicable to project work performed by CH2M HILL and its subcontractors. QC Forms associated with the QC activities described herein are provided in Forms 1-1a through 1-9b.

QC Organization and Responsibilities

This section identifies key project team members and lists the QC responsibilities associated with each position and describes communication procedures that will be followed throughout the project.

Project Team Members

The organizational structure and responsibilities of the project team (refer to Figure 1-3) are designed to provide comprehensive QC for the project. Selected positions with primary QC responsibilities are described in the following paragraphs.

Project Manager

The PM for this project is Margaret Kasim. The PM is responsible for overall project activities, including cost control, schedule control, and technical quality. In addition, the PM develops the work plan and monitors project activities to ensure compliance with project objectives and scope. The PM also communicates with the Navy RPM regarding project progress.

The PM has ultimate responsibility within the project team for producing deliverables that are technically adequate, satisfactory to the client, and cost-effective. To accomplish this, the PM develops an internal project review schedule, provides written instructions and frequent guidance to the project team, and monitors budgets and schedules. The PM will work with the project team to select an internal QC review team, to coordinate review efforts, to address review comments, and to adjudicate technical issues.

SUXOS

The Senior UXO Supervisor reports to the PM and is responsible for coordinating field efforts; maintaining field equipment and materials; and accurately completing the daily documentation. As the lead field representative, the SUXOS is also responsible for performing field activities in accordance with approved work plans, policies, and field procedures. The SUXOS is responsible for implementing and administering the project QCP and communicating the onsite QC program policies, objectives, and procedures to the project personnel (including subcontractors if present) during project meetings and informal discussions.

Corporate UXO Safety Manager

The Corporate UXO Safety Manager (UXOSM) for this project is Dan Young. The UXOSM reviews and approves the HASPs for MEC-related operations. The UXOSM serves as the point of contact for the UXOSO for any MEC health- or safety-related issues, and may

conduct MEC-related project audits. He is also responsible for investigating MEC-related accidents should any occur during the course of the project.

Project Communication

One of the most critical elements in performing any type of project is to establish and maintain lines of communication among all project personnel. Before field activity begins, a project team meeting will be held to review the concept, assumptions, objectives of the field approach, and project objectives. During the field investigation phase of the project, the field team will meet daily to review the status of the project and to discuss technical and safety issues. When significant problems or decisions requiring additional authority occur, the SUXOS can immediately contact the PM for assistance.

All communications with the Navy RPM will be channeled through the CH2M HILL PM, who will be informed on a daily basis of field activities being conducted.

Definable Features of Work

Quality control will be monitored through the Definable Features of Work (DFOW) as outlined in this section.

Definable Features of Work

The DFOWs for this project are divided into activities related to planning, field operations, and final project reports and closeout:

1. **Planning**
   - Pre-Mobilization Activities: document management and control, data management and subcontracting
   - Preparing WP
2. **Field Operations**
   - Site Preparation: mobilization
   - Surface items inspection
3. **Final Project Reports and Closeout**
   - Draft and Final Reports: preparing and obtaining approval
   - Data archiving and project closeout

Quality Control Audit/Verification

The CH2M HILL project manager is responsible for ensuring that quality control audit/verification of the procedures and activities of the DFOW is performed. Each QC audit/verification is important for obtaining a quality product and meeting the project objectives. Table 1 presents each DFOW auditing procedure and responsibilities. The PM or a designee is to verify that procedures conform to applicable specifications stated in this WP or other applicable guidance. Identified deficiencies are to be communicated to the responsible individual and documented in the project files. Corrective actions are to be verified by the PM and recorded in the project files.

Continual Improvement

Project staff at all levels are encouraged to provide recommendations for improvements in established work processes and techniques. The intent is to identify activities that are compliant but can be performed in a more efficient or cost-effective manner. Typical quality improvement recommendations include identifying an existing practice that should be improved and/or recommending an alternate practice that provides a benefit without compromising prescribed standards of quality. Project staff are to bring their recommendations to the attention of project management through verbal or written means. However, deviations from established protocols are not to be implemented without prior written approval by the PM.

Project File

The PM will establish and maintain a project file. Part of the file will be in paper format and part in digital format. The files will be maintained in the CH2M HILL office. The purpose of these files is to maintain a complete set of all documents, reports, certifications, and other records that provide information on project plans and project activities.

The files (in either paper or digital format) will include copies of the following:

- Qualifications and training records of all site personnel
- Submittals (including work plans, safety plans, QC reports, etc.)
- Schedule and progress reports
- Conversation logs
- Meeting minutes and agenda
- Photo documentation
- Site maps
- Daily work activity summary reports, which may include:
  - Weekly QC Report
  - Daily Health and Safety Report
  - Reports on any emergency response actions (Only Navy EOD will make physical contact with MEC)
  - Incident reports

Personnel Qualifications and Training

The Site Manager will maintain records documenting the required qualifications, training, and certifications for each site worker. The Site Manager will maintain records of site-specific and routine training for personnel and visitors, as required by these project plans. These records will be maintained onsite for audit purposes.

TABLE 1
Definable Features of Work Auditable Functions and Responsibilities
MEC Project Quality Control Plan Igniter Area - UXO 19
NSF-IH, Indian Head, Maryland

Definable Feature of Work with Auditable Function	Responsible Person(s)[1]	Audit Procedure[2]	Freq. of Audit	Pass/Fail Criteria	Action if Failure Occurs
Planning					
Subcontracting	Project Manager	Verify subcontractor qualifications, training, and licenses.	O	Subcontractors' qualifications, training, and licenses are up to date and acceptable.	Ensure subcontractor provides the qualifications, training, and licenses or change subcontractor.
Technical and Operational approach	Project Manager	Verify technical and operational approaches have been agreed on by the project team.	O	Technical and operational approaches have been agreed on by project team and incorporated into the SWP.	Do not proceed with field activities until criterion is passed
Survey Work Plan	Project Manager	Verify Work Plan has been prepared and approved.	O	WP has been approved by Navy	Do not proceed with field activities until criterion is passed.
Field Operations					
Site preparation	SUXOS	Verify equipment has been inspected and tested.	O	Equipment passes inspection and testing.	Proceed only with activities for which equipment has passed inspection and testing.
Site preparation	SUXOS	Verify communications and other logistical support are coordinated.	O	Communications and other logistical support are coordinated.	Do not proceed with field activities until criterion is passed.
Site preparation	SUXOS	Verify site-specific training is performed and acknowledged.	O	Site-specific training is performed and acknowledged	Do not proceed with field activities until criterion is passed.
Surface Items Inspection	SUXOS	Verify surface items inspection is performed IAW Work Plan		Surface items inspection is performed IAW Work Plan	
Final Project Reports and Closeout					
Report preparation and approval	Project Manager	Verify documentation of the field actions are accurate and complete.	O	Documentation of the field actions are accurate and complete.	Ensure that documentation of the field actions are accurate and complete.

IAW = in accordance with Frequency: O = Once D = Daily E = Each occurrence W = Weekly

[1] The responsible person (if other than the PM) is the individual with whom the PM will coordinate with to ensure compliance with requirements and to verify that any necessary follow-up actions are taken.

Form 1-1a: Field Change Documentation

Date: _____

Page _____ **of** _____

Project:

Project No.:

Applicable Document:

Change Description:

Reason for change:

Recommended disposition:

Impact on present and completed work:

Final disposition (NSF Indian Head only)

Request by:

CH2M HILL Project Manager: _____ Date:_____

Approvals:

NSF Indian Head Project Manager: _____ Date:_____

Form 1-2a: Corrective Action Request Form

Originator: _____ Date: _____

Person responsible for replying: _____

Description of problem and when identified: _____

_____

Sequence of Corrective Action (CA): (Note, if no responsible person is identified, submit this form directly to the PM)

State date, person, and action planned:

_____

_____

_____

_____

_____

CA initially approved by: _____ Date: _____

Follow-up date: _____

Final CA approval by: _____ Date: _____

Information copies to:

Responsible person:_____

Field Team Leader:_____

Project Manager: _____

FORM 1-1b

Preparatory Inspection Checklist
(Part I)

Contract No.:

Date: _____

TITLE AND NO. OF TECHNICAL SECTION: _____

A. Planned Attendees:

	Name	Position	Company
1)			
2)			
3)			
4)			
5)			
6)			
7)			
8)			
9)			
10)			
11)			

B. Submittals required to begin work:

	Item	Submittal No.	Action Code
1)			
2)			
3)			
4)			
5)			
6)			
7)			
8)			

I hereby certify, that to the best of my knowledge and belief, that the above required materials delivered to the job site are the same as those submitted and approved.

_____

Contractor Quality Control Systems Manager

FORM 1-1b (Continued)

Preparatory Inspection Checklist
(Part I)

Contract No.:

Date: _____

C. Equipment to be used in executing work:

1) _____
2) _____
3) _____
4) _____
5) _____

D. Work areas examined to ascertain that all preliminary work has been completed:

_____
_____

E. Methods and procedures for performing Quality Control, including specific testing requirements:

_____
_____

The above methods and procedures have been identified from the project plans and will be performed as specified for the Definable Feature of Work.

_____
Contractor Quality Control Systems Manager

FORM 1-1b (Continued)

Preparatory Inspection Checklist
(Part II)

A. Persons in attendance: See Meeting Attendance Sheet (attached)

B. Because of mutual understanding developed during review of preparatory outline and Contract Requirements: (Contract items not specifically covered during the preparatory inspection conference are assumed to be in strict conformance with the contract requirements.)

The items noted above constitute a memorandum of mutual understanding and will be performed as planned and specified.

MEC QCS

Technical Representative

FORM 1-2b

Initial Phase Check List

Contract No.:

Date: _____

Title and No. of Technical Section: _____

_____

_____

Description and Location of Work Inspected: _____

A. Key Personnel Present:

Name	Position	Company

B. Materials being used are in strict compliance with the contract plans and specifications: Yes ___ No ____

If not, explain: _____

_____

_____

_____

C. Procedures and/or work methods witnessed are in strict compliance with the contract specifications: Yes No ___

If not, explain: _____

_____

_____

_____

D. Workmanship is acceptable: Yes ____ No ____

State where improvement is needed: _____

_____

_____

_____

E. Workmanship is free of safety violations: Yes ____ No ____

If no, corrective action taken: _____

_____

_____

_____

_____

MEC QCS

FORM 1-3b

FOLLOW-UP CHECKLIST

Date:
Contractor:
Contract No:

Y=YES; N=NO; SEE REMARKS BLANK=NOT APPLICABLE	
WORK COMPLIES WITH CONTRACT AS APPROVED IN INITIAL PHASE	

IDENTIFY DEFINABLE FEATURE OF WORK, LOCATION, AND LIST PERSONNEL PRESENT

TESTING PERFORMED & WHO PERFORMED TEST (Include number of samples and/or tests taken)

QA Representative_____ **Date** _____

MEC QCS_____ **Date** _____

FORM 1-4b

Final Inspection Checklist
(Part I)

DATE: _____

CONTRACT NO.:_____

Project / Area of Inspection: _____

A. DEFINABLE FEATURES OF WORK: Status of Inspection:

I hereby certify, that to the best of my knowledge and belief, that the work inspected is complete and all materials and equipment used and work performed were completed in accordance with plans submitted and approved.

_____

CONTRACTOR QUALITY CONTROL SYSTEMS MANAGER

B. Final Acceptance is Approved, Subject to the Correction of the Punchlist Items Below:

FORM 1-4b (Continued)

Final Inspection Checklist
(Part I)

DATE:_____

CONTRACT NO.:

A. Persons in Attendance: See Meeting Attendance Sheet (attached)

B. Resolution of Punchlist Items:

The items noted above constitute a memorandum of mutual understanding and work has been performed as planned and specified.

MEC QCS

TECHNICAL REPRESENTATIVE

FORM 1-4b (Continued)

Final Inspection Checklist
(Part II)

MEETING ATTENDANCE LIST

Meeting:		Date:
Name	**Organization**	**Phone Number**

FORM 1-5b

INSPECTION SCHEDULE AND TRACKING FORM

Project:	**Project Manager:**	**MEC QCS:**

		Preparatory		**Initial**		**Follow-Up**		**Completion**		
Reference Number	Definable Feature of Work	Date Planned	Actual Date	Date Planned	Actual Date	Planned Begin/End	Actual Dates	Planned Begin/End	Actual Dates	Status

Form 1-6B (continued)
CORRECTIVE ACTION REQUEST

PART B: CORRECTIVE ACTION

(17)PROPOSED CORRECTIVE ACTION/ACTION TAKEN: NOTE: SUPPORTING DOCUMENTATION MUST BE LISTED ON THE BACK OF THIS FORM AND ATTACHED.

(18)PART B COMPLETED BY (NAME & TITLE): SIGNATURE: DATE:	(19)QC CONCURRENCE:

PART C: CORRECTIVE ACTION VERIFICATION

(20)CAR VERIFICATION AND CLOSE-OUT: (CHECK ONLY ONE & EXPLAIN STIPULATIONS, IF ANY)
- ☐ APPROVED FOR CLOSURE WITHOUT STIPULATIONS
- ☐ APPROVED FOR CLOSURE WITH FOLLOWING STIPULATIONS

COMMENTS/STIPULATIONS:

(21)CLOSED BY (PRINTED NAME & TITLE):

SIGNATURE: DATE:

Form 1-6B (continued)
CORRECTIVE ACTION REQUEST

CORRECTIVE ACTION REQUEST (CAR) INSTRUCTION SHEET

(1) **MEC QCS**: Verify that the total number of pages includes all attachments.

(2) **MEC QCS**: Fill in CAR number from CAR log.

(3) **MEC QCS**: Fill in appropriate priority category. **High** priority indicates resolution of deficiency requires expediting corrective action plan and correction of deficient conditions noted in the CAR and extraordinary resources may be required due to the deficiency's impact on continuing operations. **Normal** priority indicates that the deficiency resolution process may be accomplished without further impacting continuing operations.

(4) **CAR Requestor**: Fill in date CAR is initiated.

(5) **CAR Requestor**: Identify project name, number, CTO, and WAD.

(6) **CAR Requestor**: Identify Project Manager

(7) **CAR Requestor**: Identify CQC System Manager.

(8) **CAR Requestor**: Identify project organization, group, or discrete work environment where deficiency was first discovered.

(9) **CAR Requestor**: Identify line manager responsible for work unit where deficiency was discovered.

(10) **MEC QCS**: Identify responsible manager designated to resolve deficiency (this may not be work unit manager).

(11) **CAR Requestor**: Identify source of requirement violated in contract, work planning document, procedure, instruction, etc; use exact reference to page and, when applicable, paragraph.

(12) **CAR Requestor**: Identify problem as it relates to requirement previously stated. Identify location of work activities impacted by deficiency.

(4) **MEC QCS**: Identify if Corrective Action Plan (CAP) is required. CAP is typically required where one or more of the following conditions apply: CAR priority is **High**; deficiency requires a rigorous corrective action planning process to identify similar work product or activities affected by the deficiency; or deficiency requires extensive resources and planning to correct the deficiency and to prevent future recurrence.

(14) **MEC QCS**: Identify date by which proposed corrective action is due to QC for concurrence.

Form 1-6B (continued)
CORRECTIVE ACTION REQUEST

(15) **MEC QCS**: Sign and date CAR and forward to responsible manager identified in (10) above.

(16) **Responsible Manager**: Initial to acknowledge receipt of CAR.

(17) **Responsible Manager**: Complete corrective action plan and identify date of correction. Typical corrective action response will include statement regarding how the condition occurred, what the extent of the problem is (if not readily apparent by the problem description statement in [12]), methods to be used to correct the condition, and actions to be taken to prevent the condition from recurring. If a CAP is required, refer to CAP only in this section.

(18) **Responsible Manager**: Sign and date corrective action response.

(19) **MEC QCS**: Initial to identify concurrence with corrective action response from responsible manager.

(20) **MEC QCS**: Check appropriate block to identify if corrective action process is complete so that CAR may be closed. Add close-out comments relevant to block checked.

(21) **MEC QCS**: Indicate document closeout by signing and dating.

FORM 1-7b

CORRECTIVE ACTION PLAN

Attach clarifications and additional information as needed. Identify attached material in appropriate section of this form.

PART A: TO BE COMPLETED BY PROJECT MANAGER OR DESIGNEE

(1)PROJECT:		
(2)PROJECT MANAGER:	(3)MEC QCS:	
(4)CAR NO(S) AND DATE(S) ISSUED:		
(5)DEFICIENCY DESCRIPTION AND LOCATION:		
(6)PLANNED ACTIONS	(7)ASSIGNED RESPONSIBILITY	(8) COMPLETION DUE DATE
(9)PROJECT MANAGER SIGNATURE:		DATE:

PART B: TO BE COMPLETED BY MEC QCS OR DESIGNEE

(10)CAP REVIEWED BY:	DATE:
(11)REVIEWER COMMENTS:	
(12)CAP DISPOSITION: (CHECK ONLY ONE AND EXPLAIN STIPULATIONS, IF ANY) ☐ APPROVED WITHOUT STIPULATIONS ☐ APPROVED WITH STIPULATIONS ☐ APPROVAL DELAYED, FURTHER PLANNING REQUIRED COMMENTS:	
(4)MEC QCS SIGNATURE:	DATE:

FORM 1-6b

CORRECTIVE ACTION REQUEST

(2)CAR #:	(3)PRIORITY: □HIGH □NORMAL	(4)DATE PREPARED:

PART A: NOTICE OF DEFICIENCY

(5)PROJECT:		
(6)PROJECT MANAGER:	(7)MEC QCS:	
(8)WORK UNIT:	(9)WORK UNIT MANAGER:	
(10)ISSUED TO (INDIVIDUAL & ORGANIZATION):		
(11)REQUIREMENT & REFERENCE:		
(12)PROBLEM DESCRIPTION & LOCATION: (4)CAP REQUIRED? □YES □NO (14)RESPONSE DUE:		
(15)ISSUED BY (PRINTED NAME & TITLE): SIGNATURE: DATE:		(16)MANAGEMENT CONCURRENCE:

FORM 1-8b

DAILY QUALITY CONTROL REPORT

Contract No.: _____

Date: _____Task Order No.:_____Report No:_____

LOCATION OF WORK: _____
DESCRIPTION: _____ _____
WEATHER: (CLEAR) (FOG) (P.CLOUDY) (RAIN) (WINDY)
TEMPERATURE: MIN °F MAX °F

1. Work performed today:

_____
_____

2. Work performed today by CH2MHILL subcontractor(s):

_____
_____

3. Preparatory Phase Inspections performed today (include personnel present, specification section, drawings, plans, and submittals required for definable feature of work):

_____
_____

4. Initial phase Inspections performed today (include personnel present, workmanship standard established, material certifications/test are completed, plans and drawings are reviewed):

_____
_____

5. Follow-up Phase Inspections performed today (include locations, feature of work and level of compliance with plans and procedures):

_____
_____
_____

6. List tests performed, samples collected, and results received:

_____
_____
_____

7. Verbal instructions received (instructions given by Government representative and actions taken):

_____
_____
_____

8. Non-conformances/deficiencies reported:

_____
_____
_____

9. Site safety monitoring activities performed today:

_____
_____

10. Remarks:

_____
_____
_____
_____

CERTIFICATION: *I certify that the above report is complete and correct and that I, or my representative, have inspected all work identified on this report performed by CH2M HILL and our subcontractor(s) and have determined to the best of my knowledge and belief that noted work activities are in compliance with the plans and specifications, except as may be noted above.*

MEC QCS (or designee) Signature: _____

Form 1-9b

Document Release and Review

Client:	Author:						Submittal Register Item No.:		Date:
Document Title:							Revision:	D.O.#	WAD#
Reviewer (*print)*	Reviewer initial & date	Technical	Project Manager	CQC System Mgr.	Health & Safety	Editorial	Chemistry	Construction	Reviewer Comments Resolved (*Signature & Date)*
Same as Technical Reviewer Above		X	Topic outline with objectives for each section submitted prior to Rev. A						

Program Reviewer's Acceptance for Document Submittal	Signature	Yes	No
1) A 4025 (as applicable) prepared and submitted with document?			
2) Technical Conclusions adequately supported by text and data?			
3) Tables and Figures are in the proper format and checked and approved?			
4) The Table of Contents consistent with text information?			
5) Technical Reviewers are qualified and accepted by Technical Manager?			
6) A document Distribution List been prepared and submitted with document?			

Approval: _____
Project Manager

Approval: _____
MEC QCS

Recommended
4025 Code _____

Appendix C
Health and Safety Plan

Final

Health and Safety Plan
Site Inspection for Igniter Area - UXO 19

Naval Support Facility Indian Head
Indian Head, Maryland

Contract Task Order 0012

September 2009

Department of the Navy
Naval Facilities Engineering Command
Washington

Under the

NAVFAC CLEAN 1000 Program
Contract N62470-08-D-1000

Prepared by:

Chantilly, VA

Prepared By:

Mark Orman _____ _____

Responsible Health and Safety Manager Date

Approved By:

_____ _____

Project Manager Date

Client Acceptance:

_____ _____

Responsible Authority Date

CH2M HILL HEALTH AND SAFETY PLAN

This Health and Safety Plan (HSP) will be kept on the site during field activities and will be reviewed as necessary. The plan will be amended or revised as project activities or conditions change or when supplemental information becomes available. The plan adopts, by reference, the Enterprise-wide Core Standards (CS) and Standard Operating Procedures (SOPs), as appropriate. In addition, this plan adopts procedures in the project Work Plan. The Safety Coordinator (SC) is to be familiar with the CSs and SOPs and the contents of these instructions. CH2M HILL's personnel and subcontractors must be trained on this plan and sign Attachment 1.

Project Information and Background

PROJECT NO: CLEAN 1000 CTO-0012

CLIENT: Naval Facilities Engineering Command Washington

PROJECT/SITE NAME: Naval Support Facility Indian Head (NSF-IH) Igniter Area (UXO 19)

SITE ADDRESS: Indian Head, Maryland

CH2M HILL PROJECT MANAGER: Margaret Kasim

CH2M HILL OFFICE: Chantilly, VA

DATE HEALTH AND SAFETY PLAN PREPARED: 1/19/2009

DATE(S) OF SITE WORK: February through December 2009

SITE BACKGROUND AND SETTING: NSF-IH is a military facility consisting of the main area (on the Cornwallis Neck Peninsula) and the Stump Neck Annex, near Indian Head, in northwestern Charles County, Maryland, approximately 25 miles southwest of Washington D.C. The mission of NSF-IH is to provide primary technical capability in energetics for all warfare centers through engineering, fleet and operational support, manufacturing technology, limited production, and industrial base support. Secondary technical capability is provided through research, development, test and evaluation for energetic materials, ordnance devices and components, and related ordnance engineering standards including chemicals, propellants and their propulsion systems, explosives, pyrotechnics, warhead, and simulators.

Igniter Area (UXO 19)

The Igniter Area is approximately 0.01-acre in size and is located along the southeastern shoreline of the Indian Head Main Installation peninsula in a small promontory known as "Thieves Point." The promontory is a wetland and considered a species protection area. The initial site boundary, as provided by the Base, covered the entire promontory shoreline,

which was about 0.028 acres. The boundary was changed after further review during the Preliminary Assessment (PA).

A small pile of igniters, the origin of which is unknown, was found at this site during an extremely low tide in 1996 or 1997. Several of the igniters were reportedly picked up and disposed of, but it is unknown if the disposal of the remaining igniters occurred. The igniters were described to be electric primers or electrically-primed rifle cartridges approximately .50 caliber in size. Additional ordnance items seen along the shoreline during a low tide event appear to be float signals, MK 1 MOD 1 or MK 2 MOD 0, and a 250, 500 or 750 pound old style bombs. The origin of the igniters, dates of use, or date of disposal are unknown. There is one structure nearby, Building 1451, which is currently vacant.

Based on the PA, further investigation was recommended for munitions and explosives of concern (MEC) and munitions constituents (MC). No sampling has been conducted at this site. The site is a known MEC area because of the items found. Munitions constituents include lead styphnate; the filler material used in M2 and M60 igniters, and smoke composition; the filler material used in MK 1 MOD 1 and MK 2 MOD 0 float signals. The objective of the SI is to verify the presence of both MEC and MC. A shoreline visual survey will be conducted to identify any surface MEC. Four sediment samples will be collected adjacent to observed munitions. A water based geophysical survey will be conducted to identify potential underwater MEC.

Site Map

This page is reserved for a Site Map.

Note locations of Support, Decontamination, and Exclusion Zones; site telephone; first aid station; evacuation routes; and assembly areas.

Emergency Contacts

24-hour CH2M HILL Serious Incident Reporting Contact/Pager – 720-286-4911

If injured on the job, notify your supervisor and then call 1-866-893-2514 to contact CH2M HILL'S Occupational Nurse

Medical Emergency Facility Medical Response #: 301-744-4333 (if in restricted area, use red call boxes – no cell phone usage in restricted area!) Off Base# 911	**CH2M HILL- Medical Consultant** Fred Kohanna, MD, MBA, FACOEM Health Resources 600 West Cummings Park, Suite 3400 Woburn, Massachusetts 01801 781-935-8581 After Hours 800/350-4511 (After hours calls will be returned within 20 minutes)
Urgent Care Facility Bryans Road Urgent Care 3059 Marshall Hall Road, Bryans Road MD 301/375-8080	**CH2M HILL Director Security Operations** Thomas Horton/DEN 720/273-3100 (cell) or 720/286-0022 (office)
Fire/Spill Emergency Facility Fire Response #:301-744-4333 Local Fire Dept #: 911	**Responsible Health and Safety Manager (RHSM)** Name: Mark Orman Phone:(414) 847-0597
Security & Police – 911 Facility Security #:301-744-4333 (if in restricted area, use red call boxes – no cell phone usage in restricted area!) Local Police #:911	**Human Resources Department** Name: Sherri Huntley Phone: 703-376-5000
Utilities Emergency Phone Numbers On base: Contact Nick Carros, NSF-IH Phone: 301-744-2263	**Worker's Compensation:** Contact Business Group HR dept. to have form completed or contact Jennifer Rindahl after hours: (720)891-5382
Safety Coordinator (SC) Name: TBD Phone: TBD	**Media Inquiries Corporate Strategic Communications** Name: John Corsi Phone: (720) 286-2087
Project Manager Name: Margaret Kasim Phone: 703/376-5154	**Automobile Accidents**: Rental: Linda Anderson/COR 720/286-2401 CH2M HILL owned vehicle: Linda George 720-286-2057
Federal Express Dangerous Goods Shipping Phone: 800/238-5355	**CH2M HILL Dangerous Goods Shipping** Phone: 800/255-3924

Facility Alarms: Since CH2M HILL personnel will not always be working in close proximity to each other, hand signals, voice commands, air horns, and two-way radios will comprise the mechanisms to alert site personnel of an emergency.
All onsite contractors must read and sign the "Hazard Control Briefing for Environmental Division Visitors IHDIVNAVSURFAWARCEN", and attend the "Pre-construction Safety Briefing" from the Safety Department prior to commencing work.

Evacuation Assembly Area(s): In the event that the site must be evacuated, all personnel will immediately stop activities and report to a safe place of refuge at the support zone area. The safe place of refuge may also serve as the telephone communication point, as communication with emergency response agencies may be necessary. A telephone communication point and safe place of refuge will be determined prior to the commencement of site activities at each site.

Facility/Site Evacuation Route(s): TBD before start of work.

Directions to Local Hospital

Local Hospital **Hospital Phone#:** 301-609-4000

Civista Medical Center
701 East Charles St., LaPlata MD 20646

Start at : Indian Head, MD

1) Head **east** on **Strauss Ave** toward **Ward Rd** 0.6 mi
2) Continue on **MD-210** for 2 mi
Turn **right** at **Hawthorne Rd/MD-225**. Continue to follow MD-225 for 10.9 mi
Turn **right** at **Kent Ave.** go 0.7 mi
Turn **left** at Charles **St/MD-6** Destination will be on the right go 0.2 mi

1.0 Tasks to be Performed under this Plan

1.1 Description of Tasks

Refer to project documents (i.e., Work Plan) for detailed task information. A health and safety risk analysis (Table 1) has been performed for each task and is incorporated in this plan through task-specific hazard controls and requirements for monitoring and protection. Tasks other than those listed below require an approved amendment or revision to this plan before tasks begin. Refer to Section 8.2 for procedures related to "clean" tasks that do not involve hazardous waste operations and emergency response (Hazwoper).

1.1.1 Hazwoper-Regulated Tasks

- Visual surveying for MEC
- Soil/sediment sampling at select locations
- Boat geophysical surveys for MEC

1.1.2 Non-Hazwoper-Regulated Tasks

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

TASKS	CONTROLS
• No non-hazwoper regulated tasks currently scoped. • • • • •	• Brief on hazards, limits of access, and emergency procedures • Post contaminant areas as appropriate (refer to Section 8.2 for details) • Sample and monitor as appropriate (refer to Section 5.0)

1.2 Change Management

PROJECT HS&E Change Management Form

*This evaluation form should be reviewed on a **continuous** basis to determine if the current site health and safety plan adequately addresses ongoing project work, and should be completed whenever new tasks are contemplated or changed conditions are encountered.*

Project Task:	Indian Head igniter area shoreline visual survey, sediment sampling, and boat geophysical survey of UXO site 19.	Project/Task Manager: **Margaret Kasim**
Project Number:	380785.PP.XO	Project Name: Igniter Area visual survey, sediment sampling and boat geophysical survey.

	Evaluation Checklist	Yes	No
1.	Have the CH2MHILL staff listed in the original HASP changed?		
2.	Has a new subcontractor been added to the project?		
3.	Is any chemical or product to be used that is not listed in Attachment 2 of the plan?		
4.	Have additional tasks been added which were not originally addressed in Section 1.1 of the plan?		
5.	Have new contaminants or higher than anticipated levels of original contaminants been encountered?		
6.	Have other safety, equipment, activity or environmental hazards been encountered that are not addressed in Section 2.1 of the plan?		

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

- Confirm that staff's medical and training status is current – check training records at: http://www.int.ch2m.com/hands (or contact your regional SPA), and confirm subcontractor qualifications.
- Confirm with the project KA that subcontractor safety performance has been reviewed and is acceptable
- Confirm with H&S that subcontractor safety procedures have been reviewed and are acceptable.

If the answer is "YES" to Questions 4-6, an HSP revision MAY BE NEEDED.

TABLE 1 HAZARD ANALYSIS
(Refer to Section 2.0 for Hazard Controls)

POTENTIALHAZARDS	Project Activities									
	Boat Geophysical Surveying	**Land Visual Surveying**	**Sediment Sampling**							
Biological Hazards		X	X							
Boating	X		Potential							
Chemical Hazard-Dermal/Inhalation		X								
Field Vehicles	X	X								
Hand & Power Tools			X							
Lead		X	X							
Manual Lifting	X	X	X							
MEC/MPPEH	X	X	X							
Noise	X									
Visible Lighting	X	X	X							
Work Over Water	X		Potential							

2.0 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 RHSM for clarification.

The health and safety hazards posed by field activities have been identified for each project activity and are provided in the Hazard Analysis Table (Table 1). Hazard control measures for project-specific and general H&S hazards are provided in 2.1 and 2.2 of this section.

In addition to the controls specified in this section, Project-Activity Self-Assessment Checklists are contained in Attachment 4. 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 RHSM. The self-assessment checklists, including documented corrective actions, should be made part of the permanent project records.

Applicable project activity self-assessment checklists (see Attachment 4) shall be completed weekly by a CH2M HILL representative during the course of the project depending on the work performed at the time.

2.1 Project-Specific Hazards

Munitions and Explosives of Concern (MEC) (Reference CH2M HILL SOP HSE 610, Explosives Usage and Munitions Response [MR])

- MEC avoidance will be practiced during all site visits and during the geophysical surveys. MEC avoidance will be provided by one UXO Technician III.
- No underwater work is authorized.
- All work will be performed in accordance with the approved Work Plan.
- Contact with MEC or MPPEH is prohibited.

2.1.1 Boating Safety

- CH2M HILL employees will only pilot small boats in territorial waters or near coastlines on navigable waters. Commercial boating services will be conducted by professional marine operators and must be subcontracted.
- CH2M HILL employees who intend to operate a small boat during the course of the project shall first demonstrate to a designated Qualified Boat Operator that they are

experienced in operating boats similar to those used for the project, that they possess basic skill necessary to operate, maneuver, troubleshoot basic mechanical problems that may occur, and that they are knowledgeable of the requirements related SOPs, and the project Health and Safety Plan. The demonstration shall take the form of an operational sea trial developed by the Qualified Small Boat Trainer. A sea trial checklist is included in the Safety Coordinator Implementation Package (SCIP).

- Watercraft shall be licensed and identified in accordance with state or other applicable regulations.
- The boat operator shall complete a float plan prior to leaving the dock or shore. A copy of the float plan shall be left with a reliable individual or marina staff who will notify the coast guard if the vessel does not return according to the float plan schedule.
- Check all safety systems such as brakes, windshield wipers and lights. Tires must be in good condition and properly inflated. Make sure windshields and lights are free of obstructions such as dirt.
- U.S. Coast Guard-approved Type II personal flotation devices (PFDs), or life jacket, shall be provided for each employee and will be worn.
- PFDs will be inspected before and after each use. Defective equipment will not be used.
- A minimum of one Type IV ring buoy with 90 feet of 3/8-inch solid-braid polypropylene (or equal) rope will be provided for emergency rescue.
- The vessel shall be equipped with fire extinguishers or a fixed fire extinguishing systems.
- Safe means of boarding or leaving a boat or a platform will be provided to prevent slipping and falling.
- All gasoline engines, except outboard motors, installed in a boat must have an approved backfire flame arrestor (backfire preventor) fitted to the carburetor.
- The boat shall carry at least one operational air horn or similar sound signaling device.
- Visual distress signals shall be maintained onboard (e.g., flare, distress flag, distress light).
- Work requiring the use of a boat will not take place at night or during inclement weather.
- The boat must be operated according to U.S. Coast Guard regulations (speed, lighting, right-of-way, etc.).
- The engine should be shut off before refueling the generator; do not smoke while refueling.
- Sampling with a line/rope shall be done with the engine in neutral, or by other means, that effectively prevents propeller entanglement.

- Sampling line/rope that is loose on the deck shall be kept to a minimum, caution must be exercised to avoid entanglement, and the line/rope shall not be looped or wrapped around any part of a person.
- Marine Distress Communications information shall be posted near the vessel radio or telephone.
- If conditions of low or limit visibility is possible, boats shall be equipped with lighting (navigation and anchor).

2.1.2 Field Vehicles

- Field vehicles may be personal vehicles, rental vehicles, fleet vehicles or project vehicles.
- Emergency kits are available in all NWR offices for personal and rental vehicles. Fleet vehicles are equipped with emergency supplies. It is a project responsibility to equip all project vehicles with emergency equipment.
- Maintain both a First Aid kit and Fire Extinguisher in the field vehicle at all times.
- Utilize a rotary beacon on vehicle if working adjacent to active roadway.
- Car rental must meet the following requirements:
- Dual air bags
- Antilock brakes
- Be midsize or larger.
- Familiarize yourself with rental vehicle features.
- Mirror adjustments
- Seat adjustments
- Cruise control features, if offered.
- Pre-program radio stations.
- Always wear seatbelt while operating vehicle.
- Adjust headrest to proper position.
- Tie down loose items if utilizing a van.
- Pull off the road, put the car in park and turn on flashers before talking on a mobile phone.
- Close car doors slowly and carefully. Fingers can get pinched in doors or the truck.
- Park vehicle in a location where it can be accessed easily in the event of an emergency. If not possible, carry a phone.

2.1.3 Manual Lifting

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

- Back injuries are the leading cause of disabling work and most back injuries are the result of improper lifting techniques or overexertion. Office or field tasks and activities involving manual lifting are to be identified and a program implemented to assist employees to mitigate the risks associated with manual lifting.
- When possible, the task should be modified to minimize manual lifting hazards.
- Effectiveness of manual handling control measures will be evaluated during assessments (HSE-114, Office & Warehouse Safety Program, or HSE-109, Audits).
- Manual handling incidents are reviewed as part of the HSE Program reviews, and the results influence program development, training, and education efforts.
- Lifting of loads weighing more than 40 pounds (18 kilograms) should be evaluated by the SC using the Lifting Evaluation Form contained in SOP HSSE-112.
- Using mechanical lifting devices is the preferred means of lifting heavy objects such as forklifts; cranes, hoists, and rigging; hand trucks; and trolleys.
- Personnel shall seek assistance when performing manual lifting tasks that appear beyond their physical capabilities.
- Physical differences make it difficult to set up safe lifting limits, unless extensive individual testing is performed. In general, the following steps must be practiced when planning and performing manual lifts: Assess the situation before you lift; ensure good lifting and body positioning practices; ensure good carrying and setting down practices.
- All employees must receive training for the correct procedures to lift safely using the computer-based health and safety training or project-specific training.

2.1.4 Visible Lighting

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

2.1.5 Knife Use

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

- The open-bladed knife is determined to be the best tool for the job.

- An approved Activity Hazard Analysis (AHA) or written procedure is in place that covers the necessary safety precautions (work practices, PPE, and training).
- Knife users have been trained and follow the AHA.

Responsibilities	• Supervisors with assistance from the FTL/SC are responsible for funding and ensuring the correct tool is being used, employees wear the proper PPE when using knives, and they have reviewed this policy. • Employees are responsible for having and utilizing the proper PPE while performing an activity requiring the use of a knife. Employees are also responsible for understanding the proper use of a knife.
Glove Requirements	• In general, Kevlar cut resistant gloves are to be worn when using a knife in an occupational setting. • Other types of gloves may be required and will be identified within the AHA / written procedure. Example - Leather gloves may be worn when using the acetate sleeve cutter.

Training (Ref. VO for additional hand safety topics)	All employees that will use a knife must be trained in the proper use. • When using a knife always cut away from yourself. • Many tasks using a utility knife require a knife edge but not a sharp point. For these tasks you can add protection against puncture wounds by using a rounded-tip blade. • If you use a folding knife, it must be a locking blade type. • Never use a knife that will fold under pressure. • If you use a fixed blade knife, make sure there is a handle guard to keep your hand from slipping forward. Also, make sure the handle is dry and non- greasy/slippery to assure a better grip. • When cutting, make the force of the cut carry the blade away from any part of your body. If you have a peculiar situation where this is not possible, protect yourself with a leather apron, or other material placed between you and the blade. Consider putting the material to be cut in a vise, or other holding device. • If you carry a fixed blade knife, use a sheath or holder. • Store utility knives safely, retract the blade or sheath an open blade before storing. Never, leave a knife with the blade exposed on the floor, on a pallet, on a work surface, or in a drawer or cabinet. • Keep your knife sharp. A dull blade requires you to use more force to cut, and consequently increases the risk of slip or mistake. • Knives used on the job, but not carried with you , must be properly stored when not in use • Never use a defective knife. • Utility knife blades are brittle and can snap easily. Don't bend them or apply side loads to them by using them to open cans or pry loose objects. Use the knife only to cut. It was not designed to work as a prybar, screw driver, hole punch, and other assorted things that make it seem so easy. • If you do get cut, seek medical attention to treat the injury by notifying your supervisor and contacting WorkCare at 1-866-893-2514.

Examples of preferred tools and Kevlar cut resistant gloves:

A safety spring provides for automatic blade "shoot-back" into the handle when contact w/cutting surface is lost

Stay focused on the cutting job. It only takes a second of inattention with a sharp blade to produce a serious cut. Letting the mind wander or talking with others while using a knife greatly increases the risk of an accident and injury. If you are interrupted while working with a knife, stop cutting, retract the blade, and place the knife down on a secure surface before dealing with the interruption. You should never continue cutting while distracted!

As always, utilize the hierarchy of controls and first attempt to engineer out the hazard and frequently ask ourselves do we have the right tool for the job.

2.1.6 Hand and Power Tools

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

- Tools shall be inspected prior to use and damaged tools will be tagged and removed from service.
- Hand tools will be used for their intended use and operated in accordance with manufacturer's instructions and design limitations;
- Maintain all hand and power tools in a safe condition.
- Use PPE (such as gloves, safety glasses, earplugs, and face shields) when exposed to a hazard from a tool.
- Do not carry or lower a power tool by its cord or hose.
- Portable power tools will be plugged into GFCI protected outlets; and
- Portable power tools will be Underwriters Laboratories (UL) listed and have a three-wire grounded plug or be double insulated.
- Disconnect tools from energy sources when they are not in use, before servicing and cleaning them, and when changing accessories (such as blades, bits, and cutters).
- Safety guards on tools must remain installed while the tool is in use and must be promptly replaced after repair or maintenance has been performed.

- Store tools properly in a place where they will not be damaged or come in contact with hazardous materials.
- If a cordless tool is connected to its recharge unit, both pieces of equipment must conform strictly with electrical standards and manufacturer's specifications.
- Tools used in an explosive environment must be rated for work in that environment (that is, intrinsically safe, spark-proof, etc.).
- 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.

Machine Guarding

- Ensure that all machine guards are in place to prevent contact with drive lines, belts, chains, pinch points or any other sources of mechanical injury.
- Unplugging jammed equipment will only be performed when equipment has been shut down, all sources of energy have been isolated and equipment has been locked/tagged and tested.
- Maintenance and repair of equipment that results in the removal of guards or would otherwise put anyone at risk requires lockout of that equipment prior to work.

2.1.7 Working over Water

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

- Fall protection should be provided to prevent personnel from falling into water. Where fall protection systems are not provided and the danger of drowning exists, U.S. Coast Guard-approved personal flotation devices (PFDs), or a life jacket, shall be worn.
- Provide employees with an approved (USCG for U.S. operations) life jacket or buoyant work vest.
    - Employees should inspect life jackets or work vests daily before use for defects. Do not use defective jackets or vests.
- Post ring buoys with at least 90 feet of of 3/8-inch solid-braid polypropylene (or equal) line next to the work area. If the work area is large, post extra buoys 200 feet or less from each other.
- Provide at least one life saving skiff, immediately available at locations where employees are working over or adjacent to water.

  - Ensure the skiff is in the water and capable of being launched by one person and is equipped with both motor and oars.

- Designate at least one employee on site to respond to water emergencies and operate the skiff at times when there are employees above water.
  - If the designated skiff operator is not within visual range of the water, provide him or her with a radio or provide some form of communication to inform them of an emergency.
  - Designated employee should be able to reach a victim in the water within three to four minutes.
- Ensure at least one employee trained in CPR and first aid is on site during work activities.
- No smoking is permitted on board vessels or during refueling operations.
- The boat skipper has the final authority with regard to boat safety and navigational safety.
- Use the checklist below to evaluate vessel integrity.

Marine Vessel Checklist		
	Yes	**N/A**
Personal Flotation Devices (PFDs)		
Visual Distress Signals		
Anchor and Anchor Line		
Sound-Producing Devices		
Navigation Lights and Shapes		
Fire Extinguishers		
Alternative Propulsion (for example, paddles)		
Overall Vessel Condition Satisfactory		
State Requirements		
Marine Sanitation Device		
Navigation Rules		
Ropes and Buoys		
First Aid Kit and Bloodborne Pathogen Kit		
Nonslip Deck		
Personnel Access Ladder		

2.2 General Hazards

2.2.1 General Practices and Housekeeping

- Site work should be performed during daylight hours whenever possible.

- Good housekeeping must be maintained at all times in all project work areas.
- Common paths of travel should be established and kept free from the accumulation of materials.
- Keep access to aisles, exits, ladders, stairways, scaffolding, and emergency equipment free from obstructions.
- Provide slip-resistant surfaces, ropes, and/or other devices to be used.
- Specific areas should be designated for the proper storage of materials.
- Tools, equipment, materials, and supplies shall be stored in an orderly manner.
- As work progresses, scrap and unessential materials must be neatly stored or removed from the work area.
- Containers should be provided for collecting trash and other debris and shall be removed at regular intervals.
- All spills shall be quickly cleaned up. Oil and grease shall be cleaned from walking and working surfaces.
- Review the safety requirements of each job you are assigned to with your supervisor. You are not expected to perform a job that may result in injury or illness to yourself or to others.
- Familiarize yourself with, understand, and follow jobsite emergency procedures.
- Do not fight or horseplay while conducting the firm's business.
- Do not use or possess firearms or other weapons while conducting the firm's business.
- Report unsafe conditions or unsafe acts to your supervisor immediately.
- Report occupational illnesses, injuries, and vehicle accidents.
- Do not remove or make ineffective safeguards or safety devices attached to any piece of equipment.
- Report unsafe equipment, defective or frayed electrical cords, and unguarded machinery to your supervisor.
- Shut don and lock out machinery and equipment before cleaning, adjustment, or repair. Do not lubricate or repair moving parts of machinery while the parts are in motion.
- Do not run in the workplace.
- When ascending or descending stairways, use the handrail and take one step at a time.
- Do not apply compressed air to any person or clothing.
- Do not wear steel taps or shoes with metal exposed to the sole at any CH2M HILL project location.

- Do not wear finger rings, loose clothing, wristwatches, and other loose accessories when within arm's reach of moving machinery.
- Remove waste and debris from the workplace and dispose of in accordance with federal, state, and local regulations.
- Note the correct way to lift heavy objects (secure footing, firm grip, straight back, lift with legs), and get help if needed. Use mechanical lifting devices whenever possible.
- Check toe work area to determine what problems or hazards may exist.

2.2.2 Personal Hygiene

- Keep hands away from nose, mouth, and eyes.
- Keep areas of broken skin (chapped, burned, etc.) covered.
- Wash hands with hot water and soap frequently prior to eating and smoking.

2.2.3 Drugs and Alcohol

(Reference CH2MHILL SOP HSE-105, *Drug-Free Workplace)*

The following situations pertaining to drugs and alcohol are prohibited:

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

2.2.4 Driving

- Always be aware of surroundings while operating a vehicle. Avoid intellectual stress & worries, talking on a cellular phone, eating, drinking, smoking, reading a map, adjusting controls or looking at a passenger while driving.
- Use prudent speed limits, assure that backup warning devices are working, be aware of blind spots or other hazards associated with low visibility, etc. Use a spotter if necessary.
- Do no drive while drowsy. Drowsiness can occur at any time, but is most likely after 18 hours or more without sleep.

2.2.5 Hazard Communication

(Reference CH2M HILL SOP HSSE-107, *Hazard Communications)*

The Hazard Communication Coordinator is to perform the following:

- Complete an inventory of chemicals brought on site by CH2M HILL using Attachment 2.
- Confirm that an inventory of chemicals brought on site by CH2M HILL subcontractors is available.

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

2.2.6 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 RHSM or the Warehouse Coordinator for additional information.

2.2.7 Ultraviolet (UV) Radiation (sun exposure)

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

Acute overexposure of UV radiation to the eyes may lead to photokeratitis (inflammation of the cornea), also known as snow blindness. Symptoms include redness of the eyes and a gritty feeling, which progresses to pain and an inability to tolerate any kind of light. This condition can also occur when working in or around water and other UV radiation reflectors. In addition, long-term exposure to sunlight is thought to cause cataracts or clouding of the lens of the eye.

Limit Exposure Time

- Rotate staff so the same personnel are not exposed all of the time.
- Limit exposure time when UV radiation is at peak levels (approximately 2 hours before and after the sun is at its highest point in the sky).
- Avoid exposure to the sun, or take extra precautions when the UV index rating is high.

Provide Shade

- Take lunch and breaks in shaded areas.
- Create shade or shelter through the use of umbrellas, tents, and canopies.

- Fabrics such as canvas, sailcloth, awning material and synthetic shade cloth create good UV radiation protection.
- Check the UV protection of the materials before buying them. Seek protection levels of 95 percent or greater, and check the protection levels for different colors.

Clothing

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

Sunscreen

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

2.2.8 Heat Stress

- Drink 16 ounces of water before beginning work. Disposable cups and water maintained at 50°F to 60°F should be available. Under severe conditions, drink 1 to 2 cups every 20 minutes, for a total of 1 to 2 gallons per day. Do not use alcohol in place of water or other nonalcoholic fluids. Decrease your intake of coffee and caffeinated soft drinks during working hours.
- Acclimate yourself by slowly increasing workloads (e.g., do not begin with extremely demanding activities).
- Use cooling devices, such as cooling vests, to aid natural body ventilation. These devices add weight, so their use should be balanced against efficiency.

- Use mobile showers or hose-down facilities to reduce body temperature and cool protective clothing.
- Conduct field activities in the early morning or evening and rotate shifts of workers, if possible.
- Avoid direct sun whenever possible, which can decrease physical efficiency and increase the probability of heat stress. Take regular breaks in a cool, shaded area. Use a wide-brim hat or an umbrella when working under direct sun for extended periods.
- Provide adequate shelter/shade to protect personnel against radiant heat (sun, flames, hot metal).
- Maintain good hygiene standards by frequently changing clothing and showering.
- Observe one another for signs of heat stress. Persons who experience signs of heat syncope, heat rash, or heat cramps should report it to their supervisor immediately 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!

Monitoring Heat Stress

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

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

2.2.9 Cold Stress

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

SYMPTOMS AND TREATMENT OF COLD STRESS			
	Immersion (Trench) Foot	**Frostbite**	**Hypothermia**
Signs and Symptoms	Feet discolored and painful; infection and swelling present.	Blanched, white, waxy skin, but tissue resilient; tissue cold and pale.	Shivering, apathy, sleepiness; rapid drop in body temperature; glassy stare; slow pulse; slow respiration.
Treatment	Seek medical treatment immediately.	Remove victim to a warm place. Re-warm area quickly in warm–but **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.

Wind Chill Chart

Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

2.3 Biological Hazards and Controls

2.3.1 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.

2.3.2 Poison Ivy, Poison Oak, and Poison Sumac

Poison ivy, poison oak, and poison sumac typically are found in brush or wooded areas. They are more commonly found in moist areas or along the edges of wooded areas. Shrubs are usually 12 to 30 inches high, or can also be a tree-climbing vine, with triple leaflets and

short, smooth hair underneath. Plants are red and dark green in Spring and Summer, with yellowing leaves anytime especially in dry areas. Leaves may achieve bright reds in Fall, but plants lose its (yellowed, then brown) leaves in Winter, leaving toxic stems. All parts of the plant remain toxic throughout the seasons. These plants contain urushiol (you-ROO-shee-ol), a colorless or pale yellow oil that oozes from any cut or crushed part of the plant, including the roots, stems and leaves and causes allergic skin reactions when contacted. The oil is active year round.

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

Poison Ivy

Poison Sumac

Poison Oak

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

- Direct skin contact with any part of the plant (even roots once above ground foliage has been removed).
- Contact with clothing that has been contaminated with the oil.
- Contact from removing shoes that have been contaminated (shoes are coated with urishol oil).
- Sitting in a vehicle that has become contaminated.
- Contact with any objects or tools that have become contaminated.
- Inhalation of particles generated by weed whacking, chipping, vegetation clearing.

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

- Do not drive vehicles onto the site where it will come into contact with poison ivy, sumac or oak. Vehicles which need to work in the area, such as drill rigs or heavy equipment must be washed as soon as possible after leaving the site.
- All tools used in the poison ivy, sumac or oak area, including those used to cut back poison oak, surveying instruments used in the area, air monitoring equipment or other

test apparatus must be decontaminated before they are placed back into the site vehicle. If on-site decontamination is not possible, use plastic to wrap any tools or equipment until they can be decontaminated.

- Personal protective equipment, including Tyvek coveralls, gloves, and boot covers must be worn. PPE must be placed into plastic bags and sealed if they are not disposed immediately into a trash receptacle.
- As soon as possible following the work, shower to remove any potential contamination. Any body part with suspected or actual exposure should be washed with "Tecnu" or other product designed for removing urushiol. If you do not have Tecnu wash with cold water. Do not take a bath, as the oils can form and invisible film on top of the water and contaminate your entire body upon exiting the bath.
- Tecnu may also be used to decontaminate equipment.
- Use IvyBlock or similar products to prevent poison oak, ivy and sumac contamination. Check with the closest CH2M HILL warehouse to see if these products are available. Follow all directions for application.

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

2.3.3 Spiders - Brown Recluse

It is regarded by many as the most dangerous spider in the United States. Because of interstate shipping/transportation, the Brown Recluse spider can be found most anywhere in the United States. Brown Recluse Spiders are usually 1 inch or larger in size, including the legs and can grow as large as 3 inches. Young Brown Recluse spiders are smaller. Brown recluse spider bites don't always hurt right away. away. In fact, you may not know that you have been bitten until other symptoms appear. Symptoms of a brown recluse spider bite may include the following:

- Reddened skin followed by a blister that forms at the bite site.
- Mild to intense pain and itching for 2 to 8 hours following the bite.
- An open sore with a breakdown of tissue (necrosis) that develops within a few hours to 3 to 4 days following the bite and the area may become painful, itchy, hot, swollen, red and tender. An irregular ulcerous sore, caused by necrosis, will often appear that is from 1/4 inch to 10 inches in diameter. Prompt attention is the best defense against preventing the necrosis. The wound is often described as being reddish and surrounded by a bluish area with a narrow whitish separation in between the red and the blue. This gives it the famous "bull's eye" pattern. In just hours, a bite from the highly venomous Brown Recluse spider can create blisters and cause tissue damage.

Some people have a severe, systemic (whole-body) reaction to brown recluse spider bites, including the rapid destruction of red blood cells and anemia. Signs and symptoms include:

Fever and chills.

- Skin rash all over the body with many tiny, flat purple and red spots.
- Nausea or vomiting.
- Joint pain.

If you think you have been bitten by a brown recluse spider:

- Remain calm. Too much excitement or movement will increase the flow of venom into the blood.
- Try to collect the spider, without being bitten, (even a mangled specimen has diagnostic value), if possible, for positive identification by a spider expert. A plastic bag, small jar, or pill vial is useful and no preservative is necessary, but rubbing alcohol helps to preserve the spider.
- Apply a cool, wet cloth to the bite or cover the bite with a cloth and apply an ice bag to the bite.
- Do not apply a tourniquet. It may cause more harm than benefit.
- Try to positively identify the spider to confirm its type.
- Seek prompt medical attention.

A brown recluse bite can be serious and will likely require immediate medical care. Seek medical attention if you believe you have been bitten by a recluse spider, especially if severe symptoms develop throughout your body or an open sore and necrosis develop. A brown recluse spider bite is diagnosed through a physical examination and questions about the bite. You should be prepared to describe the spider, where and when the bite took place, and what you were doing at the time. Your health professional will ask what your main symptoms are, when they began, and how they have developed, progressed, or changed since the bite.

2.3.4 Widow Spiders

The Northern Black Widow spider may be encountered in Northern Regions of the United States. Other similar widow spiders are the Red Widow and the Brown Widow. Female widow spiders range from 8-15 mm in body length; males are smaller, sometimes very small (2 mm). Most have globose, shiny abdomens that are predominantly black with red markings (although some may be pale and/or have lateral stripes), with moderately long, slender legs. These spiders are nocturnal and build a three-dimensional tangled web, often with a conical tent of dense silk in a corner where the spider hides during the day. In nature, most species are found under rocks and logs, but they readily adapt to human-altered environments, where they are most commonly found in outbuildings (sheds, barns, privies), water meter holes, nursery cans, and under any item or structure (*e.g.*, barbeque grill, slide, sand box) that has been undisturbed for a lengthy period. Formerly, most bites by black widows (almost all by female spiders) occurred in outhouses, but presently, widow bites occur most frequently when the spider is trapped against human skin, either by reaching under objects where the spider is hiding or when putting on clothing, gloves or shoes containing the spider. Widow spiders are generally very timid and only bite in self-defense when they accidentally contact humans.

Black Widow

Red Widow

Brown Widow

Bite symptoms are systemic, spreading through the lymphatic system, and usually start about 1-3 hours after the bite. The most common symptoms are intense pain, rigid abdominal muscles, muscle cramping, malaise, local sweating, nausea, vomiting, and hypertension. Other symptoms may includetremors, labored breathing, restlessness, increased blood pressure, and fever. If left untreated, widow bite symptoms usually last 3-5 days.

If bitten, remain calm, and immediately seek medical attention (contact your physician, hospital and/or poison control center). Apply an ice pack directly to the bite area to relieve swelling and pain. Try to collect the spider, without being bitten, (even a mangled specimen has diagnostic value), if possible, for positive identification by a spider expert. A plastic bag, small jar, or pill vial is useful and no preservative is necessary, but rubbing alcohol helps to preserve the spider. A hospital stay may be recommended, particularly for those with a heart condition or with health problems. A physician may administer a specific antivenin to counteract the venom or calcium gluconate to relieve pain. Calcium gluconate and/or antivenin may be administered to relieve or counteract symptoms.

2.3.5 Ticks

Every year employees are exposed to tick bites at work and at home putting them at risk of illness. Ticks typically are in wooded areas, bushes, tall grass, and brush. Ticks are black, black and red, or brown and can be up to one-quarter inch in size.

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

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

Take precautions to avoid exposure by including pre-planning measures for biological hazards prior to starting field work. Contact the MKE Warehouse for preventative equipment such as repellants, protective clothing and tick removal kits. Use the buddy system and perform tick inspections prior to entering the field vehicle. If ticks were not planned to be encountered and are observed, do not continue field work until these controls can be implemented.

See Tick Fact Sheet attached to this HSP for further precautions and controls to implement when ticks are present. Information includes the procedure for submitting a removed tick for testing. If bitten by a tick, follow the removal procedures found in the tick fact sheet, call the occupational nurse at 1-866-893-2514 and submit the tick to Clongen laboratory using the form in the fact sheet attachment.

Be aware of the 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 RMSF and Lyme disease, chills, fever, headache, fatigue, stiff neck, and bone pain may develop. If symptoms appear, again contact the occupational nurse at 1-866-893-2514.

Be sure to complete an Incident Report (either use the HITS system on the VO) or see Attachment 5 if you do come in contact with a tick. For more detailed information go to HSSE website or contact the RHSM.

2.3.6 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 your supervisor 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 by notifying your supervisor and contacting Health Resources at 1-800-756-1130 if a reaction develops.

2.3.7 Bloodborne Pathogens

(Reference CH2M HILL SOP HSSE-202, *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 (PIM).

- Employees trained in first-aid/CPR or those exposed to PIM must complete CH2M HILL's 1-hour bloodborne computer-based training module annually.
- Hepatitis B vaccine (HBV) is offered to employees who may be exposed to PIM when they complete training and within 10 working days of assignment. (Note: Employees whose exposure stems only from rendering first aid as a collateral duty receives the vaccine after exposure.)
- Employees who decline the HBV vaccine must sign the declination form (contact regional Safety Program Assistant [SPA]) indicating they declined the vaccination. Anyone who declines the vaccination and chooses to receive the vaccination at a later time may still receive the vaccination by contacting the SPA.
- Hepatitis B and tetanus vaccinations can be requested by completing the medical portion of the enrollment form, located under Tools & Forms at the HS&E web page, or by contacting the regional SPA.

2.3.8 Feral Dogs

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

2.3.9 Mosquito Bites

Due to the recent detection of the West Nile Virus in the Southwestern United States it is recommended that **preventative measures** be taken to reduce the probability of being bitten by mosquitoes whenever possible. Mosquito's 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% DEET (N,N-diethyl-meta-toluamide). DEET in high concentrations (greater than 35%) provides no additional protection.
- Repellents may irritate the eyes and mouth, so avoid applying repellent to the hands.
- Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's DIRECTIONS FOR USE, as printed on the product.
- Note: Vitamin B and "ultrasonic" devices are NOT effective in preventing mosquito bites.

Symptoms of Exposure to the West Nile Virus

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

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

Contact the project RHSM with questions, and immediately report any suspicious symptoms to your supervisor/PM.

2.4 Radiological Hazards and Controls

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

Hazards	Controls
None Known	None Required

2.5 Contaminants of Concern

Contaminants of Concern

Contaminant	Location and Maximuma Concentration (ppm)	Exposure Limit [b]	IDLH [c]	Symptoms and Effects of Exposure	PIPd (eV)
Smoke Compositon– Reference RDX and TNT	UK	1.5 mg/m^3	UK	Irritation eyes, skin; headache, irritability, lassitude (weakness, exhaustion),	NL
Lead Styphnate	UK	(lead) 0.050 mg/m^3	(lead) 100 mg/m^3	contains lead	NL

Footnotes:

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

[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.

Potential Routes of Exposure

Dermal: Contact with contaminated media. This route of exposure is minimized through proper use of PPE, as specified in Section 4.	**Inhalation:** Vapors and contaminated particulates. This route of exposure is minimized through proper respiratory protection and monitoring, as specified in Sections 4 and 5, respectively.	**Other:** Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (e.g., wash hands and face before drinking or smoking).

3.0 Project Organization and Personnel

3.1 CH2M HILL Employee Medical Surveillance and Training

(Reference CH2M HILL- SOPs HSSE-113, Medical Surveillance, and HSSE-110, 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 "SC" have completed a 12-hour site safety coordinator course, and have documented requisite field experience. An SC with a level designation (D, C, B) equal to or greater than the level of protection being used must be present during all tasks performed in exclusion or decontamination zones. Employees designated "FA-CPR" are currently certified by the American Red Cross, or equivalent, in first aid and CPR. At least one FA-CPR designated employee must be present during all tasks performed in exclusion or decontamination zones. The employees listed below are currently active in a medical surveillance program that meets state and federal regulatory requirements for hazardous waste operations. Certain tasks (e.g., confined-space entry) and contaminants (e.g., lead) may require additional training and medical monitoring.

Pregnant employees are to be informed of and are to follow the procedures in CH2M HILL-SOP HSSE-120, *Reproductive Health*, including obtaining a physician's statement of the employee's ability to perform hazardous activities before being assigned fieldwork.

Employee Name	Office	Responsibility	SC/FA-CPR
TBD			Level C SC/HW, FA-CPR*

* Safety coordinator must have boating experience.

3.2 Field Team Chain of Command and Communication Procedures

3.2.1 Client

Contact Name: Mr. Joe Rail - Remedial Project Manager
Phone: 202-685-3105
Facility Contact Name: **Mr**. Jeff Bossart - Remedial Project Manager
Phone: 301-744-4705

3.2.2 CH2M HILL

Program Manager: Doug Dronfield
Project Manager (PM): Margaret Kasim
Responsible Health and Safety Manager (RHSM): Mark Orman
Field Team Leader: TBD
Safety Coordinator (SC): TBD

The 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 RHSM 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 oversight of subcontractor (and lower-tier subcontractors) HS&E practices and interfaces with on-site 3rd parties per the site-specific safety plan
- Approving revision to PPE levels

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

- Verify this HSP is current and amended when project activities or conditions change.
- Verify CH2M HILL site personnel and subcontractor personnel read the HSP and sign Attachment 1, Employee Sign-Off 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 2.2.6
- Act as the project "Emergency Response Coordinator" and perform the responsibilities outlined in Section 9.
- Post OSHA job-site poster; the poster is required at sites where project field offices, trailers, or equipment-storage boxes are established.
- 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 4 and 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 4, 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 RHSM 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 SC/HW is as follows:

- SC-Initial, SC_HW
- First Aid and CPR

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

3.2.3 CH2M HILL Subcontractors

(Reference CH2M HILL SOP HSSE-215, *Contracts, Subcontracts and HSSE Management Practices*)

Subcontractor: Geophysical Subcontractor TBD

Subcontractor Contact Name:

Telephone:

Subcontractor: Boat Subcontractor TBD

Subcontractor Contact Name:

Telephone:

Subcontractor: UXO Subcontractor TBD

Subcontractor Contact Name:

Telephone:

The subcontractors listed above are required to submit their own Accident Prevention Plan, specific to this project. Other plans, such as Lead or Asbestos Abatement Compliance plans, may be required as well. Subcontractors are responsible for the health and safety procedures specific to their work, and are required to submit their plans to CH2M HILL for review before the start of field work.

Subcontractors are also required to prepare an Activity Hazard Analysis (AHA) before beginning each activity posing H&S hazards to their personnel using the AHA form provided in Attachment 5 as a guide. The AHA shall identify the principle steps of the activity, potential H&S hazards for each step and recommended control measures for each identified hazard. In addition, a listing of the equipment to be used to perform the activity, inspection requirements and training requirements for the safe operation of the equipment listed must be identified.

CH2M HILL should continuously endeavor to observe subcontractors' safety performance and adherence to their Accident Prevention Plan and AHAs. This endeavor should be reasonable, and include observing for hazards or unsafe practices that are both readily observable and occur in common work areas. CH2M HILL is not responsible for exhaustive observation for hazards and unsafe practices. Self-assessment checklists contained in Attachment 4 are to be used by CH2M HILL personnel to review subcontractor performance. CH2M HILL oversight does not relieve subcontractors of their responsibility for effective implementation and compliance with the established plan(s).

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 PM and RHSM as appropriate.
- Document all oral health and safety related communications in project field logbook, daily reports, or other records.

4.0 Personal Protective Equipment (PPE)

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

- PPE must be worn by employees when actual or potential hazards exist and engineering controls or administrative practices cannot adequately control those hazards.
- A PPE assessment has been conducted by the RHSM based on project tasks (see PPE specifications below). Verification and certification of assigned PPE by task is completed by the RHSM or designee.
- The PPE initially identified for tasks may be changed based on field reconnaissance, results of
- site monitoring, or additional hazard analysis. These changes must be reviewed by the RHSM prior to implementation.
- Employees must be trained to properly wear and maintain the PPE.
- In work areas where actual or potential hazards are present at any time, PPE must be worn by employees working or walking through the area.
- Areas requiring PPE should be posted or employees must be informed of the requirements in an equivalent manner.
- PPE must be inspected prior to use and after any occurrence to identify any deterioration or damage.
- PPE must be maintained in a clean and reliable condition.
- Damaged PPE shall not be used and must either be repaired or discarded.
- PPE shall not be modified, tampered with, or repaired beyond routine maintenance.

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

PROJECT-SPECIFIC PPE REQUIREMENTS[A]

Task	Level	Body	Head	Respirator [b]
General site entry Visual survey and boat geophysics	D	Work clothes; sturdy leather work boots and gloves *Visible soil will be removed from boots prior to exiting work area.	Hardhat [c] Safety glasses with side shields Ear protection [d] Life jacket[e]	None required
Sediment sampling	Modified D	Work clothes or cotton coveralls **Boots:** Safety-toe, chemical-resistant boots OR Safety -toe, leather work boots with outer rubber boot covers	Hardhat [c] Safety glasses with side shields Ear protection [d]	None required

PROJECT-SPECIFIC PPE REQUIREMENTS[A]

Task	Level	Body	Head	Respirator [b]
		Gloves: Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.		
No tasks on this job	Modified D	**Coveralls:** Uncoated Tyvek® **Boots:** Safety -toe, chemical-resistant boots OR Safety -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 with side shields Ear protection [d]	None required.
No tasks on this job	C	**Coveralls:** Polycoated Tyvek® **Boots:** Safety -toe, chemical-resistant boots OR Safety -toe, leather work boots with outer rubber boot covers **Gloves:** Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat [c] Splash shield [c] Ear protection [d] Spectacle inserts	APR, full face, MSA Ultratwin or equivalent; with GME-H cartridges or equivalent[e]

REASONS FOR UPGRADING OR DOWNGRADING LEVEL OF PROTECTION WITH APPROVAL OF THE HSM

Upgrade[f]	Downgrade
Request from individual performing tasks.	New information indicating that situation is less hazardous than originally thought.
Change in work tasks that will increase contact or potential contact with hazardous materials.	Change in site conditions that decrease the hazard.
Occurrence or likely occurrence of gas or vapor emission.	Change in work task that will reduce contact with hazardous materials.
Known or suspected presence of dermal hazards.	
Instrument action levels (Section 5) exceeded.	

[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 SC.
[d] Ear protection should be worn when conversations cannot be held at distances of 3 feet or less without shouting.
[e] Life jackets must be worn when in boat.
[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 RHSM, and an SC qualified at that level is present.

PPE Certification

I certify that the PPE requirements listed in the table above for the associated tasks are based upon the project-specific hazard assessment I performed.

Mark Orman	5/17/09	5/17/09
Name	**Date of Certification**	**Date(s) of Project Hazard Assessment**

5.0 Air Monitoring/Sampling

(Reference CH2M HILL SOP HSSE-207, Exposure Assessment for Airborne Chemical Hazards)

5.1 Air Monitoring Specifications

Not needed for boat geophysical surveying, visual surveying, or sediment sampling assuming not visible dust will be present or generated during activities.

6.0 Decontamination

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

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

6.1 Decontamination Specifications

Personnel	Sample Equipment	Heavy Equipment
Boot wash/rinse	Wash/rinse equipment	Power wash
Glove wash/rinse	Solvent-rinse equipment	Steam clean
Outer-glove removal	Contain solvent waste for offsite disposal	Dispose of equipment rinse water to facility or sanitary sewer, or contain for offsite disposal
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		

6.2 Diagram of Personnel-Decontamination Line

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

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

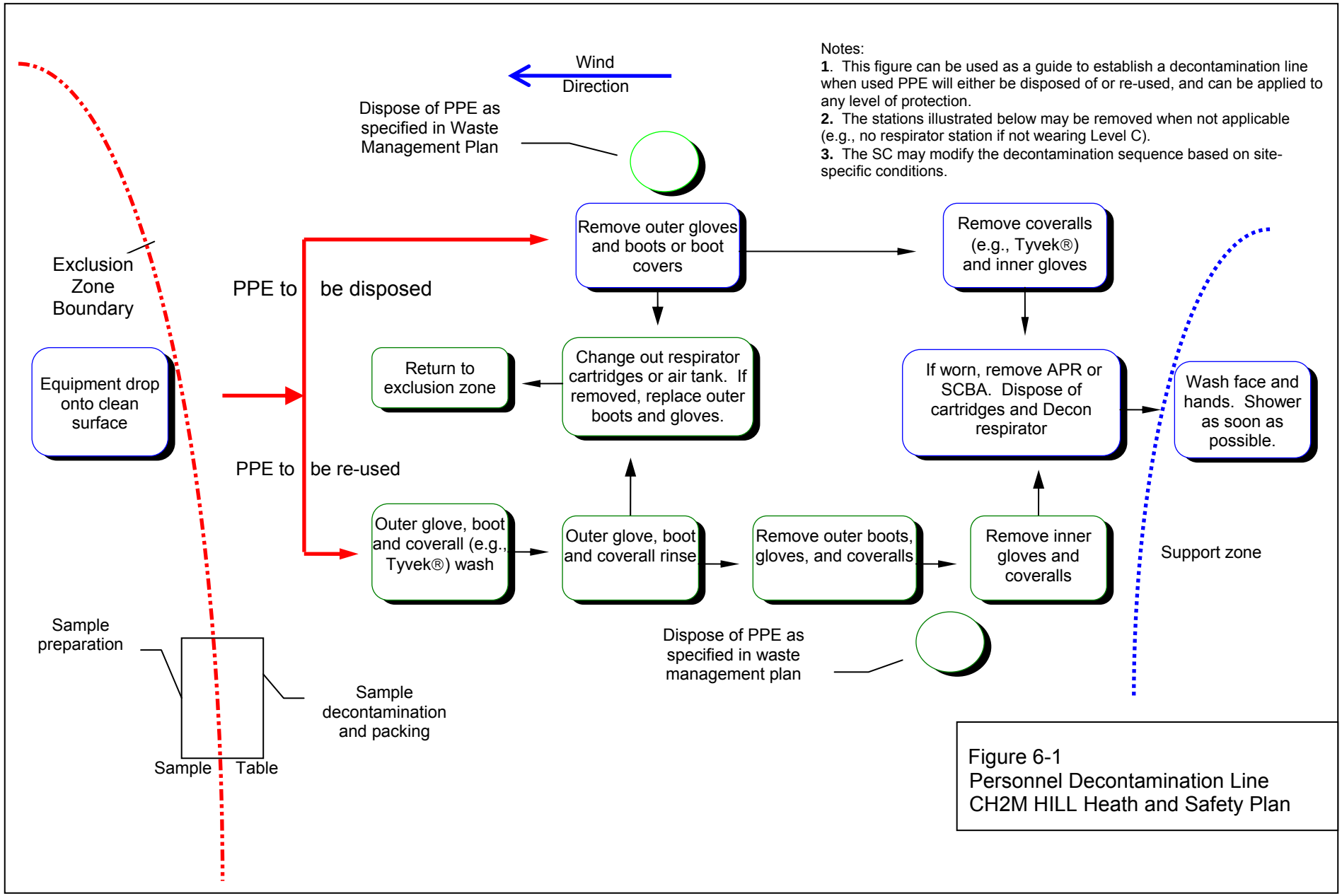


Figure 6-1
Personnel Decontamination Line
CH2M HILL Heath and Safety Plan

7.0 Spill Containment Procedures

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

Spill kit will be kept on site for gasoline spills from chainsaw operations and refueling.

8.0 Site-Control Plan

8.1 Site-Control Procedures

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

- The SC 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 SC 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- Core Standard, *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 SC in appropriate level of protection.
- The SC is to conduct periodic inspections of work practices to determine the effectiveness of this plan – refer to Sections 2 and 3. Deficiencies are to be noted, reported to the HSM, and corrected.

8.2 Hazwoper Compliance Plan

(Reference CH2M HILL CS HSSE-220, Written Plans and HSSE-218 Hazardous Waste Operations)

Certain parts of the site work are covered by state or federal Hazwoper standards and therefore require training and medical monitoring. Anticipated Hazwoper tasks (Section 1.1.1) might occur consecutively or concurrently with respect to non-Hazwoper tasks. This section outlines procedures to be followed when approved activities specified in Section

1.1.2 do not require 24- or 40-hour training. Non-Hazwoper-trained personnel also must be trained in accordance with all other state and federal OSHA requirements.

- In many cases, air sampling, in addition to real-time monitoring, must confirm that there is no exposure to gases or vapors before non-Hazwoper-trained personnel are allowed on the site, or while non-Hazwoper-trained staff is working in proximity to Hazwoper activities. Other data (e.g., soil) also must document that there is no potential for exposure. The RHSM must approve the interpretation of these data. Refer to Sections 2 and 5.0 for contaminant data and air sampling requirements, respectively.
- When non-Hazwoper-trained personnel are at risk of exposure, the SC 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.

9.0 Emergency Response Plan

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

9.1 Pre-Emergency Planning

- The Emergency Response Coordinator (ERC) 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. Drills should take place periodically but no less than once a year.
- Brief new workers on the emergency response plan.
- The ERC will evaluate emergency response actions and initiate appropriate follow-up actions.

9.2 Emergency Equipment and Supplies

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

Emergency Equipment and Supplies	Location
20 (or two 10) class A,B,C fire extinguisher	Site Vehicle
First aid kit	Site Vehicle
Eye Wash	Site Vehicle
Potable water	Site Vehicle
Bloodborne-pathogen kit	Site Vehicle
Additional equipment (specify): Cell Phone	FTL / SC

9.3 Incident Response

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

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

Small fires or spills posing minimal safety or health hazards may be controlled with onsite spill kits or fire extinguishers without evacuating the site. When in doubt evacuate. Follow the incident reporting procedures in Section 9.7.

9.4 Emergency Medical Treatment

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

- Notify 911 or other appropriate emergency response authorities as listed in Emergency Contacts at the front of this HSP.
- The ERC will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury, perform decontamination (if applicable) where feasible; lifesaving and first aid or medical treatment takes priority.
- Initiate first aid and CPR where feasible.
- Notify supervisor and if the injured person is a CH2M HILL employee. The supervisor will call the occupational nurse at 1-800-756-1130 and make other notifications as required by HSSE SOP-111, *Incident Notification, Reporting and Investigation*.
- Make certain that the injured person is accompanied to the emergency room.
- Follow the Serious Incident Reporting process in HSSE SOP-111, Incident Notification, Reporting and Investigation, and complete incident report forms in Attachment 5.
- Notify and submit reports to client as required in contract

9.5 Evacuation

- Evacuation routes, assembly areas, and severe weather shelters (and alternative routes and assembly areas) are to be specified on the site map.
- Evacuation route(s) and assembly area(s) will be designated by the ERC or designee before work begins.
- Personnel will assemble at the assembly area(s) upon hearing the emergency signal for evacuation.
- The ERC and a "buddy" will remain on the site after the site has been evacuated (if safe) to assist local responders and advise them of the nature and location of the incident.
- The ERC will account for all personnel in the onsite assembly area.
- A designated person will account for personnel at alternate assembly area(s).
- The ERC will follow the incident reporting procedures in Section 9.7.

9.6 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.

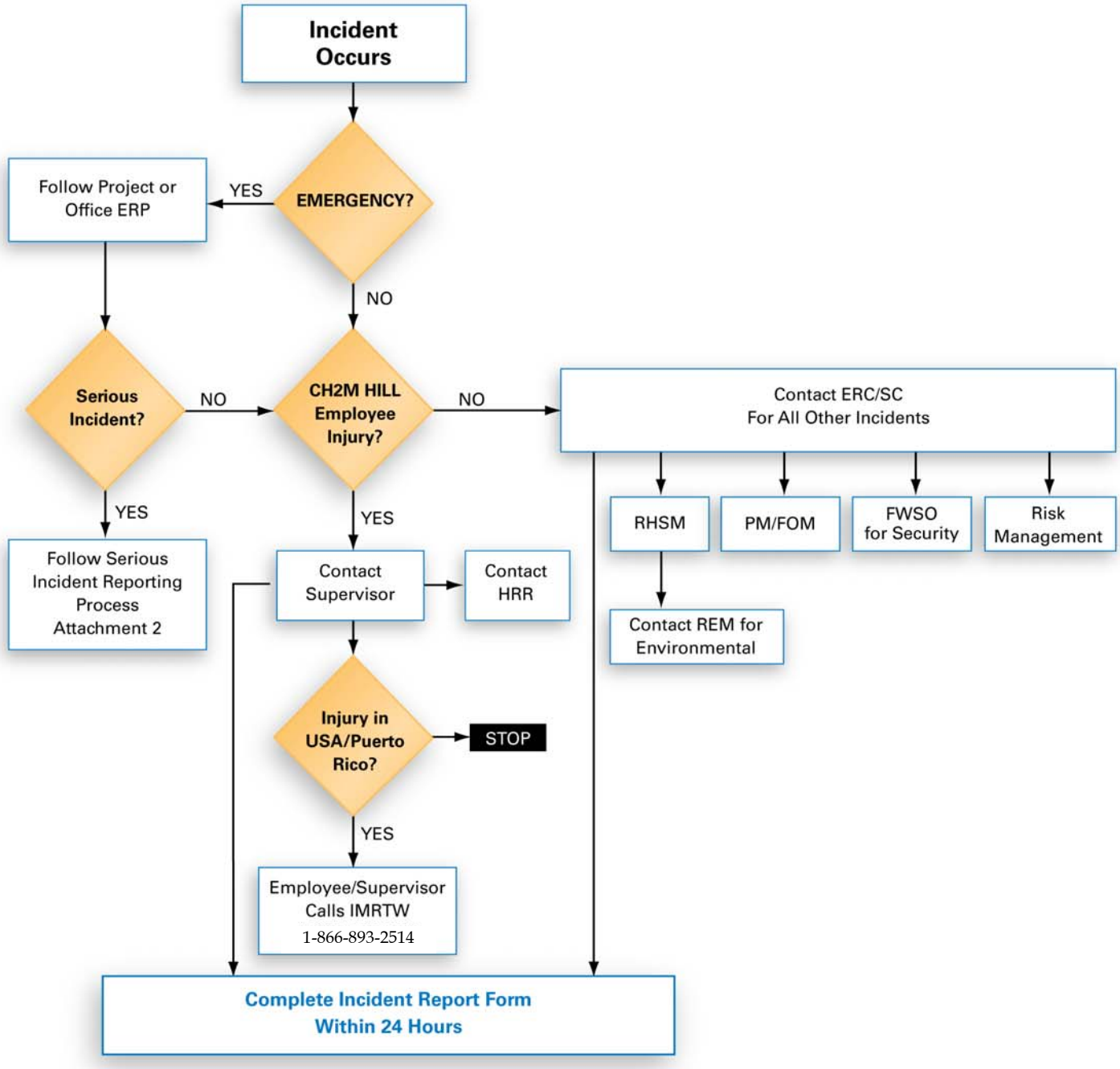
9.7 Incident Notification and Reporting

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

- If you are injured at work, notify your supervisor immediately and contact the Injury Management/Return-to-Work toll free number (for US and Puerto Rico) 1-866-893-2514. All supervisors must contact their Human Resources Representative and complete the employee injury/illness in the Incident Report Form (IRF) in the HITS database within 24 hours of the incident
- Immediately notify the Project Manager (PM), Emergency Response Coordinator (ERC), and/or Responsible Health and Safety Manager (RHSM) for any project incident (fire, spill/release, injury/illness, near miss, property damage, or security-related)
- Report any **serious incidents** (life-threatening injury/illness, death, kidnap/missing person, terrorism, property damage greater than $500K, significant environmental release) **immediately** to your ERC, PM, or RHSM. The Serious Incident Reporting number is 720-286-4911.
- For serious incidents, the Corporate Legal Department will determine who completes the IRF.
- For CH2M HILL subcontractor incidents, immediately notify the ERC and HSM to complete and submit an IRF.

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

Attachment 1
CH2M HILL Immediate Incident Notification



ERC = Emergency Response Coordinator (designated in Emergency Response Plan)
ERP = Emergency Response Plan
FOM = Facility Office Manager
FWSO = Firm Wide Security Operations
HRR = Human Resources Representative
IMRTW = Injury Management/Return-to-Work
PM = Project Manager
REM = Responsible Environmental Manager
RHSM = Responsible Health & Safety Manager
SC = Safety Coordinator

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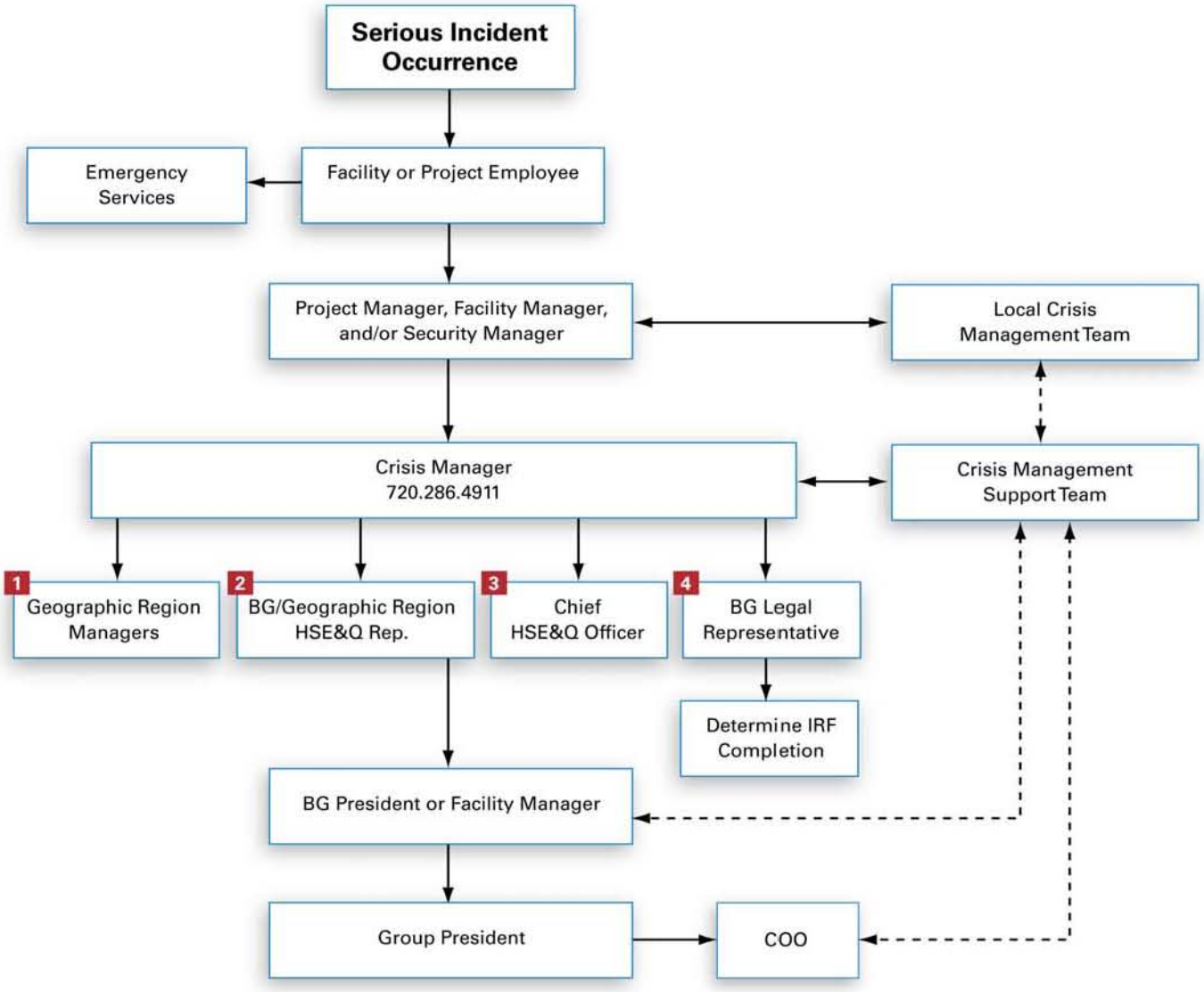
Attachment 2
CH2M HILL Serious Incident Notification



LEGEND:

Direct line of communication

Indirect line of communication

DEFINITIONS:

Local Crisis Management Team: Team comprised of key facility, project and/or business group personnel. Team is assembled as necessary and as appropriate to effectively manage and respond to a crisis situation (serious incident) at/on scene.

Crisis Management Support Team: Team comprised of key corporate personnel. Team is assembled as necessary and as appropriate to effectively support, direct, and /or supplement a Local Crisis Management Team.

Crisis Manager: Corporate based Crisis Manager, contactable by pager 24/7.

HS052007002MKT

10.0 Behavior Based Loss Prevention System

(Reference CH2M HILL SOP HSSE-103, *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 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 SC or designated CH2M HILL representative onsite is responsible for implementing the BBLPS on the project site. The Project Manager remains accountable for its implementation. The SC or designee shall only oversee the subcontractor's implementation of their AHAs and PTSPs processes on the project.

10.1 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 5. The AHA shall identify the work tasks required to perform each activity, along with potential H&S hazards and recommended control measures for each work task. In addition, a listing of the equipment to be used to perform the activity, inspection requirements and training requirements for the safe operation of the equipment listed must be identified.

An AHA shall be prepared for all field activities performed by CH2M HILL and subcontractor activities during the course of the project. Hazard Controls (found in Sections 2.0 and its subsections of the HSP), the Hazard Analysis Table (Table 1), and applicable CH2M HILL CSs and SOPs should be used as a basis for preparing AHAs.

CH2M HILL subcontractors are required to provide AHAs specific to their scope of work on the project for acceptance by CH2M HILL. Each subcontractor shall submit AHAs for their field activities, as defined in their work plan/scope of work, along with their project-specific safety plan/accident prevention plan. 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.

10.2 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 5, 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.

10.3 Loss Prevention Observations

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

10.4 Loss/Near Loss Investigations

Loss/Near Loss Investigations shall be performed for 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.

The SC or designee shall perform an incident investigation, as soon as practical after incident occurrence during the day of the incident, for all Loss and Near Loss Incidents that occur on the project. Loss and Near Loss incident investigations shall be performed using the following incident investigation forms provided in **Attachment 5.**

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

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

11.0 Approval

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

Original Plan

Written By: Stephen Brand **Date: 01/21/2009**

Approved By: Mark Orman **Date: 5/17/09**

Revisions

Revisions Made By: Victoria Waranoski Date:08/24/2009

1. Updated base contact information to Nick Carros

2. On page 11, first bullet in Section 2.1, "practice" was changed to "practiced."

3. Deleted first sentence on page 18, Section 2.1.7 because it is repeated twice.

Revisions to Plan: Victoria Waranoski

Revisions Approved By: Mark Orman **Date: 8/24/2009**

12.0 Attachments

Attachment 1: Employee Signoff Form – Health and Safety Plan

Attachment 2: Chemical Inventory/Register Form

Attachment 3: Chemical-Specific Training Form

Attachment 4: Project Activity Self-Assessment Checklists/Permits

Attachment 5: Behavior Based Loss Prevention Forms

Attachment 6: Material Safety Data Sheets

CH2M HILL Health and Safety Plan

Attachment 1

Health and Safety Plan Employee Sign-off Form

EMPLOYEE SIGNOFF FORM

Health and Safety Plan

The CH2M HILL project employees and subcontractors listed below have been provided with a copy of this HSP, have read and understood it, and agree to abide by its provisions.

Project Name: **Project Number:**

EMPLOYEE NAME (Please print)	**EMPLOYEE SIGNATURE**	**COMPANY**	**DATE**

CH2M HILL Health and Safety Plan

Attachment 2

Chemical Inventory/Register Form

CH2MHILL

CHEMICAL INVENTORY/REGISTER FORM

Refer to Standard of Practice HSE-107 Attachment 1 for instructions on completing this form.

Location: _____

HCC: _____

☐ Office ☐ Warehouse ☐ Laboratory ☐ Project: _____

Project No.: _____

Regulated Product	Location	Container labeled (✓if yes)	MSDS available (✓if yes)

MSDS for the listed products will be maintained at: _____

CH2M HILL Health and Safety Plan

Attachment 3

Chemical-Specific Training Form

CH2MHILL

CHEMICAL-SPECIFIC TRAINING FORM

Refer to Standard Operating Procedure HSE-107 Attachment 1 for instructions on completing this form.

Location:	Project # :
HCC:	Trainer:

TRAINING PARTICIPANTS:

NAME	SIGNATURE	NAME	SIGNATURE

REGULATED PRODUCTS/TASKS COVERED BY THIS TRAINING:

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

☐ Physical and health hazards

☐ Control measures that can be used to provide protection (including appropriate work practices, emergency procedures, and personal protective equipment to be used)

☐ Methods and observations used to detect the presence or release of the regulated product in the workplace (including periodic monitoring, continuous monitoring devices, visual appearance or odor of regulated product when being released, etc.)

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

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

CH2M HILL Health and Safety Plan

Attachment 4

Project Activity Self-Assessment Checklists/Permits/Forms

- **Boating**

Boat Operator Sea Trial:

Name: Date:

Boat Type: Size:

Boat Operator Task	**Yes**	**NO**	**N/A**
1. Review SOP	☐	☐	☐
2. File float plan	☐	☐	☐
3. Inspect boat (Boat checklist)	☐	☐	☐
4. Check fuel level	☐	☐	☐
5. Start boat engine	☐	☐	☐
6. Get boat underway	☐	☐	☐
7. Initiate right and left turns	☐	☐	☐
8. Stop boat and back down	☐	☐	☐
9. Motor boat ahead full throttle	☐	☐	☐
10. Reduce speed and return to pier/dock	☐	☐	☐
11. Land boat along side pier/dock	☐	☐	☐
12. Secure boat and shut down engine	☐	☐	☐
13. Close out float plan	☐	☐	☐

_____ has successfully demonstrated his/her ability to operate the above listed boat on (date)_____

Qualified Boat Operator Name:_____

Signature:_____

Health and Safety Self Assessment Checklist-BOATS

This self assessment is only to be used at locations where CH2M HILL controls the work. It is not to be used at locations where others control the work.

Project Name: _____ Project No.: _____

Location: _____ PM: _____

Auditor: _____ Title: _____

Date: _____

If an assessment item is complete/correct the "Yes" box should be checked. If an item is incomplete or deficient the "No" box should be checked. Items that are considered to be imminently dangerous must be corrected immediately or all exposed personnel must be removed from the hazard. All deficiencies shall be brought to the attention of the appropriate party that is responsible for correcting the deficiency. If an item is not applicable, the "N/A" box should be checked. If an item is applicable but was not observed during the assessment, the "N/O" box should be checked.

	Yes	No	NA	N/O
GENERAL				
1. Weather forecast checked.	☐	☐	☐	☐
2. At Least one Team Member is trained in First Aid/CPR.	☐	☐	☐	☐
3. Lights, horn, battery, fuel, steering, bilge pump, anchor & propeller checked.	☐	☐	☐	☐
4. Daily safety briefing/meeting conducted with crew	☐	☐	☐	☐
5. Personal Floatation Devices (PFD's) inspected daily.	☐	☐	☐	☐
6. Fire extinguisher available, charged and accessible.	☐	☐	☐	☐
7. First aid kit available	☐	☐	☐	☐
8. Project Instructions and H&S Plan available	☐	☐	☐	☐
9. Potable water available	☐	☐	☐	☐
10. Sunscreen & Bug Spray available	☐	☐	☐	☐
11. Distress communications available (flare gun, air horn, Cell phone, CB)	☐	☐	☐	☐
12. An oar is available on board the boat in the event of mechanical failure	☐	☐	☐	☐
BOAT TRANSPORT				
13. Boat motor secured prior to boat transport	☐	☐	☐	☐
14. Turn signals and brake lights verified as operable.	☐	☐	☐	☐
15. Safety chains available on trailer and secured in a criss-cross fashion	☐	☐	☐	☐
16. Trailer winch engaged	☐	☐	☐	☐
17. Ball hitch seated and latch pin installed	☐	☐	☐	☐
18 Tools and equipment secured prior to boat movement	☐	☐	☐	☐
19 Personnel not allowed ride on boat as it is being towed	☐	☐	☐	☐

20. Safe distance is maintained with traveling around power lines	☐	☐	☐	☐
21. Backup alarm or spotter used when backing boat	☐	☐	☐	☐
22. Boat is unhitched on a level and stabile surface	☐	☐	☐	☐
BOAT OPERATION				
23. Boat holds appropriate size load	☐	☐	☐	☐
24. Personnel cleared during boat start-up	☐	☐	☐	☐
25. Kill switch clearly identified and operational	☐	☐	☐	☐
26. Personnel wearing appropriate PPE	☐	☐	☐	☐
27. All personnel wearing PFD's	☐	☐	☐	☐
28. Boat will not be used for recreational purposes	☐	☐	☐	☐

Attachment : 3 Boat Equipment Checklist

Boat Check List Item	Yes	No	N/A
State Numbering			
Personal Flotation Device			
Throwable PFD/Ring Bouy			
Visual Distress Signal			
Backfire Flame Arrestor			
Sound Producing Device			
Fire Extinguisher			
Navigation/Anchor Lights			
Radio/Communications			
First Aid Kit			
Flashlight			
Tool Kit			
Mooring Lines			
Food and Water			
Binoculars			
Spare Batteries			
Spare Parts			
Spare Fuel			
AM/FM Radio			
Anchor and Tackle			
Alternate Propulsion			
Overall Boat Condition-Satisfactory			
Electrical Systems-Satisfactory			
Fuel Systems-Satisfactory			
File Float Plan			
Weather Forecast			
Inspected By:	**Boat Operator:**		
Date:			

CH2M HILL Health and Safety Plan

Attachment 5

Behavior Based Loss Prevention System Forms

Activity Hazard Analysis

Pre-Task Safety Plans

Loss Prevention Observation

Incident Report and Investigation

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

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

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

	PRINT NAME	SIGNATURE	
Supervisor Name:			**Date/Time:**
Safety Officer Name:			**Date/Time:**
Employee Name(s):			**Date/Time:**
			Date/Time:
			Date/Time:
			Date/Time:
			Date/Time:
			Date/Time:
			Date/Time:
			Date/Time:
			Date/Time:

CH2MHILL

Pre-Task Safety Plan (PTSP)

Project: _____ Location: _____Date:_____

Supervisor: _____ Job Activity:_____

_____

Task Personnel:

_____

_____

_____

_____

List Tasks:

_____

_____

_____

_____

Tools/Equipment Required for Tasks (ladders, scaffolds, fall protection, cranes/rigging, heavy equipment, power tools):

_____

_____

_____

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

__ Chemical burns/contact	__ Trench, excavations, cave-ins	__ Ergonomics
__ Pressurized lines/equipment	__ Overexertion	__ Chemical splash
__ Thermal burns	__ Pinch points	__ Poisonous plants/insects

__ Electrical	__ Cuts/abrasions	__ Eye hazards/flying projectile
__ Weather conditions	__ Spills	__ Inhalation hazard
__ Heights/fall > 6 feet	__ Overhead Electrical hazards	__ Heat/cold stress
__ Noise	__ Elevated loads	__ Water/drowning hazard
__ Explosion/fire	__ Slips, trip and falls	__ Heavy equipment
__ Radiation	__ Manual lifting	__ Aerial lifts/platforms
__ Confined space entry	__ Welding/cutting	__ Demolition
Other Potential Hazards (Describe): _____ _____ _____ _____		

Hazard Control Measures (Check All That Apply):			
PPE __ Thermal/lined __ Eye __ Dermal/hand __ Hearing __ Respiratory __ Reflective vests __ Flotation device	Protective Systems __ Sloping __ Shoring __ Trench box __ Barricades __ Competent person __ Locate buried utilities __ Daily inspections	Fire Protection __ Fire extinguishers __ Fire watch __ Non-spark tools __ Grounding/bonding __ Intrinsically safe equipment	Electrical __ Lockout/tagout __ Grounded __ Panels covered __ GFCI/extension cords __ Power tools/cord inspected
Fall Protection __ Harness/lanyards __ Adequate anchorage __ Guardrail system __ Covered opening __ Fixed barricades __ Warning system	Air Monitoring __ PID/FID __ Detector tubes __ Radiation __ Personnel sampling __ LEL/O2 __ Other	Proper Equipment __ Aerial lift/ladders/scaffolds __ Forklift/heavy equipment __ Backup alarms __ Hand/power tools __ Crane with current inspection __ Proper rigging __ Operator qualified	Welding & Cutting __ Cylinders secured/capped __ Cylinders separated/upright __ Flash-back arrestors __ No cylinders in CSE __ Flame retardant clothing __ Appropriate goggles
Confined Space Entry __ Isolation __ Air monitoring __ Trained personnel __ Permit completed __ Rescue	Medical/ER __ First-aid kit __ Eye wash __ FA-CPR trained personnel __ Route to hospital	Heat/Cold Stress __ Work/rest regime __ Rest area __ Liquids available __ Monitoring __ Training	Vehicle/Traffic __ Traffic control __ Barricades __ Flags __ Signs

Permits	Demolition	Inspections:	Training:
__ Hot work __ Confined space __ Lockout/tagout __ Excavation __ Demolition __ Energized work	__ Pre-demolition survey __ Structure condition __ Isolate area/utilities __ Competent person __ Hazmat present	__ Ladders/aerial lifts __ Lanyards/harness __ Scaffolds __ Heavy equipment __ Cranes and rigging	__ Hazwaste __ Construction __ Competent person __ Task-specific (THA) __ Hazcom
Field Notes:_____ _____ _____			

Name (Print): _____

Signature:_____ Date:_____

CH2MHILL

Safe Work Observation Form		
Project:	Observer:	Date:
Position/Title of worker observed:	Background Information/ comments:	
Task/Observation Observed:		

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

Actions & Behaviors	Safe	At-Risk	Observations/Comments
Current & accurate Pre-Task Planning/Briefing (Project safety plan, STAC, AHA, PTSP, tailgate briefing, etc., as needed)			**Positive Observations/Safe Work Practices:**
Properly trained/qualified/experienced			
Tools/equipment available and adequate			
Proper use of tools			**Questionable Activity/Unsafe Condition Observed:**
Barricades/work zone control			
Housekeeping			
Communication			
Work Approach/Habits			
Attitude			
Focus/attentiveness			**Observer's Corrective Actions/Comments:**
Pace			
Uncomfortable/unsafe position			
Inconvenient/unsafe location			
Position/Line of fire			
Apparel (hair, loose clothing, jewelry)			
Repetitive motion			**Observed Worker's Corrective Actions/Comments:**
Other			

HITS Incident Report Hardcopy (Phase 1 – Initial Entry)
Rev. 1, 12/03/2007

Phase 1 – Initial Entry

Type of Incident (May select more than one)

- ☐ Injury/Illness
- ☐ Property Damage
- ☐ Spill/Release
- ☐ Environment/Permit
- ☐ Near Miss
- ☐ Other

General Information Section

Preparer's Name: _____ **Preparer's Phone Number:** _____

Date of Incident: _____ **Time of Incident**: _____ AM / PM

What Business Group is accountable for this incident:

_____

What Business Group SubGroup is accountable for this incident:

_____

What CH2M HILL Company is accountable for this incident:

_____

Where did the Incident occur?

- ☐ United States, Geographic Region: _____
- ☐ Canada, Province/Territory: _____
- ☐ International, County: _____

1.1.1.1.1.1.1 Location of Incident?

☐ Company Premises, CH2M HILL Office (use 3 letter office code if available):

_____

☐ Project, Project name:

_____

☐ In Transit

Traveling from:

_____

Traveling to:

_____

- ☐ At Home
- ☐ Other, Specify:

_____

Describe the incident:

_____

_____

_____

_____

_____

Describe how this event could have been prevented:

_____

_____

_____

Provide Witness Information:

Name: _____ Phone: _____

Name: _____ Phone: _____

Name: _____ Phone: _____

Personnel Notified of Incident (Provide name, date and time):

CH2M HILL Personnel:

_____

Client Personnel:

_____

Additional Comments:

_____

_____

_____

_____

Injury/Illness Section [Complete only if Injury/Illness Incident type selected]

Who was injured?

- ☐ CH2M HILL Employee or CH2M HILL Temp Employee
- ☐ Subcontractor to CH2M HILL (Non-LLC Joint Venture Project)
- ☐ LLC Joint Venture Partner Employee
- ☐ LLC Joint Venture Project Subcontractor/Contractor
- ☐ Other

Name of Injured: _____ **Job Title:**

_____

Employer Name: _____ **Supervisor of Employee:**

_____

Complete for CH2M HILL Employee Injuries

Business Group of Injured Employee:

_____

Has the employee called the Injury Management Administrator (1-800-756-1130)?

☐ Yes ☐ No ☐ Not Sure

Has the injured employee's supervisor been notified of this incident?

☐ Yes ☐ No ☐ Not Sure

Complete for Non-CH2M HILL Employee Injuries

Has the project safety coordinator been notified of this incident?

☐ Yes ☐ No ☐ Not Sure

Project Safety Coordinator:

_____

Body Part Affected:

_____

Injury/Illness (Result):

_____

Describe treatment provided (if medication provided, identify whether over-the-counter or prescription):

_____

_____

_____

Describe any work restriction prescribed (include dates and number of days):

_____

_____

_____

Physician/Health Care Provider Information

Name: _____ Phone:

_____

Was treatment provided away from the worksite?

- ☐ No
- ☐ Yes

Facility Name:
_____

Address:
_____

City: _____ Phone Number: _____

Was injured treated in an emergency room?

☐ No ☐ Yes

Was injured hospitalized overnight as an in-patient?

☐ No ☐ Yes

General Information Environmental Section **[Complete only if Environment/Permit or Spill/Release Incident type selected]**

Who had control of the area during the incident?

☐ CH2M HILL, Company:
_____

☐ Subcontractor, Company:
_____

☐ Joint Venture Partner/Contractor/Subcontractor, Company:
_____

☐ Other, Company:
_____

Relationship to CH2M HILL:
_____

Property Damage Section **[Complete only if Property Damage Incident type selected]**

Property Damaged:
_____

Property Owner:
_____

Damage Description:
_____

Estimated US Dollar Amount:
_____

Spill or Release Section **[Complete only if Spill/Release Incident type selected]**

Substance:
_____

Estimated Quantity:
_____

Did the spill/release move off the property?:
_____

Spill/Release From:
_____

Spill/Release To:
_____

Environment/Permit Section **[Complete only if Environment/Permit Incident type selected]**

Describe Environmental or Permit Issue:
_____

Permit Type:
_____

Permitted Level or Criteria (e.g., discharge limit):
_____

Permit Name and Number (e.g., NPDES No. ST1234):
_____

Substance and Estimated Quantity:

_____

Duration of Permit Exceedence:

_____

CH2M HILL Health and Safety Plan

Attachment 6

Material Safety Data Sheets

CHEVRON U S A -- CHEVRON 2-CYCLE OIL - OIL,2-CYCLE
MATERIAL SAFETY DATA SHEET
NSN: 915000F005683
Manufacturer's CAGE: 81230
Part No. Indicator: A
Part Number/Trade Name: CHEVRON 2-CYCLE OIL
==========
=
General Information
==========
=
Item Name: OIL,2-CYCLE
Company's Name: CHEVRON U S A INC
Company's Street: 575 MARKET ST
Company's P. O. Box: 7643
Company's City: SAN FRANCISCO
Company's State: CA
Company's Country: US
Company's Zip Code: 94120-2856
Company's Emerg Ph #: 800-231-0623 800-424-9300(CHEMTREC)
Company's Info Ph #: 800-582-3835 800-582-3835
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 002
Status: SE
Date MSDS Prepared: 14APR93
Safety Data Review Date: 16JUN94
Supply Item Manager: CX
MSDS Preparer's Name: UNKNOWN
MSDS Serial Number: BTJYT
Specification Number: NONE
Spec Type, Grade, Class: NONE
Hazard Characteristic Code: N1
Unit Of Issue: NK
Unit Of Issue Container Qty: UNKNOWN
Type Of Container: UNKNOWN
Net Unit Weight: UNKNOWN
==========
==
Ingredients/Identity Information
==========
==
Proprietary: NO
Ingredient: SOLVENT,DEWAXED RESIDUAL OIL (PETROLEUM)
Ingredient Sequence Number: 01
Percent: UNKNOWN
NIOSH (RTECS) Number: 1004315SD
CAS Number: 64742-62-7

OSHA PEL: 5 MG/M3 (OIL MIST)
ACGIH TLV: 5 MG/M3 (OIL MIST)
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: RESIDUAL OILS, HYDROTREATED
Ingredient Sequence Number: 02
Percent: UNKNOWN
NIOSH (RTECS) Number: 1003242SR
CAS Number: 64742-57-0
OSHA PEL: 5 MG/M3 (OIL MIST)
ACGIH TLV: 5 MG/M3 (OIL MIST)
Proprietary: NO
Ingredient: DISTILLATES, HYDROTREATED HEAVY PARAFFINIC
Ingredient Sequence Number: 03
Percent: UNKNOWN
NIOSH (RTECS) Number: PY8035500
CAS Number: 64742-54-7
OSHA PEL: 5 MG/M3 (OIL MIST)
ACGIH TLV: 5 MG/M3 (OIL MIST)
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: MINERAL OIL, PETROLEUM DISTILLATES, SOLVENT-DEWAXED HEAVY PARAFFINIC
Ingredient Sequence Number: 04
Percent: UNKNOWN
NIOSH (RTECS) Number: PY8038500
CAS Number: 64742-65-0
OSHA PEL: 5 MG/M3 (OIL MIST)
ACGIH TLV: 5 MG/M3 (OIL MIST)
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: HYDROTREATED LIGHT PETROLEUM DISTILLATE
Ingredient Sequence Number: 05
Percent: 1
Specific Gravity: 0.891
Decomposition Temperature: UNKNOWN
Evaporation Rate And Ref: UNKNOWN
Solubility In Water: NEGLIGIBLE
Percent Volatiles By Volume: NIL
Corrosion Rate (IPY): UNKNOWN
==========
=

Fire and Explosion Hazard Data

==========
==
Flash Point: NONE
Lower Explosive Limit: UNKNOWN
Upper Explosive Limit: UNKNOWN
Extinguishing Media: USE WATER FOG, CARBON DIOXIDE, FOAM, OR DRY CHEMICAL.
WATER OR FOAM MAY CAUSE FROTHING.
Special Fire Fighting Proc: WEAR FIRE FIGHTING PROTECTIVE EQUIPMENT AND A FULL FACED SELF CONTAINED BREATHING APPARATUS. COOL FIRE EXPOSED CONTAINERS
WITH WATER SPRAY.
Unusual Fire And Expl Hazrds: COMBUSTION OR HEAT OF FIRE MAY PRODUCE HAZARDOUS DECOMPOSITION PRODUCTS AND VAPORS.

==========
==
Reactivity Data
==========
==
Stability: YES
Cond To Avoid (Stability): HIGH HEAT, OPEN FLAMES AND OTHER SOURCES OF IGNITION
Materials To Avoid: STRONG OXIDIZING AGENTS
Hazardous Decomp Products: AIRBORNE SOLID AND LIQUID PARTICULATES, CARBON
MONOXIDE, OTHER UNIDENTIFIED HYDROCARBON PRODUCTS.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT APPLICABLE
==========
==
Health Hazard Data
==========
==LD50-LC50 Mixture: LD 50 ORAL RAT IS UNKNOWN
Route Of Entry - Inhalation: NO
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: EYES:MAY CAUSE IRRITATION.SKIN:MAY CAUSE IRRITATION.INGEST:MAY CAUSE GI TRACT IRRITATION.INHAL:MAY CAUSE RESPIRATORY
IRRITATION,CNS EFFETS.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE OF THE INGREDIENTS IN THIS PRODUCT IS

LISTED BY NTP, IARC OR OSHA AS A CARCINOGEN.
Signs/Symptoms Of Overexp: EYES: PAIN,TEARING,SWELLING,REDNESS,BLURRED VISION.
Med Cond Aggravated By Exp: BECAUSE OF ITS DEFATTING PROPERTIES, PROLONGED
AND REPEATED SKIN CONTACT MAY AGGRAVATE AN EXISTING DERMATITIS.
Emergency/First Aid Proc: EYES: FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. IF IRRITATION PERSISTS, SEE DOCTOR. SKIN: WASH WITH SOAP. IF IRRITATION PERSISTS, SEE DOCTOR. INHALATION: REMOVE VICTIM TO FRESH AIR. GIVE OXYGEN/CPR IF NEEDED. SEE DOCTOR. INGESTION: DO NOT INDUCE VOMITING.
SEE DOCTOR. INJECTION: THIS IS A MEDICAL EMERGENCY. SEE DOCTOR IMMEDIATELY.
==========
Precautions for Safe Handling and Use
==========
Steps If Matl Released/Spill: REMOVE PERSONNEL. ELIMINATE IGNITION SOURCES. VENTILATE AREA. WEAR PROTECTIVE CLOTHING AND EQUIPMENT. DIKE AND
CONTAIN. ABSORB IN INERT MATERIAL AND PLACE IN APPROPIATE DISPOSAL CONTAINER AND COVER. WASH AREA WITH SOAP AND WATER.
Neutralizing Agent: NONE
Waste Disposal Method: CONTACT YOUR LOCAL ENVIRONMENTAL OFFICER. DISPOSE
OF IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS.
Precautions-Handling/Storing: STORE IN A COOL, DRY PLACE WITH ADEQUATE VENTILATION. KEEP AWAY FROM HEAT, OPEN FLAMES AND STRONG OXIDANTS. KEEP
CONTAINERS TIGHTLY CLOSED.
Other Precautions: AVOID EYE AND SKIN CONTACT. DO NOT BREATHE VAPORS.
==========
Control Measures
==========
Respiratory Protection: NONE NORMALLY REQUIRED. NIOSH/MSHA-APPROVED RESPIRATOR OR SCBA AS APPROPIATE FOR EXPOSURE OF CONCERN.
Ventilation: MECHANICAL (GENERAL) VENTILATION.
Protective Gloves: NITRILE GLOVES.
Eye Protection: SPLASH GOGGLES IF MISTING.
Other Protective Equipment: PROTECTIVE CLOTHING AS REQUIRED TO MINIMIZE EXPOSURE FROM PROLONGED OR REPEATED CONTACT. EYE BATH AND SAFETY SHOWER.
Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING AND BEFORE EATING.

LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. DISCARD CONTAMINATED SHOES
Suppl. Safety & Health Data: NONE
==========
Transportation Data
==========
Trans Data Review Date: 94167
DOT PSN Code: ZZZ
DOT Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
IMO PSN Code: ZZZ
IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
IATA PSN Code: ZZZ
IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
AFI PSN Code: ZZZ
AFI Prop. Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
MMAC Code: NR
Additional Trans Data: NONE
==========
Disposal Data
==========
==========
Label Data
==========
Label Required: YES
Technical Review Date: 16JUN94
MFR Label Number: UNKNOWN
Label Status: F
Common Name: CHEVRON 2-CYCLE OIL
Signal Word: CAUTION!
Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-Slight: X
Reactivity Hazard-None: X
Special Hazard Precautions: EYES:MAY CAUSE IRRITATION.SKIN:MAY CAUSE IRRITATION.INGEST:MAY CAUSE GI TRACT IRRITATION.INHAL:MAY CAUSE RESPIRATORY
IRRITATION,CNS EFFETS. STORE IN A COOL, DRY PLACE WITH ADEQUATE VENTILATION. KEEP AWAY FROM HEAT, OPEN FLAMES AND STRONG OXIDANTS. KEEP

CONTAINERS TIGHTLY CLOSED. FIRST AID: EYES: FLUSH WITH PLENTY OF WATER FOR
AT LEAST 15 MINUTES. IF IRRITATION PERSISTS, SEE DOCTOR. SKIN: WASH WITH SOAP. IF IRRITATION PERSISTS, SEE DOCTOR. INHALATION: REMOVE VICTIM TO FRESH AIR. GIVE OXYGEN/CPR IF NEEDED. SEE DOCTOR. INGESTION: DO NOT INDUCE
VOMITING. SEE DOCTOR. INJECTION: THIS IS A MEDICAL EMERGENCY. SEE DOCTOR
IMMEDIATELY.
Protect Skin: Y
Label Name: CHEVRON U S A INC
Label Street: 575 MARKET ST
Label P.O. Box: 7643
Label City: SAN FRANCISCO
Label State: CA
Label Zip Code: 94120-2856
Label Country: US
Label Emergency Number: 800-231-0623 800-424-9300(CHEMTREC)
==========
URL for this msds http://siri.org. If you wish to change, add to, or
delete information in this archive please sent updates to dan@siri.org.

SINCLAIR OIL -- GASOLINE - GASOLINE,UNLEADED
MATERIAL SAFETY DATA SHEET
NSN: 9130012720983
Manufacturer's CAGE: 2X948
Part No. Indicator: A
Part Number/Trade Name: GASOLINE
==========
==
General Information
==========
==
Item Name: GASOLINE,UNLEADED
Company's Name: SINCLAIR OIL CORP
Company's Street: 550 E SOUTH TEMPLE
Company's P. O. Box: 30825
Company's City: SALT LAKE CITY
Company's State: UT
Company's Country: US
Company's Zip Code: 84130-0825
Company's Emerg Ph #: 801-524-2700/800-424-9300(CHEMTREC)
Company's Info Ph #: 801-524-2853/307-324-3404 MEDICAL
Record No. For Safety Entry: 037
Tot Safety Entries This Stk#: 072
Status: SE
Date MSDS Prepared: 01JAN92
Safety Data Review Date: 04DEC92
Supply Item Manager: KY
MSDS Serial Number: BPKZJ
Hazard Characteristic Code: F2
Unit Of Issue: GL
==========
==
Ingredients/Identity Information
==========
==
Proprietary: NO
Ingredient: CYCLOHEXANE (SARA III)
Ingredient Sequence Number: 01
Percent: 0.9-1.8
NIOSH (RTECS) Number: GU6300000
CAS Number: 110-82-7
OSHA PEL: 300 PPM
ACGIH TLV: 300 PPM, 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: BENZENE (SARA III)

Ingredient Sequence Number: 02
Percent: 0.8-4.8
NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: 1PPM/5STEL;1910.1028
ACGIH TLV: 10 PPM; A2; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: TOLUENE (SARA III)
Ingredient Sequence Number: 03
Percent: 6.6-7.8
NIOSH (RTECS) Number: XS5250000
CAS Number: 108-88-3
OSHA PEL: 200 PPM/150 STEL
ACGIH TLV: 50 PPM; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: XYLENES (O-,M-,P- ISOMERS) (SARA III)
Ingredient Sequence Number: 04
Percent: 6- 10.4
NIOSH (RTECS) Number: ZE2100000
CAS Number: 1330-20-7
OSHA PEL: 100 PPM/150 STEL
ACGIH TLV: 100 PPM/150STEL;9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: NAPHTHALENE (SARA III)
Ingredient Sequence Number: 05
Percent: 0.1-1.2
NIOSH (RTECS) Number: QJ0525000
CAS Number: 91-20-3
OSHA PEL: 10 PPM/15 STEL
ACGIH TLV: 10 PPM/15 STEL; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: METHYL TERT-BUTYL ETHER (SARA III)
Ingredient Sequence Number: 06
Percent: 0 - 15
NIOSH (RTECS) Number: KN5250000
CAS Number: 1634-04-4
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED

Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: ETHYL ALCOHOL (ETHANOL)
Ingredient Sequence Number: 07
Percent: 0 - 10
NIOSH (RTECS) Number: KQ6300000
CAS Number: 64-17-5
OSHA PEL: 1000 PPM
ACGIH TLV: 1000 PPM; 9293
Other Recommended Limit: NONE RECOMMENDED

==========
Physical/Chemical Characteristics
==========
Appearance And Odor: CLEAR, BRONZE, RED OR PURPLE COLOR LIQUID - STRONG HYDROCARBON ODOR
Boiling Point: UNKNOWN
Melting Point: <-76F,<-60C
Vapor Pressure (MM Hg/70 F): 466 - 776
Specific Gravity: 0.7
Decomposition Temperature: UNKNOWN
Solubility In Water: NEGLIGIBLE
Corrosion Rate (IPY): UNKNOWN
Autoignition Temperature: >500F
==========
Fire and Explosion Hazard Data
==========
Flash Point: -45F,-43C
Lower Explosive Limit: 1.4%
Upper Explosive Limit: 7.6%
Extinguishing Media: USE WATER FOG, CARBON DIOXIDE, FOAM, DRY CHEMICAL OR
HALON. WATER MAY BE INEFFECTIVE.
Special Fire Fighting Proc: WEAR FIRE FIGHTING PROTECTIVE EQUIPMENT & A FULL FACED SELF CONTAINED BREATHING APPARATUS/SUPPLIED-AIR RESPIRATOR.COOL
FIRE EXPOSED CONTAINERS WITH WATER SPRAY.
Unusual Fire And Expl Hazrds: EXTREMELY FLAMMABLE LIQUID. VAPOR ACCUMULATION COULD FLASH AND/OR EXPLODE IF IT COMES IN CONTACT WITH OPEN

FLAME.

==========

Reactivity Data

==========

Stability: YES

Cond To Avoid (Stability): HEAT, SPARKS, OPEN FLAMES, STATIC ELECTRICITY AND OTHER SOURCES OF IGNITION

Materials To Avoid: STRONG OXIDIZING AGENTS, HALOGENS, STRONG ACIDS, ALKALIES

Hazardous Decomp Products: CARBON MONOXIDE, CARBON DIOXIDE

Hazardous Poly Occur: NO

==========

Health Hazard Data

==========

LD50-LC50 Mixture: ORAL LD50 (RAT) IS UNKNOWN

Route Of Entry - Inhalation: YES

Route Of Entry - Skin: YES

Route Of Entry - Ingestion: NO

Health Haz Acute And Chronic: ACUTE/CHRONIC-HIGH VAPOR CONCENTRATIONS ARE
IRRITATING TO THE EYES & THE RESPIRATORY TRACT.MAY CAUSE DIZZINESS, HEADACHE,ARE ANESTHETIC,MAY CAUSE
UNCONSCIOUSNESS.PROLONGED/REPEATED LIQUID
CONTACT WITH SKIN WILL DRY & DEFAT SKIN,LEADING TO IRRITATION & DERMATITIS.
CONTAINS BENZENE WHICH CAUSES BLOOD DISEASE,LEUKEMIA.

Carcinogenicity - NTP: YES

Carcinogenicity - IARC: YES

Carcinogenicity - OSHA: YES

Explanation Carcinogenicity: CONTAINS BENZENE.MAY CAUSE BLOOD DISEASES INCLUDING LEUKEMIA.VAPORS MAY CAUSE KIDNEY CANCER IN MALE RATS.

Signs/Symptoms Of Overexp: HIGH VAPOR CONCENTRATIONS ARE IRRITATING TO THE
EYES & THE RESPIRATORY TRACT. MAY CAUSE DIZZINESS, HEADACHE, ARE ANESTHETIC, MAY CAUSE UNCONSCIOUSNESS & EVEN DEATH.
PROLONGED/REPEATED
LIQUID CONTACT WITH SKIN WILL DRY & DEFAT SKIN, LEADING TO IRRITATION &
DERMATITIS. CONTAINS BENZENE WHICH CAUSES BLOOD DISEASE,LEUKEMIA

Med Cond Aggravated By Exp: BENZENE-INDIVIDUALS WITH LIVER DISEASE MAY BE MORE SUSCEPTIBLE TO TOXIC EFFECTS.HEXANE-INDIVIDUALS WITH NEUROLOGICAL
DISEASE SHOULD AVOID EXPOSURE.PETROLEUM SOLVENT-THOSE WITH EXISTING

DERMATITIS.
Emergency/First Aid Proc: CALL A PHYSICIAN IN ALL CASES.EYES: IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES,HOLDING EYELIDS OPEN.SKIN:WASH WITH SOAP &
WATER.INHALED:REMOVE TO FRESH AIR & PROVIDE CPR/OXYGEN IF NECESSARY.ORAL:DO
NOT INDUCE VOMITING.CALL A PHYSICIAN IMMEDIATELY.

========== Precautions for Safe Handling and Use ==========

Steps If Matl Released/Spill: WEAR PROTECTIVE EQUIPMENTS.ELIMINATE ALL SOURCES OF IGNITION.USE EXPLOSION-PROOF TOOLS.SHUT OFF FUEL SOURCE.DIKE
SPILL.PREVENT LIQUID FROM ENTERING SEWERS/WATERWAYS.RECOVER FREE LIQUID.ADD
SAND,EARTH OR OTHER ABSORBENT MATERIAL.TRANSFER TO CONTAINER.
Neutralizing Agent: NOT APPLICABLE
Waste Disposal Method: TREATMENT, STORAGE, TRANSPORTATION AND DISPOSAL MUST BE IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL LAWS AND
REGULATIONS.
Precautions-Handling/Storing: STORAGE-STORE IN ACCORDANCE WITH NATIONAL FIRE PROTECTION ASSOCIATION REGULATIONS.KEEP CONTAINERS CLOSED.
Other Precautions: "EMPTY" CONTAINERS RETAIN RESIDUE AND CAN BE DANGEROUS.
DO NOT PRESSURIZE,CUT,WELD,BRAZE,SOLDER,DRILL,GRIND OR EXPOSE SUCH CONTAINERS TO HEAT,FLAME,SPARKS.THEY MAY EXPLODE AND CAUSE INJURY/DEATH.
AVOID REPEATED OR PROLONGED CONTACT WITH SKIN.

========== Control Measures ==========

Respiratory Protection: NIOSH-APPROVED SELF-CONTAINED BREATHING APPARATUS
OR ORGANIC VAPOR RESPIRATOR OR SUPPLIED-AIR RESPIRATOR, IF NEEDED.
Ventilation: LOCAL/MECHANICAL (GENERAL) VENTILATION - EXPLOSION PROOF, WELL GROUNDED EQUIPMENTS
Protective Gloves: RUBBER
Eye Protection: CHEMICAL SPLASH GOGGLES & FACE SHIELD
Other Protective Equipment: IMPERVIOUS CLOTHING TO AVOID SKIN AND EYE CONTACT. EYE WASH STATION & SAFETY SHOWER.
Work Hygienic Practices: AVOID CONTACT WITH EYES, SKIN OR CLOTHING. WASH HANDS AFTER USING PRODUCT. AVOID BREATHING VAPORS OR MISTS.

==========
==
Transportation Data
==========
==
Trans Data Review Date: 92339
DOT PSN Code: GTN
DOT Proper Shipping Name: GASOLINE
DOT Class: 3
DOT ID Number: UN1203
DOT Pack Group: II
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: HRV
IMO Proper Shipping Name: GASOLINE
IMO Regulations Page Number: 3141
IMO UN Number: 1203
IMO UN Class: 3.1
IMO Subsidiary Risk Label: -
IATA PSN Code: RMF
IATA UN ID Number: 1203
IATA Proper Shipping Name: MOTOR SPIRIT
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MUC
AFI Prop. Shipping Name: GASOLINE
AFI Class: 3
AFI ID Number: UN1203
AFI Pack Group: II
AFI Label: FLAMMABLE LIQUID
AFI Basic Pac Ref: 7-7
==========
==
Disposal Data
==========
==
==========
==
Label Data
==========
==Label Required: YES
Technical Review Date: 04DEC92
MFR Label Number: UNKNOWN
Label Status: F
Common Name: GASOLINE
Signal Word: DANGER!
Acute Health Hazard-Severe: X
Contact Hazard-Severe: X

Fire Hazard-Severe: X
Reactivity Hazard-None: X
Special Hazard Precautions: ACUTE/CHRONIC-HIGH VAPOR CONCENTRATIONS ARE IRRITATING TO THE EYES & THE RESPIRATORY TRACT.MAY CAUSE DIZZINESS, HEADACHE,ARE ANESTHETIC,MAY CAUSE UNCONSCIOUSNESS.PROLONGED/REPEATED LIQUID CONTACT WITH SKIN WILL DRY & DEFAT SKIN,LEADING TO IRRITATION & DERMATITIS.
CONTAINS BENZENE WHICH CAUSES BLOOD DISEASE,LEUKEMIA.STORAGE-STORE IN ACCORDANCE WITH NATIONAL FIRE PROTECTION ASSOCIATION REGULATIONS.FIRST AID-
CALL A PHYSICIAN IN ALL CASES.EYES:IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES,HOLDING EYELIDS OPEN.SKIN:WASH WITH SOAP & WATER.INHALED:REMOVE TO FRESH AIR & PROVIDE CPR/OXYGEN IF NEEDED.ORAL:DO NOT INDUCE VOMITING.CALL A PHYSICIAN IMMEDIATELY
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: SINCLAIR OIL CORP
Label Street: 550 E SOUTH TEMPLE
Label P.O. Box: 30825
Label City: SALT LAKE CITY
Label State: UT
Label Zip Code: 84130-0825
Label Country: US
Label Emergency Number: 801-524-2700/800-424-9300(CHEMTREC)
==========

Appendix D
Standard Operating Procedures

STANDARD OPERATING PROCEDURE

Preparing Field Log Books

I. Purpose

To provide general guidelines for entering field data into log books during site investigation and remediation field activities.

II. Scope

This is a general description of data requirements and format for field log books. Log books are needed to properly document all field activities in support of data evaluation and possible legal activities.

III. Equipment and Materials

- Log book
- Indelible pen

IV. Procedures and Guidelines

Properly completed field log books are a requirement of much of the work we perform under the Navy CLEAN contract. Log books are legal documents and, as such, must be prepared following specific procedures and must contain required information to ensure their integrity and legitimacy. This SOP describes the basic requirements for field log book entries.

A. PROCEDURES FOR COMPLETING FIELD LOG BOOKS

1. Field notes commonly are kept in bound, orange-covered logbooks used by surveyors and produced, for example, by Peninsular Publishing Company and Sesco, Inc. Pages should be water-resistant and notes should be taken only with water-proof, non-erasable permanent ink, such as that provided in Sanford Sharpie® permanent markers.

2. On the inside cover of the log book the following information should be included:

    - Company name and address
    - Log-holders name if log book was assigned specifically to that person

- Activity or location
- Project name
- Project manager's name
- Phone numbers of the company, supervisors, emergency response, etc.

3. All lines of all pages should be used to prevent later additions of text, which could later be questioned. Any line not used should be marked through with a line and initialed and dated. Any pages not used should be marked through with a line, the author's initials, the date, and the note "Intentionally Left Blank."

4. If errors are made in the log book, cross a single line through the error and enter the correct information. All corrections shall be initialed and dated by the personnel performing the correction. If possible, all corrections should be made by the individual who made the error.

5. Daily entries will be made chronologically.

6. Information will be recorded directly in the field log book during the work activity. Information will not be written on a separate sheet and then later transcribed into the log book.

7. Each page of the log book will have the date of the work and the note takers initials.

8. The final page of each day's notes will include the note-takers signature as well as the date.

9. Only information relevant to the subject project will be added to the log book.

10. The field notes will be copied and the copies sent to the Project Manager or designee in a timely manner (at least by the end of each week of work being performed).

B. INFORMATION TO BE INCLUDED IN FIELD LOG BOOKS

1. Entries into the log book should be as detailed and descriptive as possible so that a particular situation can be recalled without reliance on the collector's memory. Entries must be legible and complete.

2. General project information will be recorded at the beginning of each field project. This will include the project title, the project number, and project staff.

3. Scope: Describe the general scope of work to be performed each day.

4. Weather: Record the weather conditions and any significant changes in the weather during the day.

5. Tail Gate Safety Meetings: Record time and location of meeting, who was present, topics discussed, issues/problems/concerns identified, and corrective actions or adjustments made to address concerns/ problems, and other pertinent information.

6. Standard Health and Safety Procedures: Record level of personal protection being used (e.g., level D PPE), record air monitoring data on a regular basis and note where data were recording (e.g., reading in borehole, reading in breathing zone, etc). Also record other required health and safety procedures as specified in the project specific health and safety plan.

7. Instrument Calibration; Record calibration information for each piece of health and safety and field equipment.

8. Personnel: Record names of all personnel present during field activities and list their roles and their affiliation. Record when personnel and visitors enter and leave a project site and their level of personal protection.

9. Communications: Record communications with project manager, subcontractors, regulators, facility personnel, and others that impact performance of the project.

10. Time: Keep a running time log explaining field activities as they occur chronologically throughout the day.

11. Deviations from the Work Plan: Record any deviations from the work plan and document why these were required and any communications authorizing these deviations.

12. Heath and Safety Incidents: Record any health and safety incidents and immediately report any incidents to the Project Manager.

13. Subcontractor Information: Record name of company, record names and roles of subcontractor personnel, list type of equipment being used and general scope of work. List times of starting and stopping work and quantities of consumable equipment used if it is to be billed to the project.

14. Problems and Corrective Actions: Clearly describe any problems encountered during the field work and the corrective actions taken to address these problems.

15. Technical and Project Information: Describe the details of the work being performed. The technical information recorded will vary significantly between projects. The project work plan will describe the specific activities to be performed and may also list requirements for note taking. Discuss note-taking expectations with the Project Manager prior to beginning the field work.

16. Any conditions that might adversely affect the work or any data

obtained (e.g., nearby construction that might have introduced excessive amounts of dust into the air).

17. Sampling Information; Specific information that will be relevant to most sampling jobs includes the following:

- Description of the general sampling area – site name, buildings and streets in the area, etc.
- Station/Location identifier
- Description of the sample location – estimate location in comparison to two fixed points – draw a diagram in the field log book indicating sample location relative to these fixed points – include distances in feet.
- Sample matrix and type
- Sample date and time
- Sample identifier
- Draw a box around the sample ID so that it stands out in the field notes
- Information on how the sample was collected – distinguish between "grab," "composite," and "discrete" samples
- Number and type of sample containers collected
- Record of any field measurements taken (i.e. pH, turbidity, dissolved oxygen, and temperature, and conductivity)
- Parameters to be analyzed for, if appropriate
- Descriptions of soil samples and drilling cuttings can be entered in depth sequence, along with PID readings and other observations. Include any unusual appearances of the samples.

C. SUGGESTED FORMAT FOR RECORDING FIELD DATA

1. Use the left side border to record times and the remainder of the page to record information (see attached example).

2. Use tables to record sampling information and field data from multiple samples.

3. Sketch sampling locations and other pertinent information.

4. Sketch well construction diagrams.

V. Attachments

Example field notes.

(47) MAY 12, 2003 EXAMPLE

0715 ARRIVE ON SITE AT XYZ SITE.
CH2M HILL STAFF:
JOHN SMITH: FIELD TEAM LEADER
BOB BUILDER: SITE SAFETY COORD.
WEATHER: OVERCAST + COOL, 45°F
CHANCE OF LATE SHOWERS
SCOPE: • COLLECT GROUNDWATER SAMPLES for LTM work at SITE 14
• SUPERVISE SURVEY CREW AT SITE 17

0725 BB ~~CON~~ (JS) CALIBRATES
PID: 101 ppm / 100 ppm ok
PID Model #, SERIAL #

0730 BB CALIBRATES HORIBA METER
MODEL #, SERIAL #
→ LIST CALIBRATION RESULTS

0738 SURVEY CREW ARRIVES ON SITE
→ LIST NAMES

0745 BB HOLDS H+S TALK ON SLIPS, TRIPS, FALLS, TICKS + AIR MONITORING
JS + SURVEY CREW ATTEND
NO H+S ISSUES IDENTIFIED AS CONCERNS. ALL WORK IS IN "LEVEL D."

0755 JS CONDUCTS SITE-WIDE AIR MONITORING
ALL READINGS = 0.0 ppm IN

JS 5-12-03

MAY 12, 2003 EXAMPLE (48)

SITE 14 LTM
BREATHING ZONE (BZ)

0805 MOBILIZE TO WELL MW-22 to SAMPLE, SURVEYORS SETTING UP AT SITE 17

0815 PM (PAUL PAPER PUSHER) CALLS AND INFORMS JS to COLLECT GW SAMPLE AT WELL MW-44 today for 24 hour TAT ANALYSIS OF VOC'S

0820 PURGING MW-22
→ RECORD WATER QUALITY DATA

JS 5-12-03

0843 COLLECT SAMPLE AT MW-22 for total TAL METALS AND VOC'S. NO DISSOLVED METALS NEEDED PER PM

0905 JS + BB MOBILIZE to SITE 17 to SHOW SURVEYORS WELLS to SURVEY.

0942 MOBILIZE to WELL MW-22 to COLLECT SAMPLE

0950 CAN NOT ACCESS WELL MW-22 due to BASE OPERATIONS; CONTACT PAUL PAPERPUSHER AND HE STATED HE WILL CHECK ON GAINING ACCESS WITH BASE CONTACT.

0955 MOBILIZE to WELL MW-19

JS 5-12-03

Appendix E
UFP-SAP for Munitions Constituents Investigation

SAP Worksheet #1—Title and Approval Page

Final

Uniform Federal Policy-Sampling and Analysis Plan for Igniter Area - UXO 19

Naval Support Facility Indian Head
Indian Head, Maryland

Contract Task Order 0012

September 2009

Prepared for:

Department of the Navy
Naval Facilities Engineering Command
Washington

Under the

Navy CLEAN 1000 Program
Contract N62470-02-D-1000

Prepared by:

CH2MHILL

Chantilly, Virginia

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Review Signatures:

Margaret Kasim
CH2M HILL – Activity Manager and Project Manager

John Tomik
CH2M HILL – Activity Quality Manager

Approval Signatures:

John Tucker
NAVFAC Atlantic – Chemist/QA Officer

Other Approval Signatures:

Joe Rail
NAVFAC Washington –Remedial Project Manager

Dennis Orenshaw
EPA Region 3 – Remedial Project Manager

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Executive Summary

Introduction

CH2M HILL has been contracted by the United States Navy (Navy), Naval Facilities Engineering Command Washington to conduct a Site Inspection (SI) for the Igniter Area (Unexploded Ordnance 19), at Naval Support Facility Indian Head, Indian Head, Maryland. This SI Uniform Federal Policy-Sampling and Analysis Plan (UFP-SAP) is designed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, and as amended by the Superfund Amendments and Reauthorization Act of 1986.

The constituents of potential concern at the Igniter Area consist of Target Analyte List (TAL) metals and explosives in sediment. The TAL metals are aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc, herein referred to as METAL. The explosives are octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine, hexahydro-1,3,5-trinitro-1,3,5-triazine, 1,3,5-trinitrobenzene, 1,3-dinitrobenzene, methyl-2,4,6-trinitrophenylnitramine, nitrobenzene, 2,4,6-trinitrotoluene, 2-amino-4,6-dinitrotoluene, 4-amino-2,6-dinitrotoluene, 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, 4-nitrotoluene, pentaerythritol tetranitrate (PETN), nitroguanidine, nitrocellulose, nitroglycerin, and perchlorate, herein referred to as EXPLO. The objectives of the Munitions Constituents (MC) SI are:

- Assess whether MC are likely to be present in the Igniter Area
- Determine if METAL and EXPLO are present in sediment where a small pile of igniters were found during an extremely low tide event in 1996 or 1997
- Based on the results of the SI, assess the need for further investigation

These objectives will be accomplished by collecting four sediment samples from 0 to 6 inches below the sediment surface in Mattawoman Creek. The scope of work to address METAL and EXPLO in sediment at the Igniter Area consists of the following tasks:

1. Anomaly avoidance
2. Sediment sampling

CH2M HILL prepared this UFP-SAP under contract number N62470-02-D-1000, Contract Task Order 0012 in accordance with the Navy's UFP-SAP policy guidance to ensure that environmental data collected are scientifically sound, of known and documented quality, and suitable for intended uses. The laboratory information cited in this document is specific to GPL Laboratories in Frederick, Maryland[1] and Columbia Analytical Services, Inc. in Rochester, New York[2]. GPL Laboratories and CAS-Rochester Laboratories were selected based on a competitive

[1] www.gplab.com.com
[2] www.caslab.com

selection process and will support all laboratory needs for this project. If additional laboratory services are requested requiring modification to the existing SAP, revised SAP worksheets will be submitted to the Navy and regulatory agencies for approval.

UFP-SAP Outline

This UFP-SAP consists of the 37 worksheets specific to the UFP-SAP. All tables are embedded within the worksheets. All figures are included at the end of the document. Field standard operating procedures are included as Attachment A and the site-specific laboratory SOPs are included as Attachment B.

Upon approval of this UFP-SAP by the Navy and the regulators, the field activities will take place.

SAP Worksheets

Figures

Appendixes

Abbreviations and Acronyms

µg/kg	micrograms per kilogram
AM	Activity Manager
AQ	aqueous
CA	corrective action
CCV	continuing calibration verification
COC	chain of custody
DOD	U.S. Department of Defense
DQI	Data Quality Indicator
EIS	Environmental Information Specialist
EPA	U.S. Environmental Protection Agency
EXPLO	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine, hexahydro-1,3,5-trinitro-1,3,5-triazine, 1,3,5-trinitrobenzene, 1,3-dinitrobenzene, methyl-2,4,6-trinitrophenylnitramine, nitrobenzene, 2,4,6-trinitrotoluene, 2-amino-4,6-dinitrotoluene, 4-amino-2,6-dinitrotoluene, 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, 4-nitrotoluene, PETN, nitroguanidine, nitrocellulose, nitroglycerin, and perchlorate
FTL	Field Team Leader
GPS	global positioning system
H&S	health and safety
HASP	Health and Safety Plan
HDPE	high-density polyethylene
IDW	investigation-derived waste
IHIRT	Indian Head Installation Restoration Team
IS	Internal Standard
LIMS	Laboratory Information Management System
MC	munitions constituents
MDE	Maryland Department of the Environment
MDL	Method Detection Limit
MEC	munitions and explosives of concern
METAL	aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc
MS/MSD	Matrix Spike/Matrix Spike Duplicate
N/A	not applicable

NAVFAC	Naval Facilities Engineering Command
Navy	U.S. Department of the Navy
NFA	No Further Action
NFESC	Naval Facilities Engineering Service Center
NSF-IH	Naval Support Facility Indian Head
PA	Preliminary Assessment
PAL	Project Action Limits
PETN	pentaerythritol tetranitrate
PM	Project Manager
POC	Point of Contact
PPE	personal protective equipment
PQL	project quantitation limit
PQO	Project Quality Objectives
QAPP	Quality Assurance Project Plans
QA	quality assurance
QC	quality control
QL	quantitation limit
RPD	relative percent difference
RPM	Remedial Project Manager
RSL	Regional Screening Level
SD	sediment
SI	Site Inspection
SOP	standard operating procedure
TAL	Target Analyte List
TBD	to be determined
UFP-SAP	Uniform Federal Policy Sampling Analysis Plan
UXO	unexploded ordnance
WAMS	Water Area Munitions Study

SAP Worksheet #2—SAP Identifying Information

Site Name/Number: Igniter Area (Unexploded Ordnance [UXO] 19)
Operable Unit: Not Applicable (N/A)
Contractor Name: CH2M HILL
Contract Number: N62470-02-D-1000, Task Order 0012
Contract Title: CLEAN 1000

1. This Sampling and Analysis Plan (SAP) was prepared in accordance with the requirements of:

Uniform Federal Policy (UFP) *for Quality Assurance Project Plans: Evaluating, Assessing, and Documenting Environmental Data Collection and Use Programs.* Part 1: UFP-QAPP Manual. Version 1. March. (Intergovernmental Data Quality Task Force, 2005)

Guidance for Quality Assurance Project Plans (QAPPs*). EPA QA/G-5 and EPA QA/G-5M (EPA, 2002))*

Guidance on Systematic Planning Using the Data Quality Objectives Process. EPA QA/G-4 (EPA, 2006).

2. Identify regulatory program:

Comprehensive Environmental Response, Compensation, and Liability Act of 1980

3. This SAP is specific to:

The sediment sampling in support of the Site Inspection (SI) for the Igniter Area

4. List dates of scoping sessions that were held:

Scoping Session	Date
Indian Head Tier I Partnering Meeting	2/18/2009

5. List dates and titles of any SAP documents written for previous site work that are relevant to the current investigation:

Title	Date
Final Water Area Munitions Study (Malcolm Pirnie)	2005

6. List organizational partners (stakeholders) and connection with lead organization:

Maryland Department of the Environment (MDE) – regulatory stakeholder

U.S. Environmental Protection Agency (EPA) Region III – regulatory stakeholder

7. Lead organization (see Worksheet #7 for detailed list of data users):

U.S. Department of the Navy (Navy) – Lead Agency

8. If any required SAP elements or required information are not applicable to the project or are provided elsewhere, then note the omitted SAP elements and provide an explanation for their exclusion below:

All SAP elements required for this project are described herein on the 37 UFP-SAP Worksheets. Therefore, the crosswalk table is not necessary for this project.

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SAP Worksheet #3—Distribution List

Name of SAP Recipients	Title/Role	Organization	Telephone Number (Optional)	E-mail Address or Mailing Address
Joe Rail	Remedial Project Manager (RPM)	Naval Facilities Engineering Command (NAVFAC) Washington	202-685-3105	joseph.rail@navy.mil
Dennis Orenshaw	RPM	EPA Region III	215-814-3361	orenshaw.dennis@epamail.epa.gov
Curtis DeTore	RPM	MDE	410-537-3791	cdetore@mde.state.md.us
Margaret Kasim	Activity Manager (AM) and Project Manager (PM)	CH2M HILL	703-376-5154	margaret.kasim@ch2m.com
John Tomik	Activity Quality Manager	CH2M HILL	757-671-6259	john.tomik@ch2m.com
Victoria Waranoski	UFP-SAP Primary Author	CH2M HILL	703-376-5049	victoria.waranoski@ch2m.com
To be Determined (TBD)	Field Team Leader (FTL)	CH2M HILL	TBD	TBD
TBD	Field Staff	CH2M HILL	TBD	TBD
Garth Herdrich	PM	GPL Laboratories, LLLP	301-694-5310	herdrich@gplab.com
Rita Amin	Quality Assurance (QA) Officer	GPL Laboratories, LLLP	301-694-5310	amin@gplab.com
Carlton Beechler	PM	Columbia Analytical Services, Inc. (Rochester, NY)	585-288-5380	cbeechler@caslab.com
Lisa Reyes	QA Officer	Columbia Analytical Services, Inc. (Rochester, NY)	585-288-5380	lreyes@caslab.com
Laura Maschoff	PM	DataQual Environmental Services, LLC	314-849-6264	dataqual@charter.net

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SAP Worksheet #4—Project Personnel Sign-Off Sheet

Each organization will read the SAP and provide an original copy of the sign-off sheet to the PM for maintenance in the central project file.

Organization: GPL Laboratories, LLLP

Name	Title/Role	Telephone Number (optional)	Signature/E-mail Receipt	Date SAP Read
Garth Herdrich	PM	301-694-5310		
Rita Amin	QA Officer	301-694-5310		

Organization: Columbia Analytical Services, Inc. (Rochester, NY)

Name	Title/Role	Telephone Number (optional)	Signature/E-mail Receipt	Date SAP Read
Carlton Beechler	PM	585-288-5380		
Lisa Reyes	QA Officer	585-288-5380		

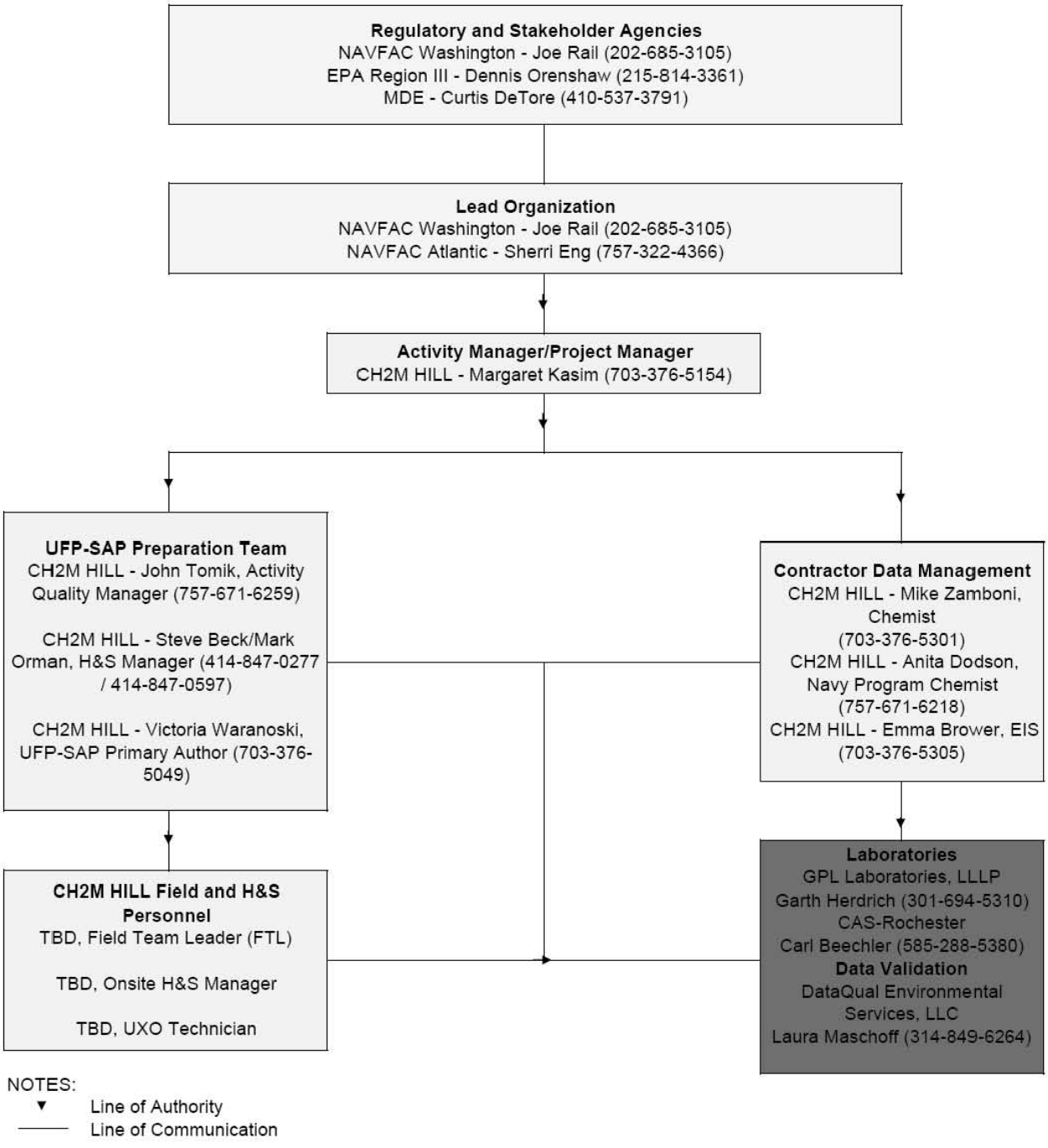
Organization: DataQual Environmental Services, LLC

Name	Title/Role	Telephone Number (optional)	Signature/E-mail Receipt	Date SAP Read
Laura Maschoff	PM	314-849-6264		

Organization: CH2M HILL

Name	Title/Role	Telephone Number (optional)	Signature/E-mail Receipt	Date SAP Read
Margaret Kasim	Naval Support Facility Indian Head (NSF-IH) AM and PM – CH2M HILL	703-376-5154		
John Tomik	Activity Quality Manager/Project Quality Manager–CH2M HILL	757-671-6259		
Steve Beck/Mark Orman	Health and Safety (H&S) Manager – CH2M HILL	414-847-0277/414-847-0597		
Anita Dodson	Navy Program Chemist – CH2M HILL	757-671-6218		
Brett Doerr	Navy CLEAN Program UFP-SAP Reviewer	757-671-6219		
Mike Zamboni	Project Chemist –CH2M HILL	703-376-5301		
Victoria Waranoski	UFP-SAP Primary Author – CH2M HILL	703-376-5049		
Emma Brower	Environmental Information Specialist (EIS) – CH2M HILL	703-376-5305		
TBD	Onsite H&S Manager	TBD		
TBD	FTL	TBD		

SAP Worksheet #5—Project Organizational Chart



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SAP Worksheet #6—Communication Pathways

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or e-mail	Procedure
Communication with Navy (lead agency)	Navy RPM	Joe Rail	202-685-3105 joseph.rail@navy.mil	• Primary point of contact (POC) for Navy • Delegate communication to other internal or external points of contact • RPM will notify EPA and MDE via email within 24 hours for field changes effecting the scope or implementation of the design • Navy will have 30 days for UFP-SAP review
Communication with EPA (regulatory agency)	RPM	Dennis Orenshaw	215-814-3361 orenshaw.dennis@epamail.epa.gov	• Primary POC for EPA • Delegate communication to other internal or external points of contact • Upon notification of field changes, EPA will have 24 hours to approve or comment on the field changes
Communication with MDE (regulatory agency)	RPM	Curtis DeTore	410-537-3791 cdetore@mde.state.md.us	• Primary POC for MDE • Delegate communication to other internal or external points of contact • Upon notification of field changes, MDE will have 24 hours to approve or comment on the field changes
Communication regarding overall project status and implementation and primary POC with Navy RPM, EPA, and MDE	AM	Margaret Kasim - CH2M HILL	703-376-5154 margaret.kasim@ch2m.com	• Margaret Kasim will forward all information and materials about the project to Joe Rail (NAVFAC Washington), Dennis Orenshaw (EPA), and Curtis DeTore (MDE) within 48 hours. • Oversees the overall project status

SAP Worksheet #6—Communication Pathways (continued)

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or e-mail	Procedure
Technical communications for project implementation, and data interpretation	Activity Quality Manager	John Tomik – CH2M HILL	757-671-6259 john.tomik@ch2m.com	• Contact Activity Quality Manager regarding questions/issues encountered in the field, input on data interpretation, as needed • Activity Quality Manager will have 24 hours to respond to technical field questions as necessary • Activity Quality Manager will review of the data as necessary prior to partnering team discussion
Communications regarding project management and implementation of all project phases, and primary POC with Navy RPM	PM	Margaret Kasim - CH2M HILL	703-376-5154 margaret.kasim@ch2m.com	• All information and materials about the project will be forwarded to Joe Rail by Margaret Kasim on a daily basis • If field changes occur during field activities, PM will work with the Navy RPM to communicate in field changes to the team via email within 24 hours
UFP-SAP changes in field	FTL	TBD	TBD	• Documentation of deviations from the UFP-SAP will be made in the field logbook and the PM will be notified immediately • Deviations made only with the approval from the PM
Daily Field Progress Reports	FTL	TBD	TBD	• Daily field progress reports will be either emailed or faxed to Margaret Kasim on a daily basis
H&S	Onsite H&S Officer	TBD	TBD	• Responsible for the adherence of team members to the site safety requirements described in the Health and Safety Plan (HASP) • Will report H&S incidents and near-misses to PM as soon as possible

SAP Worksheet #6—Communication Pathways (continued)

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or e-mail	Procedure
Reporting lab data quality issues	Laboratory QA officer	Rita Amin - GPL Lisa Reyes – CAS-Rochester	301-694-5310 amin@gplab.com 585-288-5380 lreyes@caslab.com	• All Quality Assurance/Quality Control (QA/QC) issues with project field samples will be reported within 2 days to the project chemist (Mike Zamboni) by the laboratory
Data tracking from collection through upload to database	EIS	Emma Brower - CH2M HILL	703-376-5305 emma.brower@ch2m.com	• EIS will track data from sample collection through upload to the database ensuring UFP-SAP requirements are met by laboratory and field staff • EIS will act as main POC for laboratory QA officer. • Lab issues will be reported to the PM and Project Chemist within 4 hours
Field and analytical corrective actions (CAs)	Project Chemist	Mike Zamboni – CH2M HILL	703-376-5301 michael.zamboni@ch2m.com	• Any CAs for field and analytical issues will be determined by the FTL and/or the Project Chemist and reported to the PM within 4 hours
Release of analytical data	Project Chemist	Mike Zamboni – CH2M HILL	703-376-5301 michael.zamboni@ch2m.com	• No analytical data can be released until validation of the data is completed and has been approved by the Project Chemist • The Project Chemist will review analytical results within 7 days of receipt for release to the project team

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SAP Worksheet #7—Personnel Responsibilities and Qualifications Table

Name	Title/Role	Organizational Affiliation	Responsibilities
Joe Rail	Navy RPM	NAVFAC Washington	Oversees project
Sherri Eng	Chemist	NAVFAC Atlantic	UFP-SAP QA officer
Margaret Kasim	AM/PM	CH2M HILL	Oversees the overall project status; Manages project and oversees project activities
Cathy Barnett	Project Delivery Manager	CH2M HILL	Ensures that deliverables are in accordance to CH2M HILL's standard
John Tomik	Activity Quality Manager	CH2M HILL	Provides UFP-SAP project delivery support
Anita Dodson	Navy CLEAN Program Chemist	CH2M HILL	Provides UFP-SAP project delivery support and program-level review of UFP-SAP
Brett Doerr	Navy CLEAN Program UFP-SAP Reviewer	CH2M HILL	Program level review of UFP-SAP
Mike Zamboni	Project Chemist	CH2M HILL	Assists in UFP-SAP preparation, interaction with the laboratory and data validator, and QA/QC oversight
Emma Brower	EIS	CH2M HILL	Data management;: manages sample tracking, communicates with laboratory and data validator
TBD	FTL	CH2M HILL	Coordinates and oversees all field activities and sampling
Steve Beck/Mark Orman	H&S Manager/H&S Officer	CH2M HILL	Prepares HASP; manages H&S for all field activities
TBD	UXO Technician	TBD	Responsible for anomaly avoidance.
Garth Herdrich	Laboratory PM	GPL Laboratories, LLLP	Manages samples tracking and maintains communication with Project Chemist and EIS
Rita Amin	Laboratory QA Officer	GPL Laboratories, LLLP	Responsible for audits, CAs, checks of QA performance within the laboratory
Carlton Beechler	Laboratory PM	Columbia Analytical Services, Inc. (Rochester, NY)	Manages sample tracking and maintains communications with Project Chemist and EIS.
Lisa Reyes	Laboratory QA Officer	Columbia Analytical Services, Inc. (Rochester, NY)	Responsible for audits, CAs, checks of QA performance within the laboratory.
Laura Maschoff	Data Validation PM	DataQual Environmental Services, LLC	Validate data received from laboratory prior to data use

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SAP Worksheet #8—Special Personnel Training Requirements Table

Project Function	Specialized Training By Title or Description of Course	Training Provider	Training Date	Personnel / Groups Receiving Training	Personnel Titles / Organizational Affiliation	Location of Training Records / Certificates
Igniter Area SI	Hazardous Waste Operations 40-hour training or 8-hour annual refresher, as appropriate	Registered training organization	Agency and subcontractor specific	FTL (TBD), field team members (TBD), site safety coordinator (TBD); onsite subcontractors (TBD); Navy and regulatory agency representatives	Field team members and site safety coordinators from CH2M HILL; UXO technician onsite visitors from Navy, EPA, and MDE	Contractor, Navy, regulatory agency, or subcontractor human resources department
Igniter Area SI	QA Manager	Registered training organization	Subcontractor specific	Onsite QA Manager	QA Manager from CH2M HILL	Subcontractor human resources department
Igniter Area SI	Site Safety Coordinator Hazardous Waste	Registered training organization	Subcontractor specific	Onsite H&S Officer	Onsite H&S Officer from CH2M HILL	Subcontractor human resources department
Igniter Area SI	UXO Safety Training	Registered training organization	Subcontractor specific	UXO Technician	UXO Technician	Subcontractor human resources department

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SAP Worksheet #9—Project Scoping Session Participants Sheet

Project Name: Igniter Area – UXO 19 SI **Projected Date(s) of Sampling:** Fall 2009 **PM:** Margaret Kasim –CH2M HILL	**Site Name:** Igniter Area - UXO 19 **Site Location:** NSF-IH, Indian Head, Maryland
Date of Session: February 18, 2009 **Scoping Session Purpose:** Obtain Tier I Partnering Team buy-in on SI approach	

Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Joe Rail	Navy RPM	NAVFAC Washington	202-685-3105	joseph.rail@navy.mil	Navy RPM
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John Tomik	Activity Quality Manager	CH2M HILL	757-671-6259	john.tomik@ch2m.com	Senior Consultant
Ralph Basinski	N/A	Tetra Tech	N/A	N/A	N/A

Comments/Decisions

There were no comments made during the scoping session. The Indian Head Installation Restoration Team (IHIRT) reviewed the proposed plan, including the SI objectives, sediment sampling approach, project action limits, project decision conditions, and project quality objectives. The Team agreed upon the proposed plan for the Igniter Area and recommended the continuation of the UFP-SAP preparation and submittal. The presentation is provided in the IHIRT meeting minutes dated February 18, 2009.

Action Items

No action items were created during the scoping session.

Consensus Decisions

No consensus decisions were made during the scoping session.

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SAP Worksheet #10—Problem Definition

Location

NSF-IH is a naval facility located in northwestern Charles County, Maryland, approximately 25 miles southwest of Washington, DC. The facility consists of two tracts of land: the Main Installation on the Cornwallis Neck Peninsula and the Stump Neck Annex located across Mattawoman Creek (Figure 1). The Main Installation contains approximately 2,500 acres and is bounded by the Potomac River to the northwest, west, and south; Mattawoman Creek to the south and east; and the town of Indian Head to the northeast. The Stump Neck Annex contains approximately 1,084 acres and is bounded by Mattawoman Creek to the northeast, the Potomac River to the northwest, and Chicamuxen Creek to the south-southwest.

The Preliminary Assessment (PA) reported that the site is approximately 0.01 acre in size and is offshore along a wooded and marshy area in a small promontory known as "Thieves Point" on the Main Installation. During a site visit conducted on November 25, 2008, munitions-related items were observed scattered along the shoreline and in the water. As a result, the size of the area proposed for the munitions constituents (MC) investigation has increased to approximately 0.14 acre to ensure that the potentially affected area is investigated.

History

A small pile of igniters was found by Base personnel at the site during an extremely low tide in 1996 or 1997. Based on descriptions, the igniters were assumed to be electric primers or electrically primed rifle cartridges approximately .50 caliber in size. Furthermore, the igniters were suspected to be M2 and/or M60 time blasting fuse igniters. In March 2004, additional ordnance items were observed by Base personnel along the shoreline during a low tide event. These items appeared to be MK 1 MOD 1 or MK 2 MOD 0 float signals, and a 250-, 500-, or 750-pound old-style bomb.

Several of the igniters were reportedly picked up and disposed of, but it is unknown if the disposal of the remaining igniters occurred. The origin of the igniters, dates of use, or date of disposal were unknown. As part of the PA, a site visit was conducted in June 2003, but igniters were not observed and there were no indications of munitions and explosives of concern (MEC) because the site was covered with water. Based on the information collected during and presented in the PA, the site was categorized as a MEC Area. The PA recommended further investigation for MEC and MC.

Conceptual Site Model

The following subsections define the key aspects of the site's conceptual model of contaminant sources, release and transport mechanisms, and potential receptors. Because this investigation is being conducted primarily to determine if a release has occurred, a 3D conceptual site model will be provided in the SI report if warranted.

Physical Setting and Characteristics

The PA reported that the Igniter Area is offshore along a wooded and marshy area in a small promontory known as "Thieves Point" on the Main Installation (Figure 2). The site is approximately 0.01 acre in size (approximately 20 feet by 20 feet). The promontory is a wetland

SAP Worksheet #10—Problem Definition (continued)

and considered a species protection area. One structure nearby, Building 1451, was formerly used for storage and was vacant at the time of the PA.

On November 25, 2008, the Navy and CH2M HILL conducted a site visit. Building 1451 has been demolished since the PA was conducted. Igniters were not observed; however, munitions-related items, dead wood, and other debris were scattered not only at the Igniter Area, but also along an approximately 300-foot stretch of the land, shoreline, and shallow water. As a result, MEC and MC investigations will be conducted in a larger area, approximately 0.14 acre (300 feet along the shoreline by 20 feet of land), to address the entire area where MEC-related items were observed.

Topography

A general description of NSF-IH topography can be found in Section 3.2 of *Final Water Area Munitions* (WAMS) *Study, Naval District Washington, Indian Head, Maryland,(* hereafter referred to as the WAMS report) completed by Malcolm Pirnie in 2005.

The Igniter Area is located along the shoreline of Mattawoman Creek. The area is covered by water except during extremely low tides. The depth of the water at the site varies with the tide; however, the water in this area is relatively shallow. The topography of the site is flat to gently sloping. The Igniter Area is located off the road down a steep slope to the shoreline. This will affect the access of equipment and vehicles to the site.

Hydrology

The Igniter Area site lies offshore along a wooded and marshy area on a small promontory extending into Mattawoman Creek, which drains into the Potomac River. Wetlands are present on the eastern and southern portions of the promontory, which drain directly into Mattawoman Creek. Section 3.5 of the WAMS report describes the hydrology for NSF-IH.

Sources of Potential Releases

A pile of igniters was found at this site during an extremely low tide in 1996 or 1997. Several of the igniters were reportedly picked up and disposed of, but it is unknown if the disposal of the remaining igniters occurred. It is assumed that the items were discarded at this location or washed up from another location.

MEC (including discarded military munitions and UXO), MC (including lead styphnate; the filler material used in M2 and M60 igniters, and smoke composition; the filler material used in MK 1 MOD 1 and MK 2 MOD 0 float signals), and non-hazardous munitions-related scrap (e.g., fragmentation, base plates, inert mortar fins) are thought to be present at the site. Based on available information, the igniters are suspected to contain MC. There is potential for MC to have been released into the sediment via the deteriorating igniters, which are known to have been present at the site. The Igniter Area is not suspected to contain chemical warfare material-filled munitions or depleted uranium-associated munitions.

Potential Exposure Media

The potential exposure media for both human and ecological receptors pertaining to the Igniter Area are surface water/sediments. Exposure could also take place via the food chain (Malcolm

SAP Worksheet #10—Problem Definition (continued)

Pirnie, 2005). Based on current site conditions, the migration and transport of contaminants can be influenced by tidal currents, wave action, shoreline erosion, and sedimentation. The site is affected by tidal currents and waves, which have the potential to erode the shoreline as well as to migrate, bury, or uncover MEC at the site. MC migration routes include erosion/deposition, water currents, tides, and relocation during extreme weather events.

Given the igniters were observed near the shore, it is most likely that a release will be found near the potential source. Additionally, because of the less-dynamic nature of sediment (relative to the surface water), the most likely location to identify whether a release has occurred is in the sediment immediately adjacent to the suspected source. Therefore, for the purpose of the SI, sampling will take place near the potential source (in sediment) to increase the likelihood of finding a release.

Potential Receptors

- Potential current human receptors at the Igniter Area are Navy personnel (military and civilian), commercial/recreational users and trespassers (Malcolm Pirnie, 2005).
- No future changes in site use are anticipated; therefore, the potential future human receptors at the Igniter Area are Navy personnel (military and civilian), commercial/recreational users and trespassers (Malcolm Pirnie, 2005).
- Potential current and future ecological receptors are aquatic animals and plants as well as birds and small mammals (Malcolm Pirnie, 2005).
- It is recognized that MC may migrate by fate and transport mechanisms, which would potentially affect offsite receptors. However, fate and transport would tend to reduce concentrations of potential contaminants. Potential offsite receptors are not often quantified because exposure is lower than potential onsite receptors. Potential onsite receptor exposure scenarios will be assessed as a representation of the worst-case scenario.

Project Description

The Igniter Area SI consists of a MEC investigation (Section 2 of the SI Work Plan) and an MC investigation (Section 3 of the SI Work Plan). This UFP-SAP is in support of the MC investigation of the SI.

The PA indicated that the Igniter Area is 0.01 acre in size (approximately 20 feet by 20 feet). During the November 2008 site visit, munitions-related items were observed over an area greater than 0.01 acre. The items are scattered along the shoreline and in the water. Because of these findings, both the MEC and MC investigations will be conducted over a 0.14-acre area (Figure 3). This equates to an area approximately 300 feet along the shoreline by 20 feet of land. The investigation boundary has been agreed upon by the IHIRT at the February 2009 partnering meeting.

The MEC investigation will be conducted before the MC investigation. During the MEC investigation, two UXO technicians will identify and document items observed along the shoreline using a global positioning system (GPS) device. The MEC investigation will

SAP Worksheet #10—Problem Definition (continued)

Identify the types and locations of MEC at the site, while also providing technical information to support the MC investigation.

The MC investigation will be conducted following the MEC investigation. Four sediment samples will be collected from 0 to 6 inches below the sediment surface in Mattawoman Creek (Figure 3). Although potentially complete pathways exist for the exposure to surface water, this medium is more dynamic than sediment and has the tendency to dilute and reduce contaminant concentrations. Therefore, the optimal medium to identify potential releases is sediment.

Four sediment samples, collected by CH2M HILL, will be analyzed for Target Analyte List (TAL) metals and explosives. The TAL metals are aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc, herein referred to as METAL. The explosives are octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine, hexahydro-1,3,5-trinitro-1,3,5-triazine, 1,3,5-trinitrobenzene, 1,3-dinitrobenzene, methyl-2,4,6-trinitrophenylnitramine, nitrobenzene, 2,4,6-trinitrotoluene, 2-amino-4,6-dinitrotoluene, 4-amino-2,6-dinitrotoluene, 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, 4-nitrotoluene, PETN, nitroguanidine, nitrocellulose, nitroglycerin, and perchlorate, herein referred to as EXPLO. The proposed sample locations are equidistant along the shoreline, resulting in a uniform sample grid. Based on the results of the MEC investigation, the proposed sediment sample locations may be revised. If items are identified during the MEC investigation, the equidistant sediment sample locations will be relocated and biased around the identified MEC/igniter items. Any deviation from the proposed sample locations will be documented and located with a GPS. Because these sample locations are along the shoreline, utility clearance will not be performed.

The results of the SI will be presented in a report for use by the IHIRT to make a management decision for the path forward for the Igniter Area. The two possible management decision outcomes are to: (1) perform a remedial investigation and/or other investigation as warranted based on the presence of MC in the sediment; and (2) remove the site from further study and recommend no further action (NFA) based on the absence of MC in sediment (Figure 4).

Environmental Questions answered by this Project

The objective of the SI is to assess if MC is likely to be present in sediment along the shoreline of the Igniter Area. This objective will be accomplished through the collection of four sediment samples along the shoreline. The samples will be analyzed for METAL and EXPLO.

1. **How will the MC investigation be optimized based on the results of the MEC investigation?**

   As stated above, four sediment samples will be collected from the shoreline of Mattawoman Creek after the MEC investigation has been completed. The proposed sample locations are equidistant along the shoreline, resulting in a uniform sample grid. Based on the results of the MEC investigation, the proposed sediment sample locations may be revised. If items are

SAP Worksheet #10—Problem Definition (continued)

identified during the MEC investigation, the equidistant sediment sample locations will be relocated and biased around the identified MEC/igniter items.

2. **Is MC present in the Igniter Area?**

   Previous environmental samples have not been collected at the site. Therefore, sediment samples will be analyzed for METAL and EXPLO. Refer to Worksheet 15 for the Method Detection Limits (MDLs) and Quantitation Limits (QLs) for each constituent being sampled.

3. **If present, do the MC warrant further investigation or NFA?**

   The results from the sediment sampling will support the decision for further investigation/NFA at the site. Any future action at the Igniter Area will be agreed upon by the IHIRT. Refer to the Project Quality Objectives (PQOs) at the end of Worksheet #11 and Figure 4 for the decision criteria used to evaluate the path forward at the site.

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SAP Worksheet #11—Project Quality Objectives/Systematic Planning Process Statements

- **Who will use the data?**

  Based on the MEC investigation results, the sediment sampling locations may be altered to achieve the overall goals of the SI. Participants from the Tier I Partnering Team (MDE, EPA, Navy, and CH2M HILL) will use the data to evaluate overall site conditions and potential future action. Other technically focused disciplines within each organization may use the data as well. Chemists may use the data to evaluate overall data quality with respect to subcontracted laboratories and/or conditions in the sediment.

- **What are the Project Action Limits (PALs)?**

  PALs for METAL and EXPLO can be found in Worksheet 15. PALs for the constituents are the regional screening levels (RSLs) multiplied by a factor of 10 for sediment. The concentrations of detected constituents will be screened against PALs to support the decision for further investigation/NFA at the site. The laboratory QLs were set considering the PALs. The PALs are supported by the QLs except when an RSL value was unavailable. In the case of METAL, this applies only to nutrients, which are analyzed for informational purposes. In the case of EXPLO, this applies to PETN and nitrocellulose. Nondetects will be considered "not present" at the site. Detections will be further evaluated to determine if a potential risk exists.

- **What will the data be used for?** The results of the sediment samples will be used to: 1) confirm the presence or absence of MC, METAL and EXPLO in the sediment along the shoreline of Igniter Area evaluated under the PA, and 2) assess whether further investigation is needed at the site.

- **What types of data are needed (matrix, target analytes, analytical groups, field screening, onsite analytical or offsite laboratory techniques, sampling techniques)?**

  Worksheet #17 contains detailed information on the types of data needed for this project.

  Each sediment sample will be collected using a disposable trowel and pan. The four sediment locations will be accessed by wading to them during low tide. It is assumed that the samples will not be collected in areas under water. If it is necessary to collect samples under shallow water, each sediment sample will be collected using a disposable liner and cap to ensure the sediment is not dispersed in the current. Samples will be analyzed for METAL and EXPLO by an offsite laboratory.

- **How "good" do the data need to be in order to support the environmental decision?**

  All data will be distributed to a third-party validator for data quality evaluation purposes. Data package requirements for each event are detailed below. QC data requirements are detailed in Worksheet #20.

SAP Worksheet #11—Project Quality Objectives/Systematic Planning Process Statements (continued)

Sediment sampling— A Level IV package (all laboratory forms, raw data, and a summary package) and QC sampling are required. These data will be used to determine the presence or absence of MC and support the decision for further investigation/NFA at the site. Refer to the PQOs for decision criteria.

- **How much data should be collected (number of samples for each analytical group, matrix, and concentration)?**

  Detailed information on how much data will be collected is provided on Worksheet #17. General information is discussed below.

  Sediment samples will be collected from four locations for analysis of METAL and EXPLO.

- **Where, when, and how should the data be collected/generated?**

  Detailed information on where, when, and how the data will be collected is provided in Worksheet #14.

  Sediment sampling— Will be conducted from a total of four locations after the MEC investigation has been completed. The sampling scheme is presented on Worksheet #18.

- **Who will collect and generate the data? How will the data be reported?**

  CH2M HILL will collect the sediment samples. Data will be generated by GPL Laboratories and CAS-Rochester. An SI report will be prepared following the investigation to report on all data collected and evaluate the potential for future action at the site.

- **How will the data be archived?**

  The data will be loaded to the Navy Installation Restoration Information System data base. Data archiving at the completion of the project will be in accordance with Navy CLEAN contractual requirements.

- **List the PQOs in the form of if/then qualitative and quantitative statements.**

  – If after the sediment sampling event, MC (which can be attributed to MEC) is detected at the Igniter Area and exceeds screening criteria, then further investigation for MC at the site will be recommended (Figure 4). The Navy, EPA, and MDE will evaluate current site conditions and recommendations to assess future action and make the final decision.

  – If after the sediment sampling event, MC is absent at the Igniter Area, then NFA for MC at the site will be recommended (Figure 4). The Navy, EPA, and MDE will evaluate current site conditions and recommendations to assess NFA and make the final decision.

SAP Worksheet #12-1—Measurement Performance Criteria Table

Matrix: Sediment

Analytical Group: METAL

Concentration Level: Low (SW-846 6010B, 7471A, 9014)

Measurement Performance Criteria Table – Field QC Samples

QC Sample	Analytical Group[1]	Frequency	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
METALs by SW-846 6010B					
Matrix Spike (MS)	METAL	1 per batch of 20	accuracy	75-125% recovery	A
Matrix Spike Duplicate (MSD)	METAL	1 per batch of 20	accuracy, precision	75-125% recovery and <20% relative percent difference (RPD)	A
Field Duplicate	METAL	1 per 10 normal field samples	precision	<35% RPD	S&A
Equipment Rinseate Blank	METAL	1 per event for all disposable equipment	contamination, bias	concentration of all analytes < 1/2 QL. concentration of nutrients (Na, K, Ca, and Mg) < QL	S&A
Temperature Blank	METAL	1 per cooler	representativeness	2-6°C	S
Mercury by SW-846 7471A					
MS	METAL	1 per batch of 20	accuracy	75-125% recovery	A
MSD	METAL	1 per batch of 20	accuracy, precision	75-125% recovery and <20% RPD	A

SAP Worksheet #12-1—Measurement Performance Criteria Table (continued)

QC Sample	Analytical Group[1]	Frequency	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Field Duplicate	METAL	1 per 10 normal field samples	precision	<35% RPD	S&A
Equipment Rinseate Blank	METAL	1 per event for all disposable equipment	contamination, bias	concentration of mercury < QL	S&A
Temperature Blank	METAL	1 per cooler	representativeness	2-6°C	S
Cyanide by SW-846 9014					
MS	METAL	1 per batch of 20	accuracy	75-125% recovery	A
MSD	METAL	1 per batch of 20	precision	<15% RPD	A
Field Duplicate	METAL	1 per 10 normal field samples	precision	<35% RPD	S&A
Equipment Rinseate Blank	METAL	1 per event for all disposable equipment	contamination, bias	concentration of cyanide < QL	S&A
Temperature Blank	METAL	1 per cooler	representativeness	2-6°C	S

[1]If information varies within an analytical group, separate by individual analyte.

SAP Worksheet #12-2—Measurement Performance Criteria Table

Matrix: Sediment

Analytical Group: EXPLO

Concentration Level: Low (SW-846 8330, IAPP, SW-846 8332, SW-846 6850)

Measurement Performance Criteria Table – Field QC Samples

QC Sample	Analytical Group[1]	Frequency	DQIs	Measurement Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Nitroaromatics/Nitroamines, PETN, and Nitroguanidine by SW-846 8330					
MS	EXPLO	1 per batch of 20	accuracy	Per Worksheet #15-2	A
MSD	EXPLO	1 per batch of 20	accuracy, precision	Per Worksheet #15-2	A
Field Duplicate	EXPLO	1 per 10 normal field samples	precision	<35% RPD	S&A
Equipment Rinseate Blank	EXPLO	1 per event for all disposable equipment	contamination, bias	concentration of all analytes < 1/2 QL	S&A
Temperature Blank	EXPLO	1 per cooler	representativeness	2-6°C	S
Nitrocellulose by IAPP					
MS	EXPLO	1 per batch of 20	accuracy	32-148% recovery	A
MSD	EXPLO	1 per batch of 20	accuracy, precision	32-148% recovery and <15% RPD	A
Field Duplicate	EXPLO	1 per 10 normal field samples	precision	<35% RPD	S&A

SAP Worksheet #12-2—Measurement Performance Criteria Table (continued)

QC Sample	Analytical Group[1]	Frequency	DQIs	Measurement Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Equipment Rinseate Blank	EXPLO	1 per event for all disposable equipment	contamination, bias	concentration of all analytes < QL	S&A
Temperature Blank	EXPLO	1 per cooler	representativeness	2-6°C	S
Nitroglycerin by SW-846 8332					
MS	EXPLO	1 per batch of 20	accuracy	60-140% recovery	A
MSD	EXPLO	1 per batch of 20	accuracy, precision	60-140% recovery and <25% RPD	A
Field Duplicate	EXPLO	1 per 10 normal field samples	precision	<35% RPD	S&A
Equipment Rinseate Blank	EXPLO	1 per event for all disposable equipment	contamination, bias	concentration of all analytes < 1/2 QL	S&A
Temperature Blank	EXPLO	1 per cooler	representativeness	2-6°C	S
Perchlorate by SW-846 6850 (Department of Defense (DOD) Perchlorate Handbook)					
MS	EXPLO	1 per batch of 20	accuracy	60-140% recovery	A
MSD	EXPLO	1 per batch of 20	accuracy, precision	60-140% recovery and <25% RPD	A
Field Duplicate	EXPLO	1 per 10 normal field samples	precision	<35% RPD	S&A

SAP Worksheet #12-2—Measurement Performance Criteria Table (continued)

QC Sample	Analytical Group[1]	Frequency	DQIs	Measurement Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Equipment Rinseate Blank	EXPLO	1 per event for all disposable equipment	contamination, bias	concentration of all analytes < 1/2 QL	S&A
Temperature Blank	EXPLO	1 per cooler	representativeness	0-6°C	S

[1]If information varies within an analytical group, separate by individual analyte.

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SAP Worksheet #13—Secondary Data Criteria and Limitations Table

Secondary Data	Data Source (originating organization, report title and date)	Data Generator(s) (originating organization, data types, data generation / collection dates)	How Data Will Be Used	Limitations on Data Use
N/A	N/A	N/A	N/A	N/A

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SAP Worksheet #14—Summary of Project Tasks

Project Logistics

In general, work will be performed in Level D personal protective equipment (PPE), which includes hard hat, safety glasses, and safety toed boots. Optional PPE includes the use of Tyvek® coveralls. Upgrades to higher levels of PPE are discussed in the HASP, provided as Appendix C of the Work Plan.

All activities will take place during normal working hours. It is assumed that one 10-hour day will be required to collect the samples and package and ship them to the offsite laboratory for analysis. All efforts will be taken to minimize impacts to the nearby buildings and site activities.

Project Tasks

Applicable Standard Operating Procedures (SOPs) for project tasks outlined in this section are listed on Worksheet #21 and provided in Attachment A.

- **Utility Clearance**
  - Because the sediment sampling locations are in the water, utility clearance will not be performed.
- **Anomaly Avoidance**
  - Anomaly avoidance will be performed during field activities using the *SOP Explosives Usage and Munitions Response* located in Attachment A.
  - UXO technicians will be present during sediment sampling. They will provide the field team with guidance to safely obtain sediment samples with optimal locations near identified MEC items.
- **Sediment Sampling**
  - Four locations will be sampled using the *SOP Sediment Sampling* and *SOP Homogenization of Soil and Sediment Samples* located in Attachment A.
  - Caution will be used to ensure that MEC items are not encountered during sample collection, which will be located around the MEC items.
  - It is assumed that the four sediment locations will be accessed by wading or walking to them during low tide.
  - All sediment samples will be collected from 0 to 6 inches below the sediment surface using manual excavation.
  - Each sample will be collected for METAL and EXPLO, as detailed on Worksheet #18.
- **Decontamination and Waste Management**
  - All sampling equipment will be disposable. Therefore, it is assumed that liquid investigation-derived waste (IDW) will not be generated.

SAP Worksheet #14—Summary of Project Tasks (continued)

  - It is assumed that any remaining sediment that is not sent to the laboratory will be left at the location at which it was collected. Therefore, it is assumed that solid IDW will not be generated.

- **Quality Control**
  - Implement SOPs for field (Attachment A) and laboratory (Attachment B) activities being performed.
  - QA/QC samples to be collected are outlined on Worksheet #20.
- **Analytical Tasks**
  - The laboratory will maintain, test, inspect, and calibrate analytical instruments (Worksheets #24 and #25).
  - The laboratory will process and prepare samples for analysis.
  - The laboratory will analyze sediment samples for various groups of parameters, as shown on Work Sheet #18: METAL and EXPLO.
- **Data Management**
  - Attachment A provides guidance on data management steps, such as data requirements and format for field log books and information on chain-of-custody procedures. The CH2M HILL Project EIS, Emma Brower, is responsible for data tracking and storage and will coordinate archiving and retrieval of data.
- **Procedures for recording data, including guidelines for recording and correcting data.**
  - Project Assessment/Audit (Worksheets #31 and #32)
  - Data Review
    - Data Validation (Worksheets #35 and #36)
    - Data Usability Assessment (Worksheet #37)

SAP Worksheet #15-1—Reference Limits and Evaluation Table

Matrix: Sediment

Analytical Group: METAL

Analyte	CAS Number	RSLs Res Soil X 10 for SD Adjusted (micrograms per kilogram [µg/kg])	PAL[1] (µg/kg)	Project Quantitation Limit (PQL) Goal[2] (µg/kg)	Laboratory-specific	
					QLs (µg/kg)	MDLs (µg/kg)
Aluminum	7429-90-5	77000000	77000000	38500000	20000	2190
Antimony	7440-36-0	31000	31000	15500	2000	240
Arsenic	7440-38-2	3900	3900	3900	2000	260
Barium	7440-39-3	15000000	15000000	7500000	500	10
Beryllium	7440-41-7	160000	160000	80000	200	10
Cadmium	7440-43-9	70000	70000	35000	600	20
Calcium	7440-70-2	NUT	N/A	100000	100000	5520
Chromium	7440-47-3	2800000	2800000	1400000	500	60
Cobalt	7440-48-4	23000	23000	11500	500	70
Copper	7440-50-8	3100000	3100000	1550000	1000	140
Iron	7439-89-6	55000000	55000000	27500000	15000	1910
Lead	7439-92-1	400000	400000	200000	1000	170
Magnesium	7439-95-4	NUT	N/A	25000	25000	1000
Manganese	7439-96-5	1800000	1800000	900000	500	10
Mercury	7439-97-6	23000	23000	11500	30	10
Nickel	7440-02-0	1600000	1600000	800000	1000	110
Potassium	7440-09-7	NUT	N/A	25000	25000	750
Selenium	7782-49-2	390000	390000	195000	2000	450
Silver	7440-22-4	390000	390000	195000	500	30
Sodium	7440-23-5	NUT	N/A	250000	250000	13300
Thallium	7440-28-0	5100	5100	5100	3000	550

SAP Worksheet #15-1—Reference Limits and Evaluation Table (continued)

Analyte	CAS Number	RSLs Res Soil X 10 for SD Adjusted (µg/kg)	PAL[1] (µg/kg)	PQL Goal[2] (µg/kg)	Laboratory-specific	
Vanadium	7440-62-2	550000	550000	275000	1000	50
Zinc	7440-66-6	23000000	23000000	11500000	2000	210
Cyanide	57-12-5	1600000	1600000	800000	250	84

Shading indicates rows where the laboratory specific QL is greater than the PQL Goal.

NUT: No screening level for this compound because it is a nutrient.

N/A: Not applicable

[1]The PAL is "RSLs Res Soil X 10 for SD Adjusted".

[2]The PQL Goal is 1/2 the PAL, the PAL, or the Laboratory-Specific QL, as applicable.

SAP Worksheet #15-2—Reference Limits and Evaluation Table

Matrix: Sediment
Analytical Group: EXPLO

Analyte	CAS Number	RSLs Res Soil X 10 for SD Adjusted (µg/kg)	PAL[1] (µg/kg)	PQL Goal[2] (µg/kg)	Laboratory-specific		Laboratory-specific Control Limits (MS/MSD and LCS)		
					QLs (µg/kg)	MDLs (µg/kg)	LCL (%)	UCL (%)	RPD (%)
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	2691-41-0	3800000	3800000	1900000	80	14	65	135	25
Hexahydro-1,3,5-trinitro-1,3,5-triazine	121-82-4	55000	55000	27500	80	12	65	145	25
1,3,5-Trinitrobenzene	99-35-4	2200000	2200000	1100000	40	5	65	135	25
1,3-Dinitrobenzene	99-65-0	6100	6100	3050	40	5.2	70	135	25
Methyl-2,4,6-trinitrophenylnitramine	479-45-8	240000	240000	120000	80	22	10	200	25
Nitrobenzene	98-95-3	31000	31000	15500	40	4.8	70	130	25
2,4,6-Trinitrotoluene	118-96-7	36000	36000	18000	40	5.8	45	145	25
2-Amino-4,6-dinitrotoluene	35572-78-2	150000	150000	75000	40	5.1	75	130	25
4-Amino-2,6-dinitrotoluene	19406-51-0	150000	150000	75000	40	7.9	75	130	25
2,4-Dinitrotoluene	121-14-2	120000	120000	60000	40	7.3	75	130	25
2,6-Dinitrotoluene	606-20-2	61000	61000	30500	40	2.5	70	130	25
2-Nitrotoluene	88-72-2	29000	29000	14500	80	25	70	130	25
3-Nitrotoluene	99-08-1	1200000	1200000	600000	80	14	70	130	25
4-Nitrotoluene	99-99-0	240000	240000	120000	80	34	70	135	25
PETN	78-11-5	NC	N/A	200	200	29	50	130	25
Nitroguanidine	556-88-7	6100000	6100000	3050000	120	11	40	120	25
Nitrocellulose	9004-70-0	NC	N/A	7140	7140	2330	See Worksheet 12-2 and 28-2		
Nitroglycerin	55-63-0	6100	6100	6100	5000	1000			
Perchlorate[3]	14797-73-0	55000	55000	27500	2	0.98			

Shading indicates rows where the laboratory specific QL is greater than the PQL Goal.

NC: No screening level for this compound.

N/A: Not applicable

[1]The PAL is "RSLs Res Soil X 10 for SD Adjusted".

[2]The PQL Goal is 1/2 the PAL, the PAL, or the Laboratory-Specific QL, as applicable.

[3]CAS-Rochester's Datachem's QL and MDL are presented. As of March, 2009, GPL has not yet completed the Naval Facilities Engineering Service Center (NFESC) evaluation or established a QL or MDL for perchlorate.

SAP Worksheet #15-3—Reference Limits and Evaluation Table

Matrix: AQ (Blanks)
Analytical Group: METAL

Analyte	CAS Number	PAL1 (µg/L)	PQL Goal2 (µg/L)	Laboratory-specific	
				QLs (µg/L)	MDLs (µg/L)
Aluminum	7429-90-5	N/A	200	200	26.7
Antimony	7440-36-0	N/A	20	20	3.9
Arsenic	7440-38-2	N/A	20	20	4.2
Barium	7440-39-3	N/A	5	5	0.16
Beryllium	7440-41-7	N/A	2	2	0.1
Cadmium	7440-43-9	N/A	6	6	0.21
Calcium	7440-70-2	N/A	1000	1000	56.2
Chromium	7440-47-3	N/A	5	5	0.63
Cobalt	7440-48-4	N/A	5	5	0.67
Copper	7440-50-8	N/A	10	10	1.4
Iron	7439-89-6	N/A	150	150	15.4
Lead	7439-92-1	N/A	10	10	1.2
Magnesium	7439-95-4	N/A	250	250	11.6
Manganese	7439-96-5	N/A	5	5	0.19
Mercury	7439-97-6	N/A	0.2	0.2	0.019
Nickel	7440-02-0	N/A	10	10	0.9
Potassium	7440-09-7	N/A	250	250	47.6
Selenium	7782-49-2	N/A	20	20	1.7
Silver	7440-22-4	N/A	5	5	0.47
Sodium	7440-23-5	N/A	2500	2500	255
Thallium	7440-28-0	N/A	30	30	4.1
Vanadium	7440-62-2	N/A	10	10	0.83
Zinc	7440-66-6	N/A	20	20	1.6
Cyanide	57-12-5	N/A	5	5	1.3

Shading indicates rows where the laboratory specific QL is greater than the PQL Goal.

N/A: Not applicable

[1]There are no project action levels for Aqueous METAL samples because they are blanks.

[2]The PQL Goal is 1/2 the PAL, the PAL, or the Laboratory-Specific QL, as applicable.

SAP Worksheet #15-4—Reference Limits and Evaluation Table

Matrix: AQ (Blanks)

Analytical Group: EXPLO

Analyte	CAS Number	PAL[1] (µg/L)	PQL Goal[2] (µg/L)	Laboratory-specific		Laboratory-specific Control Limits (MS/MSD and LCS)		
				QLs (µg/L)	MDLs (µg/L)	LCL (%)	UCL (%)	RPD (%)
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	2691-41-0	N/A	0.4	0.4	0.13	75	120	25
Hexahydro-1,3,5-trinitro-1,3,5-triazine	121-82-4	N/A	0.4	0.4	0.068	35	180	25
1,3,5-Trinitrobenzene	99-35-4	N/A	0.2	0.2	0.035	50	150	25
1,3-Dinitrobenzene	99-65-0	N/A	0.2	0.2	0.022	30	175	25
Methyl-2,4,6-trinitrophenylnitramine	479-45-8	N/A	0.4	0.4	0.18	10	200	25
Nitrobenzene	98-95-3	N/A	0.2	0.2	0.038	35	155	25
2,4,6-Trinitrotoluene	118-96-7	N/A	0.2	0.2	0.024	35	160	25
2-Amino-4,6-dinitrotoluene	35572-78-2	N/A	0.2	0.2	0.023	35	170	25
4-Amino-2,6-dinitrotoluene	19406-51-0	N/A	0.2	0.2	0.028	40	170	25
2,4-Dinitrotoluene	121-14-2	N/A	0.2	0.2	0.073	50	145	25
2,6-Dinitrotoluene	606-20-2	N/A	0.2	0.2	0.028	50	150	25
2-Nitrotoluene	88-72-2	N/A	0.4	0.4	0.075	30	150	25
3-Nitrotoluene	99-08-1	N/A	0.4	0.4	0.088	35	145	25
4-Nitrotoluene	99-99-0	N/A	0.4	0.4	0.12	35	145	25
PETN	78-11-5	N/A	1	1	0.35	50	130	25
Nitroguanidine	556-88-7	N/A	10	10	2.8	50	125	25
Nitrocellulose	9004-70-0	N/A	357	357	99	See Worksheet #28-4		
Nitroglycerin	55-63-0	N/A	1000	1000	20			
Perchlorate[3]	14797-73-0	N/A	0.2	0.2	0.017			

Shading indicates rows where the laboratory specific QL is greater than the PQL Goal.

N/A: Not applicable

[1]There are no PALs for aqueous EXPLO samples because they are blanks.

[2]The PQL Goal is 1/2 the PAL, the PAL, or the Laboratory-Specific QL, as applicable.

[3]CAS-Rochester's Datachem's QL and MDL are presented. As of March, 2009, GPL has not yet completed the NFESC evaluation or established a QL or MDL for perchlorate.

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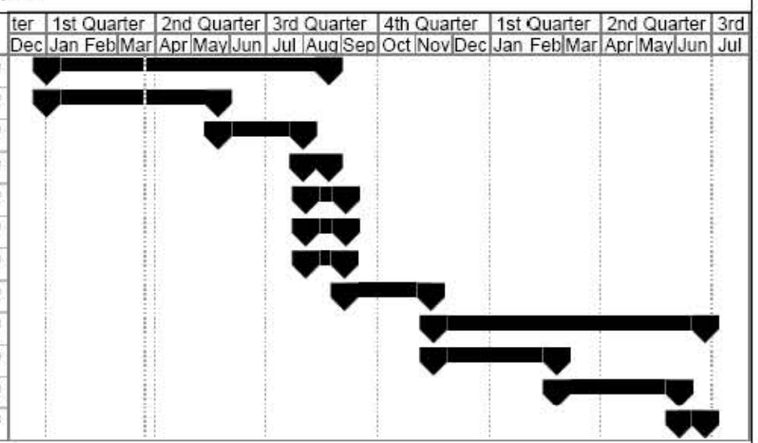
SAP Worksheet #16—Project Schedule / Timeline Table

Site Inspection at Igniter Area - UXO 19
Tentative Schedule for SI Work Plan, Fieldwork, and SI Report
NSF-IH, Indian Head, Maryland

ID	Task Name	Duration	Start	Finish
1	**SI Work Plan for Igniter Area**	**166 days**	**Fri 1/2/09**	**Fri 8/21/09**
2	**Pre-Draft Work Plan**	**101 days**	**Fri 1/2/09**	**Fri 5/22/09**
13	**Draft Work Plan**	**50 days**	**Fri 5/22/09**	**Fri 7/31/09**
19	**Final Work Plan**	**15 days**	**Fri 7/31/09**	**Fri 8/21/09**
23	**Fieldwork - Planning and Conducting**	**25 days**	**Mon 8/3/09**	**Fri 9/4/09**
24	**MEC**	**25 days**	**Mon 8/3/09**	**Fri 9/4/09**
27	**MC**	**24 days**	**Mon 8/3/09**	**Thu 9/3/09**
30	**Lab Anaysis and Data Loading**	**51 days**	**Fri 9/4/09**	**Fri 11/13/09**
35	**SI Report**	**160 days**	**Mon 11/16/09**	**Fri 6/25/10**
36	**Pre draft SI Report**	**72 days**	**Mon 11/16/09**	**Tue 2/23/10**
40	**Draft SI Report**	**73 days**	**Tue 2/23/10**	**Fri 6/4/10**
44	**Final SI Report**	**15 days**	**Fri 6/4/10**	**Fri 6/25/10**



Project: Igniter Area SI Tentative Sche
Date: Mon 3/23/09

Task | Milestone | External Tasks
Split | Summary | External Milestone
Progress | Project Summary | Deadline

Page 1

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SAP Worksheet #17—Sampling Design and Rationale

Matrix	Depth of Samples	Analysis	Method	Number of Samples	Rationale	Sampling Strategy
Sediment	0 to 6 inches	TAL Metals	SW-846 6010B	4	Sediment samples will be collected from a total of four locations around the identified MEC items along the shoreline. The sediment sampling analysis will determine if 1) MC is present or absent and 2) support the decision for the path forward for the site.	This is the MC investigation portion of the SI. Sediment samples will be collected by implementing standard techniques using disposable trowels and pans. Samples will be taken after the MEC investigation has been completed.
		Cyanide	SW-846 9012	4		
		Mercury	SW-846 7471A	4		
		Explosives, nitroguanidine, PETN	SW-846 8330	4		
		Nitrocellulose	IAPP	4		
		Nitroglycerin	SW-846 8332	4		
		Perchlorate	SW-846 6850	4		

Note:

Number of samples does not include the QA/QC requirements (field duplicate, MS, MSD, and equipment blank). Refer to Worksheet #15 for additional information.

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SAP Worksheet #18—Sampling Locations and Methods/SOP Requirements Table

Sediment Sampling

Sampling Location / ID Number	Matrix	Depth (units)	Analytical Group	Number of Samples (identify field duplicates)	Sampling SOP Reference1
ISUXO19SD01/ISUXO19SD010006	Sediment (SD)	0 to 6 inches	METAL and EXPLO (See Worksheet #15)	See Worksheets #14 and #20	Worksheet #14 and Attachment A
ISUXO19SD02/ISUXO19SD010006P					
ISUXO19SD03/ISUXO19SD020006					
ISUXO19SD03/ISUXO19SD030006					
ISUXO19SD04/ISUXO19SD040006 (plus MS/MSD)					
ISUXO19EBMMDDYY	Water	N/A	METAL and EXPLO (See Worksheet #15)		

Notes:

Tentative location for duplicate sample labeled with P. Actual duplicate sample will be taken from the area most heavily contaminated with MEC.

Tentative location for MS/MSD sample. Actual MS/MSD sample will be taken from the area least contaminated with MEC.

All samples will be named in accordance with sample nomenclature scheme for NSF-IH.

MMDDYY – represents the month, day, and year on which the samples were collected.

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SAP Worksheet #19—Analytical SOP Requirements Table

Matrix	Analytical Group	Analytical and Preparation Method / SOP Reference[1]	Containers (number, size, and type)	Sample Volume[2] (units)	Preservation Requirements (chemical, temperature, light-protected)	Maximum Holding Time[3] (preparation / analysis)
SD	METAL	SW-846 6010B / H.10	one of 4oz soil jar	2.0g	2-6°C	6 months
		SW-846 7471A / H.12		1.0g		28 days
		SW-846 9014 / J.43		2.0g		14 days
SD	EXPLO	SW-846 8330 / S.1	one of 8oz soil jar	20g	2-6°C	14 days / 40 days
		IAPP / J.28, J.8		5g		28 days
		SW-846 8332 / S.7		20g		14 days / 40 days
		SW-846 6850 / HPLC-6850	one of 8oz soil jar	2.0g	0-6°C, protect from light	28 days
AQ	METAL	SW-846 6010B / H.10	one of 250mL high-density polyethylene (HDPE)	200mL	HNO_3 to pH < 2, 2-6°C	6 months
		SW-846 7470A / H.12		200mL		28 days
		SW-846 9014 / J.43	one of 250mL HDPE	100mL	NaOH to pH > 12, 2-6°C	14 days
AQ	EXPLO	SW-846 8330 / S.1	two of 1L amber	1000mL	2-6°C	7 days / 40 days
		IAPP / J.28, J.8	two of 1L amber	200mL	2-6°C	28 days
		SW-846 8332 / S.7	two of 1L amber	1000mL	2-6°C	7 days / 40 days
		SW-846 6850 / HPLC-6850	one of 125mL HDPE	100mL	0-6°C, headspace in jar, protect from light[4]	28 days

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

[2]Provide the minimum sample volume or mass requirement if it differs from the container volume.

[3]Maximum holding time is calculated from the time the sample is collected to the time the sample is prepared/extracted.

[4]Field filtration with 0.2µm PTFE is not necessary since AQ samples are blanks only.

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SAP Worksheet #20—Field Quality Control Sample Summary Table

Matrix	Analytical Group	No. of Sampling Locations[2]	No. of Field Duplicates	No. of MS/MSDs[1]	No. of Field Blanks[4]	No. of Equip. Blanks[5]	No. of VOA Trip Blanks	No. of PT Samples[3]	Total No. of Samples to Lab
SD	METAL	4	1	1	0	1			8
SD	EXPLO	4	1	1	0	1			8

[1]Although the MS/MSD is not typically considered a field QC, it is included here because location determination is often established in the field.

[2]If samples will be collected at different depths at the same location, count each discrete sampling depth as a separate sampling location or station.

[3]The number of batch or project-specific proficiency testing samples are optional but highly recommended.

[4]Field blanks will not be collected during this effort. Instead, equipment blanks will be collected in the field, such that they are subject to both equipment and ambient field contamination.

[5]When all disposable equipment is used, one equipment blank is collected per event. The purpose is to demonstrate that the disposable equipment is not contributing to sample concentrations.

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SAP Worksheet #21—Project Sampling SOP References Table

Reference Number	Title, Revision Date and / or Number	Originating Organization of Sampling SOP	Equipment Type	Modified for Project Work? (Y/N)	Comments
SOP-001	Chain of Custody (COC)	CH2M HILL	N/A	N	N/A
SOP-002	Homogenization of Soil and Sediment Samples	CH2M HILL	Sample containers, disposable spoons or spatulas, and disposable pans	N	N/A
SOP-003	Preparing Field Log Books	CH2M HILL	Log book, indelible pen	N	N/A
SOP-004	Sediment Sampling	CH2M HILL	Sample collection device, disposable spoon or spatula, measuring tape, log book, PPE, materials for classifying soils, and sample jars.	N	N/A
SOP-005	Explosives Usage and Munitions Response	CH2M HILL	Schonstedt metal detector	N	N/A

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SAP Worksheet #22—Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field Equipment	Calibration Activity	Maintenance Activity	Testing/ Inspection Activity	Frequency	Acceptance Criteria	Corrective Action (CA)	Responsible Person	SOP Reference
Schonstedt metal detector	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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SAP Worksheet #23—Analytical SOP References Table

Lab SOP Number	Title, Revision Date, and / or Number	Date Last Revisited if not Revised	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work?1 (y/n)
D.1	Laboratory Waste Handling and Storage Procedure, 10/06, Rev. 5	11/08	N/A	N/A	N/A	GPL Laboratories, LLLP	N
F.2	Sample Receipt, Inspection, Preservation and Storage Condition Requirements, 04/08, Rev. 19		N/A	N/A	N/A	GPL Laboratories, LLLP	N
F.3	Sample Logging and Record Keeping, 02/03, Rev. 6	9/08	N/A	N/A	N/A	GPL Laboratories, LLLP	N
G.7	Balance Calibration, Maintenance, and Use, 10/05, Rev. 7	10/08	Definitive	All	analytical balance	GPL Laboratories, LLLP	N
G.12	Standard Operating Procedures for Submitting Reports, 10/06, Rev. 7	10/08	N/A	N/A	N/A	GPL Laboratories, LLLP	N
H.8	Acid Digestion of Aqueous Samples, EP and TCLP Extracts and Waste that contain Suspended Solids for ICP and ICPMS Analysis in Accordance with SW-846 Method 3010A, 03/08, Rev. 13		Definitive	AQ / METAL	N/A	GPL Laboratories, LLLP	N
H.10	Trace ICP Quantitation for HSL Metals plus Boron, Molybdenum, Silicon, Strontium, Titanium, and Tin According to Method 6010B11/08, Rev. 19		Definitive	SD, AQ / METAL	ICP-AES	GPL Laboratories, LLLP	N
H.12	Cold Vapor Analysis for Mercury in Accordance with SW-846 Methods 7470A and 7471B, 11/08, Rev. 24		Definitive	SD, AQ / METAL	CVAA	GPL Laboratories, LLLP	N
H.21	Acid Digestion of Soil, Sludge, Sediment, and Other Solid Waste Samples for ICP and ICPMS by SW846 Method 3050B, 11/08, Rev. 9		Definitive	SD, METAL	N/A	GPL Laboratories, LLLP	N
J.3	Cyanide, Total and Amenable (manual distillation), 10/06, Rev. 12	11/08	Definitive	SD, AQ / METAL	N/A	GPL Laboratories, LLLP	N
J.4	Percent Solids Determination Procedure, 11/07, Rev. 8	11/08	Definitive	All	analytical balance	GPL Laboratories, LLLP	N
J.8	Nitrogen, Nitrate-Nitrite (Colorimetric Automated Cadmium Reduction), 09/07, Rev. 11	11/08	Definitive	SD, AQ / EXPLO	Colorimeter	GPL Laboratories, LLLP	N
J.28	Nitrocellulose, 11/07, Rev. 9	11/08	Definitive	SD, AQ / EXPLO	Colorimeter	GPL Laboratories, LLLP	N
J.43	Cyanide, Total (colorimetric, manual spectrophotometric), 10/06, Rev. 6	11/08	Definitive	SD, AQ / METAL	UV/Vis Spectrophotometer	GPL Laboratories, LLLP	N
N.25	Soil Extraction for Explosives by Method 3550B, (Sonication Extraction), 11/02, Rev. 1	6/08	Definitive	SD / EXPLO	N/A	GPL Laboratories, LLLP	N
S.1	HPLC Analysis of Nitroaromatic and Nitramine Explosive Residues in Water, Soil, and Sediment Samples, 05/08, Rev. 25		Definitive	SD, AQ / EXPLO	HPLC	GPL Laboratories, LLLP	Y[3]

SAP Worksheet #23—Analytical SOP References Table (continued)

Lab SOP Number	Title, Revision Date, and / or Number	Date Last Revisited if not Revised	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work?1 (y/n)
S.7	HPLC Analysis of Nitroglycerine in Water and Soil Samples, 11/08, Rev. 8		Definitive	SD, AQ / EXPLO	HPLC	GPL Laboratories, LLLP	N
SMO-GEN	Standard Operating Procedure Sample Receiving, 1/22/08, Rev. 4	4/19/2008	N/A	N/A	N/A	Columbia Analytical Services, Inc. (Rochester, NY)	N
HPLC-6850	Standard Operating Procedure for Perchlorate in water, soils and solid wastes using high performance liquid Chromatography/Electrospray Ionization/Mass Spectrometry (HPLC/ESI/MS), 6/12/07, Rev. 3	Planned 3/25/09	Definitive	SD, AQ / EXPLO	LC/MS	Columbia Analytical Services, Inc. (Rochester, NY)	N

[1]If yes, then specify the modification that has been made. Note that any analytical SOP modification made relative to project-specific needs must be reviewed and approved by the Navy QA Officer.

[2]J.8 is referenced by J.28.

[3]S.1 is modified to include nitroguanidine.

SAP Worksheet #24—Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA[2]	SOP Reference[1]
HPLC	Initial Calibration	Annually, or more often whenever there is a change in the instrument response, a new column is installed, or major repairs are performed	Five- or six-point initial calibration for all analytes RPD ≤ 20% (or correlation coefficient > 0.995 if linear regression is used)	Check for source of error, repeat calibration	Analyst, Supervisor	S.1, S.7
	Continuing Calibration Verification (CCV)	Initially each day, after every ten sample injections,and at the end of the run	%Deviation </= 15% (20% for Nitroglycerine) or %recovery 85-115% (80-120% for Nitroglycerine)	Check for source of error, rerun (rerunning all samples after acceptable CCV), recalibration if failure repeats	Analyst, Supervisor	
ICP-AES	Initial Calibration	Daily	5 point initial calibration w/linear regression Correlation Coefficient >/= 0.995	recalibrate	Analyst, Supervisor	H.10
	CCV	initially, after every 10 sample injections, and at the end of the run	90-110% recovery	recalibrate and rerun all affected samples for the failing element	Analyst, Supervisor	
	Low-Level Check Standard	Once daily, before sample injections	80-120% recovery	recalibrate and rerun all affected samples for the failing element	Analyst, Supervisor	
	ICSA/ICSB (interference check standards)	Every 12 hours	ICSA recoveries must be within the absolute value of their concentration and ICSB recoveries must be within 20% of the true value	recalibrate and rerun all affected samples for the failing element	Analyst, Supervisor	
	Calibration Blank Check	after every CCV	concentrations ≤ quantitation limit	rerun samples or H-qualify if appropriate	Analyst, Supervisor	
CVAA	Initial Calibration	Daily	6 point initial calibration w/linear regression Correlation Coefficient ≥ 0.995	recalibrate	Analyst, Supervisor	H.12
	CCV	initially, after every 10 sample injections, and at the end of the run	80-120% recovery	recalibrate and rerun all affected samples	Analyst, Supervisor	
	Calibration Blank Check	after every CCV	concentrations ≤ QL	rerun affected samples	Analyst, Supervisor	
UV/Vis Spectrophotometer	Initial Calibration	Daily	6-point initial calibration w/linear regression Correlation Coefficient ≥ 0.995	recalibrate	Analyst, Supervisor	J.43
	Continuing Calibration Verification	initially, after every 10 sample injections, and at the end of the run	90-110% recovery	recalibrate and rerun all affected samples	Analyst, Supervisor	
	Calibration Blank Check	after every CCV	concentrations < QL	rerun affected samples	Analyst, Supervisor	

SAP Worksheet #24—Analytical Instrument Calibration Table (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA[2]	SOP Reference[1]
Colorimeter	Initial Calibration	Daily	6-point initial calibration w/linear regression Correlation Coefficient ≥ 0.995	recalibrate	Analyst, Supervisor	J.28, J.8
	CCV	initially, after every 10 injections, and at the end of the run	90-110% recovery	recalibrate and rerun all affected samples	Analyst, Supervisor	
	Calibration Blank Check	after every CCV	concentrations < QL	rerun affected samples	Analyst, Supervisor	
	Reduction Efficiency Check	Daily after initial calibration	10% difference between NO_3 and NO_2 results	repack Cd column and recalibrate	Analyst, Supervisor	
analytical balance	calibration check	Daily	3 weights are checked over the range of operation, readings should be within tolerances listed in the SOP	recalibrate	Analyst, Supervisor	G.7
LC/MS	Tune to m/z 69	After maintenance	N/A	N/A	Analyst	HPLC-6850
	Initial Calibration	After maintenance or any change in conductions	Correlation Coefficient ≥ 0.995	Repeat the initial calibration	Analyst	
	Initial Calibration Verification	After calibration standards	85-115% recovery	Terminate analyses, correct problem, Re-calibrate Instrument and Calibration Verification	Analyst	
	CCV	Each analysis and every 10 samples and at the end of each run	85-115% recovery	Fix problem and re-run samples	Analyst	

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

[2]Name or title of responsible person may be used.

SAP Worksheet #25—Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	CA	Responsible Person[2]	SOP Reference[1]
HPLC	check level of mobile phase and gas pressure, empty waste container, rinse column, change pre-column filter (as needed)	calibration/calibration check standard, baseline monitoring	check pump back-pressure, monitor baseline for fluctuations/excessive noise	daily	steady baseline and back-pressure, acceptable recovery of standards within retention time windows	rinse column with solvent, change pre-column filter, change column, recalibrate	Analyst, Supervisor	S.1, S.7
ICP-AES	drain waste line, check gas levels, clean inlet filter, check vacuum pump for oil, prepare fresh standards	calibration, continuing calibration and blanks	check gas and liquid lines for leaks, inspect torch glassware	daily	acceptable calibration and stable continuing standards	clean, replace trouble parts and repeat calibration	Analyst, Supervisor	H.10
CVAA	empty waste and liquid/gas separator, clean optics	calibration, continuing calibration and blanks	check pump tuing for wear, check optics, check drying tube	daily	acceptable calibration and stable continuing standards	replace pump tubing, clean optics, repeat calibration	Analyst, Supervisor	H.12
UV/Vis Spectrophotometer	Set wavelength and zero absorbance with reagent blank, clean cell path as needed	calibration curve and continuing standard and blank checks	wavelength and baseline (zero) fluctuation	daily and as necessary during the run	acceptable calibration and continuing checks	clean cell and windows, allow for longer warm-up time, repeat calibration	Analyst, Supervisor	J.43
Colorimeter	change pump tubing, repack/replace Cd reduction column, empty waste line, clean rinse reservoir, refill dilutor and carrier bottles with fresh DI water	calibration, reduction efficiency check, baseline monitoring	check pump tubing, watch manifold for evidence of excessive back pressure, reduction efficiency RPD	daily, as needed	reduction efficiency difference <10%, accpetable calibration and continuing standards	replace pump tubing, repack Cd column, replace manifold tubing, recalibrate	Analyst, Supervisor	J.28, J.8
Analytical Balance	clean balance. clean on, under, and around pan. clean along door path	calbration checks	check for dirt blocking doors, make sure pan is clean of dirt, oils or solvents, make sure anti-static chip is in place	daily	weight readings are within tolerance	clean and recalibrate	Analyst, Supervisor	G.7
LC/MS	Mass Axis Calibration, check gas and mobile phase levels	calibration and continuing standard checks	Tune report	daily	tune within vender specs	correct the problem, retune, and recalibrate	Analyst	HPLC-6850

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

[2]Name or title of responsible person may be used.

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SAP Worksheet #26—Sample Handling System

Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): FTL (TBD)/CH2M HILL
Sample Packaging (Personnel/Organization): Sample Processor or Field Team Member (TBD)/CH2M HILL
Coordination of Shipment (Personnel/Organization): Sample Processor or Field Team Member (TBD)/CH2M HILL
Type of Shipment/Carrier: Overnight/FedEx or Laboratory Courier
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Sample Receipt Personnel/GPL Laboratories, LLLP, Sample Receipt Personnel/CAS-Rochester
Sample Custody and Storage (Personnel/Organization): Sample Receipt Personnel/GPL Laboratories, LLLP, Sample Receipt Personnel/CAS-Rochester
Sample Preparation (Personnel/Organization): Extractions Personnel/GPL Laboratories, LLLP, Extractions Personnel/CAS-Rochester
Sample Determinative Analysis (Personnel/Organization): Analytical Personnel/GPL Laboratories, LLLP, Analytical Personnel/CAS-Rochester
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): 90 days
Sample Extract/Digestate Storage (No. of days from extraction/digestion): Extracts may be disposed of 90 days after extraction.
Biological Sample Storage (No. of days from sample collection): N/A
SAMPLE DISPOSAL
Personnel/Organization: Environmental H&S Officer/GPL Laboratories, LLLP, Environmental H&S Officer/CAS-Rochester
Number of Days from Analysis: Samples may be disposed of 90 days after report mail date

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SAP Worksheet #27—Sample Custody Requirements Table

Sample Labeling

Sample labels will include, at a minimum, client name, site, sample ID, date/time collected, analysis group or method, preservative, and sampler's initials. Labels will be taped to the jar to ensure they do not separate.

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory):

Samples will be collected by field team members under the supervision of the field team leader. As samples are collected, they will be placed into containers and labeled, as outlined above. Samples will be cushioned with packaging material and placed into coolers containing enough ice to keep the samples below 4°C until they are received by the laboratory. The COC form will also be placed into the cooler. Coolers will be shipped to the laboratory via FedEx, with the airbill number indicated on the COC form (to relinquish custody). If a laboratory courier is used, the courier will sign the COC form. Upon delivery, the laboratory will log in each cooler and report the status of the samples.

Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal):

See laboratory SOPs D1, F2, F3, G12, and SMO-GEN for details on waste handling, sample receipt, log-ins and record keeping, and submitting reports.

Sample Identification Procedures:

Upon opening the cooler, the receiving clerk signs the COC form and then takes the temperature using the temperature blank (if absent, then a sample container or infrared thermometer is used). The sample containers in the cooler are unpacked and checked against the client's COC form, and any discrepancies or breakage are noted on the COC form. Next, if any water samples require preservative, the clerk will check the pH values to see if they are in the acceptable pH range. The clerk will deliver the COC form (and any other paperwork; e.g. temperature or pH QA notice) to the PM for Laboratory Information Management System (LIMS) entry and client contact (if needed).

The field logbook will identify the sample ID with the location, depth, date/time collected, and the parameters requested. The laboratory will assign each field sample a laboratory sample ID based on information in the COC form. The laboratory will send sample log-in forms to the EIS to ensure that sample IDs and parameters are correct.

COC Procedures:

COCs will include, at a minimum, laboratory contact information, client contact information, sample information, and relinquished by/received by information. Sample information will include sample ID, date/time collected, number and type of containers, preservative information, analysis method, and comments. The COC form will also have the sampler's name and signature. The form will link the location of the sample from the field logbook to the laboratory receipt of the sample. The laboratory will use the sample information to populate the LIMS database for each sample.

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SAP Worksheet #28-1—Laboratory QC Samples Table

Matrix: SD
Analytical Group: METAL
Analytical Method / SOP Reference: SW-846 6010B, 7471A, 9014 / H.10, H.12, J.43

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
Method Blank	One per prep batch of 20 or fewer samples of similar matrix	concentration of all analytes < 1/2 QL. concentration of nutrients (Na, K, Ca, and Mg) < QL	If all related detects are > 10x the blank concentration, the results will be reported and the failure will be narrated. If related detects are < 10X the blank, the samples will be redigested and reanalyzed for the affected element. If any elements are detected at < the negative QL in the method blank, then the blank and all associated samples will be re-analyzed. For cyanide, any method blank contamination > QL will result in all affected samples being re-distilled and reanalyzed.	Analyst, Supervisor	contamination, bias	concentration of all analytes < 1/2 QL. concentration of nutrients (Na, K, Ca, and Mg) < QL
LCS	One per prep batch of 20 or fewer samples of similar matrix	metals and Hg: 80-120% recovery CN: 85-115% recovery	If recovery is greater than QC limits, but related data are < QL, results will be reported and the failure will be narrated. If recovery is low, or related data are > QL, the batch will be re-digested and reanalyzed.	Analyst, Supervisor	accuracy/bias	metals and Hg: 80-120% recovery CN: 85-115% recovery
MS	One per prep batch of 20 or fewer samples of similar matrix	75-125% recovery	If recoveries are within control limits for the LCS, MS failures will be narrated. If the MS recoveries are > QL and the samples are < QL for the affected element, results will be reported and the failure will be narrated. If both the MS and LCS recoveries are outside control limits, the batch will be re-prepared. If the native concentration of the affected element is > 4x the spike added, the failure will be appropriately flagged and narrated only. Elements with failed MS will be N-qualified as applicable.	Analyst, Supervisor	accuracy, bias	75-125% recovery
Matrix duplicate (or MSD)	One per prep batch of 20 or fewer samples of similar matrix	Same as MS and/or: Metals: RPD ≤ 20% Cyanide: RPD ≤ 15%	Sample results will be *-qualified and narrated for metals. Samples will be narrated for cyanide.	Analyst, Supervisor	accuracy/bias and/or precision	Same as MS and/or: Metals: RPD ≤ 20% Cyanide: RPD ≤ 15%
Serial Dilutions (6010B only)	One per prep batch of 20 or fewer samples of similar matrix	% Difference should be < 10% as long as the concentration is > 50x the quantitation limit	Samples with concentrations less than 50x the QL are not used for evaluation. Serial dilution failures result in E-qualification.	Analyst, Reporting	accuracy	% Difference should be < 10% as long as the concentration is > 50x the QL
Post-Digestion Spike (6010B only, for elements that have a failing MS)	One per prep batch of 20 or fewer samples of similar matrix	75-125% recovery	failures will be noted in the case narrative	Analyst, Supervisor	accuracy/bias	75-125% recovery

SAP Worksheet #28-2—Laboratory QC Samples Table

Matrix: SD
Analytical Group: EXPLO
Analytical Method / SOP Reference: SW-846 8330, 8332, IAAP, 6850 / S.1, S.7, J.28, J.8, HPLC-6850

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
EXPLOs, PETN, and Nitroguanidine by SW-846 8330						
Method Blank	One per batch of 20 or fewer samples of similar matrix	concentration of all analytes < 1/2 quantitation limit	If there are no related detects > QL, results will be reported and the blank contamination will be narrated. If related detects are > QL, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	contamination, bias	concentration of all analytes < 1/2 quantitation limit
LCS	One per batch of 20 or fewer samples of similar matrix	Per Worksheet #15-2	If there is a marginal exceedance (<5% outside the QC limits) for one compound or one compound and Tetryl, the results will be reported and the failure(s) will be narrated. If recoveries are > QC limits related detects are < QL, the results will be reported and the failure will be narrated. If related detects are > QL or the the LCS recovery is < QC limits, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	accuracy/bias	Per Worksheet #15-2
MS	One per batch of 20 or fewer samples of similar matrix	Per Worksheet #15-2	MS failures will be narrated if recoveries are within control limits for the LCS. If both the MS and LCS recoveries are outside control limits, the batch will be re-extracted and reanalyzed. If the unspiked concentration of an affected compound is > 4x the spike amount, the failure will be *-qualified and narrated only.	Analyst, Supervisor	accuracy/bias	Per Worksheet #15-2
MSD	One per batch of 20 or fewer samples of similar matrix	Per Worksheet #15-2	Reanalyze the MS/MSD. Repeated failures will be noted in the case narrative.	Analyst, Supervisor	accuracy/bias, precision	Per Worksheet #15-2
Surrogates	One per sample	31 - 129% recovery	Samples with high surrogate recoveries will be reported and the failure will be mentioned in the case narrative. Samples with low surrogate recoveries will be reported only if the method blank and LCS surrogate recoveries are within QC limits and the sample's surrogate recovery is >10%. All samples with surrogate recoveries <10% will be re-extracted and reanalyzed.	Analyst, Supervisor	accuracy/bias	31 - 129% recovery
Confirmation analysis	All samples with positive results	peaks within the retention time window for the compound on both columns	Results with RPD >40% (between columns) will be J-qualified as estimated concentrations	Analyst, Supervisor	presence/accuracy	peaks within the retention time window for the compound on both columns

SAP Worksheet #28-3—Laboratory QC Samples Table

Matrix: AQ
Analytical Group: METAL
Analytical Method / SOP Reference: SW-846 6010B, 7470A, 9014 / H.10, H.12, J.43

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
Method Blank	One per prep batch of 20 or fewer samples of similar matrix	concentration of all analytes < 1/2 QL. concentration of nutrients (Na, K, Ca, and Mg) < QL	If all related detects are > 10x the blank concentration, the results will be reported and the failure will be narrated. If related detects are < 10X the blank, the samples will be redigested and reanalyzed for the affected element. If any elements are detected at < the negative QL in the method blank, then the blank and all associated samples will be re-analyzed. For Cyanide, any method blank contamination > QL will result in all affected samples being re-distilled and reanalyzed.	Analyst, Supervisor	contamination, bias	concentration of all analytes < 1/2 QL. concentration of nutrients (Na, K, Ca, and Mg) < QL
LCS	One per prep batch of 20 or fewer samples of similar matrix	metals and Hg: 80-120% recovery CN: 85-115% recovery	If recovery is greater than QC limits, but related data are < QL, results will be reported and the failure will be narrated. If recovery is low, or related data are > QL, the batch will be re-digested and reanalyzed.	Analyst, Supervisor	accuracy/bias	metals and Hg: 80-120% recovery CN: 85-115% recovery
MS	One per prep batch of 20 or fewer samples of similar matrix	metals and Hg: 75-125% recovery CN: 85-115% recovery	If recoveries are within control limits for the LCS, MS failures will be narrated. If the MS recoveries are > QL and the samples are < QL for the affected element, results will be reported and the failure will be narrated. If both the MS and LCS recoveries are outside control limits, the batch will be re-prepared. If the native concentration of the affected element is > 4x the spike added, the failure will be appropriately flagged and narrated only. Elements with failed MS will be N-qualified as applicable.	Analyst, Supervisor	accuracy, bias	metals and Hg: 75-125% recovery CN: 85-115% recovery
matrix duplicate (or MSD)	One per prep batch of 20 or fewer samples of similar matrix	Same as MS and/or: Metals: RPD ≤ 20% Cyanide: RPD ≤ 15%	Sample results will be *-qualified and narrated for metals. Samples will be narrated for cyanide.	Analyst, Supervisor	accuracy/bias and/or precision	Same as MS and/or: Metals: RPD ≤ 20% Cyanide: RPD ≤ 15%
Serial Dilutions (6010B only)	One per prep batch of 20 or fewer samples of similar matrix	% Difference should be < 10% as long as the concentration is > 50x the quantitation limit	Samples with concentrations less than 50x the QL are not used for evaluation. Serial dilution failures result in E-qualification.	Analyst, Reporting	accuracy	% Difference should be < 10% as long as the concentration is > 50x the QL
Post-Digestion Spike (6010B only, for elements that have a failing MS)	One per prep batch of 20 or fewer samples of similar matrix	75-125% recovery	Failures will be noted in the case narrative.	Analyst, Supervisor	accuracy/bias	75-125% recovery

SAP Worksheet #28-3—Laboratory QC Samples Table (continued)

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
Nitrocellulose by IAPP						
Method Blank	One per batch of 20 or fewer samples of similar matrix	concentration < QL	If associated detects are < QL, the results will be reported and the contamination will be narrated. If associated detects > QL, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	contamination, bias	concentration < QL
LCS	One per batch of 20 or fewer samples of similar matrix	61 - 135% recovery	If recovery is > QC limits and related detects are < QL, the results will be reported and the failure will be narrated. If related detects are > QL or LCS recovery is < QC limits, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	accuracy/bias	61 - 135% recovery
MS	One per batch of 20 or fewer samples of similar matrix	32 - 148% recovery	MS failures will be narrated if recoveries are within control limits for the LCS. If both the MS and LCS recoveries are outside control limits, the batch will be re-extracted and reanalyzed. If the unspiked concentration of an affected compound is > 4x the spike amount, the failure will be *-qualified and narrated only.	Analyst, Supervisor	accuracy/bias	32 - 148% recovery
MSD	One per batch of 20 or fewer samples of similar matrix	Same as MS < 15% RPD	Reanalyze the MS/MSD. Repeated failures will be noted in the case narrative.	Analyst, Supervisor	accuracy/bias, precision	Same as MS < 15% RPD
Nitroglycerin by SW-846 8332						
Method Blank	One per batch of 20 or fewer samples of similar matrix	concentration < 1/2 quantitation limit	If associated detects are < QL, the results will be reported and the contamination will be narrated. If associated detects > QL, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	contamination, bias	concentration < 1/2 QL
LCS	One per batch of 20 or fewer samples of similar matrix	60 - 140% recovery	If recovery is > QC limits and related detects are < QL, the results will be reported and the failure will be narrated. If related detects are > QL or LCS recovery is < QC limits, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	accuracy/bias	60 - 140% recovery
MS	One per batch of 20 or fewer samples of similar matrix	60 - 140% recovery	MS failures will be narrated if recoveries are within control limits for the LCS. If both the MS and LCS recoveries are outside control limits, the batch will be re-extracted and reanalyzed. If the unspiked concentration of an affected compound is > 4x the spike amount, the failure will be *-qualified and narrated only.	Analyst, Supervisor	accuracy/bias	60 - 140% recovery
MSD	One per batch of 20 or fewer samples of similar matrix	Same as MS ≤25% RPD	Reanalyze the MS/MSD. Repeated failures will be noted in the case narrative.	Analyst, Supervisor	accuracy/bias, precision	Same as MS ≤25% RPD
Surrogates	One per sample	31 - 129% recovery	Samples with high surrogate recoveries will be reported and the failure will be mentioned in the case narrative. Samples with low surrogate recoveries will be reported only if the method blank and LCS surrogate recoveries are within QC limits and the samples's surrogate recovery is >10%. All samples with surrogate recoveries <10% will be re-extracted and reanalyzed.	Analyst, Supervisor	accuracy/bias	31 - 129% recovery

SAP Worksheet #28-3—Laboratory QC Samples Table (continued)

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
Confirmation analysis	All samples with positive results	peaks within the retention time window for the compound on both columns	Results with RPD >40% (between columns) will be J-qualified as estimated concentrations	Analyst, Supervisor	presence/accuracy	peaks within the retention time window for the compound on both columns
Perchlorate by SW-846 6850 (DOD Perchlorate Handbook)						
Method Blank	One per batch of 20 or fewer samples of similar matrix	concentration < 1/2 QL	If associated detects are < QL, the results will be reported and the contamination will be narrated. If associated detects > QL, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	contamination, bias	concentration < 1/2 QL
LCS	One per batch of 20 or fewer samples of similar matrix	80-120% recovery	If recovery is > QC limits and related detects are < QL, the results will be reported and the failure will be narrated. If related detects are > QL or LCS recovery is < QC limits, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	accuracy/bias	80-120% recovery
MS	One per batch of 20 or fewer samples of similar matrix	80-120% recovery	MS failures will be narrated if recoveries are within control limits for the LCS. If both the MS and LCS recoveries are outside control limits, the batch will be re-extracted and reanalyzed. If the unspiked concentration of an affected compound is > 4x	Analyst, Supervisor	accuracy/bias	80-120% recovery
MSD	One per batch of 20 or fewer samples of similar matrix	Same as MS ≤ 15% RPD	Reanalyze the MS/MSD. Repeated failures will be noted in the case narrative.	Analyst, Supervisor	accuracy/bias, precision	Same as MS ≤ 15% RPD
Internal Standard (IS)	One per sample	>50% recovery	Samples with low IS recovery will be re-injected at increasing dilutions until the IS recovery is acceptable	Analyst, Supervisor	accuracy/bias	>50% recovery

SAP Worksheet #28-4—Laboratory QC Samples Table

Matrix: AQ
Analytical Group: EXPLO
Analytical Method / SOP Reference: SW-846 8330, 8332, IAAP, 6850 / S.1, S.7, J.28, J.8, HPLC-6850

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
EXPLOs, PETN, and Nitroguanidine by SW-846 8330						
Method Blank	One per batch of 20 or fewer samples of similar matrix	concentration of all analytes < 1/2 quantitation limit	If there are no related detects > QL, results will be reported and the blank contamination will be narrated. If related detects are > QL, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	contamination, bias	concentration of all analytes < 1/2 QL
LCS	One per batch of 20 or fewer samples of similar matrix	Per Worksheet #15-4	If there is a marginal exceedance (<5% outside the QC limits) for one compound or one compound and tetryl, the results will be reported and the failure(s) will be narrated. If recoveries are > QC limits related detects are < QL, the results will be reported and the failure will be narrated. If related detects are > QL or the the LCS recovery is < QC limits, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	accuracy/bias	Per Worksheet #15-4
MS	One per batch of 20 or fewer samples of similar matrix	Per Worksheet #15-4	MS failures will be narrated if recoveries are within control limits for the LCS. If both the MS and LCS recoveries are outside control limits, the batch will be re-extracted and reanalyzed. If the unspiked concentration of an affected compound is > 4x the spike amount, the failure will be *-qualified and narrated only.	Analyst, Supervisor	accuracy/bias	Per Worksheet #15-4
MSD	One per batch of 20 or fewer samples of similar matrix	Per Worksheet #15-4	Reanalyze the MS/MSD. Repeated failures will be noted in the case narrative.	Analyst, Supervisor	accuracy/bias, precision	Per Worksheet #15-4
Surrogates	One per sample	37-149% recovery	Samples with high surrogate recoveries will be reported and the failure will be mentioned in the case narrative. Samples with low surrogate recoveries will be reported only if the method blank and LCS surrogate recoveries are within QC limits and the sample's surrogate recovery is >10%. All samples with surrogate recoveries <10% will be re-extracted and reanalyzed.	Analyst, Supervisor	accuracy/bias	37-149% recovery
Confirmation analysis	All samples with positive results	peaks within the retention time window for the compound on both columns	Results with RPD >40% (between columns) will be J-qualified as estimated concentrations	Analyst, Supervisor	presence/accuracy	peaks within the retention time window for the compound on both columns
Nitrocellulose by IAPP						
Method Blank	One per batch of 20 or fewer samples of similar matrix	concentration < QL	If associated detects are < QL, the results will be reported and the contamination will be narrated. If associated detects > QL, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	contamination, bias	concentration < quantitation limit

SAP Worksheet #28-4—Laboratory QC Samples Table (continued)

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
LCS	One per batch of 20 or fewer samples of similar matrix	67-119% recovery	If recovery is > QC limits and related detects are < QL, the results will be reported and the failure will be narrated. If related detects are > QL or LCS recovery is < QC limits, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	accuracy/bias	67-119% recovery
MS	One per batch of 20 or fewer samples of similar matrix	35-139% recovery	MS failures will be narrated if recoveries are within control limits for the LCS. If both the MS and LCS recoveries are outside control limits, the batch will be re-extracted and reanalyzed. If the unspiked concentration of an affected compound is > 4x the spike amount, the failure will be *-qualified and narrated only.	Analyst, Supervisor	accuracy/bias	35-139% recovery
MSD	One per batch of 20 or fewer samples of similar matrix	Same as MS < 15% RPD	Reanalyze the MS/MSD. Repeated failures will be noted in the case narrative.	Analyst, Supervisor	accuracy/bias, precision	Same as MS < 15% RPD
Nitroglycerin by SW-846 8332						
Method Blank	One per batch of 20 or fewer samples of similar matrix	concentration < 1/2 QL	If associated detects are < QL, the results will be reported and the contamination will be narrated. If associated detects > QL, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	contamination, bias	concentration < 1/2 QL
LCS	One per batch of 20 or fewer samples of similar matrix	70 - 120% recovery	If recovery is > QC limits and related detects are < QL, the results will be reported and the failure will be narrated. If related detects are > QL or LCS recovery is < QC limits, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	accuracy/bias	70 - 120% recovery
MS	One per batch of 20 or fewer samples of similar matrix	70-120% recovery	MS failures will be narrated if recoveries are within control limits for the LCS. If both the MS and LCS recoveries are outside control limits, the batch will be re-extracted and reanalyzed. If the unspiked concentration of an affected compound is > 4x the spike amount, the failure will be *-qualified and narrated only.	Analyst, Supervisor	accuracy/bias	70-120% recovery
MSD	One per batch of 20 or fewer samples of similar matrix	Same as MS ≤25% RPD	Reanalyze the MS/MSD. Repeated failures will be noted in the case narrative.	Analyst, Supervisor	accuracy/bias, precision	Same as MS ≤25% RPD
Surrogates	One per sample	31 - 129% recovery	Samples with high surrogate recoveries will be reported and the failure will be mentioned in the case narrative. Samples with low surrogate recoveries will be reported only if the method blank and LCS surrogate recoveries are within QC limits and the sample's surrogate recovery is >10%. All samples with surrogate recoveries <10% will be re-extracted and reanalyzed.	Analyst, Supervisor	accuracy/bias	31 - 129% recovery
Confirmation analysis	All samples with positive results	peaks within the retention time window for the compound on both columns	Results with RPD >40% (between columns) will be J-qualified as estimated concentrations	Analyst, Supervisor	presence/accuracy	peaks within the retention time window for the compound on both columns

SAP Worksheet #28-4—Laboratory QC Samples Table (continued)

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
Perchlorate by SW-846 6850 (DoD Perchlorate Handbook)						
Method Blank	One per batch of 20 or fewer samples of similar matrix	concentration < 1/2 QL	If associated detects are < QL, the results will be reported and the contamination will be narrated. If associated detects > QL, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	contamination, bias	concentration < 1/2 QL
LCS	One per batch of 20 or fewer samples of similar matrix	80-120% recovery	If recovery is > QC limits and related detects are < QL, the results will be reported and the failure will be narrated. If related detects are > QL or LCS recovery is < QC limits, the batch will be re-extracted and reanalyzed.	Analyst, Supervisor	accuracy/bias	80-120% recovery
MS	One per batch of 20 or fewer samples of similar matrix	80-120% recovery	MS failures will be narrated if recoveries are within control limits for the LCS. If both the MS and LCS recoveries are outside control limits, the batch will be re-extracted and reanalyzed. If the unspiked concentration of an affected compound is > 4x	Analyst, Supervisor	accuracy/bias	80-120% recovery
MSD	One per batch of 20 or fewer samples of similar matrix	Same as MS ≤ 15% RPD	Reanalyze the MS/MSD. Repeated failures will be noted in the case narrative.	Analyst, Supervisor	accuracy/bias, precision	Same as MS ≤ 15% RPD
Internal Standard	One per sample	>50% recovery	Samples with low IS recovery will be re-injected at increasing dilutions until the IS recovery is acceptable	Analyst, Supervisor	accuracy/bias	>50% recovery

SAP Worksheet #29—Project Documents and Records Table

Document	Where Maintained
Field Notebooks	Electronic .pdf copies in the project file. Hardcopy (bound notebook) in the project file. Archived at project closeout.
COC Records	Electronic .pdf copies in the project file. Hardcopy in the project file. Archived at project closeout.
Airbills	Hardcopy in the project file. Archived at project closeout.
Telephone Logs	Hardcopy in the project file. Archived at project closeout.
CA Forms	Electronic .pdf copies in the project file. Hardcopy in the project file. Archived at project closeout.
Photo Ionization Detector/Flame Ionization Detector readings, if collected	Recorded in Field Notebook. Stored in database.
Water quality parameters (groundwater sampling), if collected	Recorded in Field Notebook. Stored in database.
Organic Vapor Meter/Orgaic Vapor Analyzer readings, if collected	Recorded in Field Notebook. Stored in database.
Other various field measurements	Recorded in Field Notebook.
All field equipment calibration information	Recorded in Field Notebook.
Pertinent telephone conversations	Recorded in Field Notebook.
Field equipment maintenance records	Inspected by FTL. Not maintained.
Sample Receipt, Custody, and Tracking Records	Electronic .pdf copies in the project file. Hardcopy in the full data package.
Standard Traceability Logs	Hardcopy in the full data package. Archived at project closeout.
Equipment Calibration Logs	Hardcopy in the full data package. Archived at project closeout.
Sample Prep Logs	Hardcopy in the full data package. Archived at project closeout.
Run Logs	Hardcopy in the full data package. Archived at project closeout.
Equipment Maintenance, Testing, and Inspection Logs	Hardcopy in the full data package. Archived at project closeout.
Reported Field Sample Results	Electronic .pdf copies in the project file. Hardcopy in the data package. Archived at project closeout.
Reported Results for Standards, QC Checks, and QC Samples	Hardcopy in the full data package. Archived at project closeout.
Instrument Printouts (raw data) for Field Samples, Standards, QC Checks, and QC Samples	Hardcopy in the full data package. Archived at project closeout.
Data Package Completeness Checklists	Hardcopy in the data validation report. Archived at project closeout.
Sample Disposal Records	Maintained by the laboratory.
Extraction/Clean-up Records	Maintained by the laboratory.
Raw Data	Hardcopy in the full data package. Archived at project closeout.
Field Sampling Audit Checklists	Hardcopy in the project file. Archived at project closeout.
Fixed Laboratory Audit Checklists	If completed, hardcopy in the project file. Archived at project closeout.
Data Validation Reports	Electronic .pdf copies in the project file. Hardcopy stored with the data package. Archived at project closeout.

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SAP Worksheet #30—Analytical Services Table

Matrix[3]	Analytical Group	Sample Locations/ID Number	Analytical Method	Data Package Turnaround Time	Laboratory / Organization[1] (name and address, contact person, and telephone number)	Backup Laboratory / Organization (name and address, contact person, and telephone number)
SD	METAL	4	METALs by SW-846 6010B Mercury by SW-846 7471A Cyanide by SW-846 9014	28 calendar days	GPL Laboratories, LLLP 7210A Corporate Court Frederick, MD 21703 Garth Herdrich (301) 694-5310	GPL Laboratories, LLLP 71 Wilson Ave. Johnson City, TN 37604 Garth Herdrich (301) 694-5310
SD	EXPLO[2]	4	Nitroaromatics/Nitroamines, PETN, and Nitroguanidine by SW-846 8330 Nitrocellulose by IAPP Nitroglycerin by SW-846 8332	28 calendar days		TBD
			Perchlorate by SW-846 6850 (DOD Perchlorate Handbook)	28 calendar days	Columbia Analytical Services, Inc. 1 Mustard Street Ste. 250 Rochester, NY 14609 Carlton Beechler (585) 288-5380	GPL Laboratories, LLLP 7210A Corporate Court Frederick, MD 21703 Garth Herdrich (301) 694-5310

[1]If the laboratory is not known at time of SAP submission, put "TBD" in the column as a placeholder.

[2]Perchlorate may be analyzed at GPL as long as an NFESC letter (including perchlorate) is received before the sampling event, an SOP is provided, and a QL/MDL is established.

[2]All perchlorate-related information in this UFP-SAP is specific to CAS-Rochester.

[3]Aqueous samples are blanks (associated with sediment samples) only.

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SAP Worksheet #31—Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing CAs	Person(s) Responsible for Monitoring Effectiveness of CAs
Offsite Laboratory Technical Systems Audit	Laboratory must have current NFESC evaluation letter which will identify the period of performance. The laboratory must be re-evaluated prior to expiration of period of performance	External	U.S. Navy (NFESC)	Project QA Officer- Pati Moreno/ NFESC, Port Hueneme, CA	Rita Amin, GPL Laboratories QA Officer Lisa Reyes, CAS-Rochester Laboratory QA Officer	Rita Amin, GPL Laboratories QA Officer Lisa Reyes, CAS-Rochester Laboratory QA Officer	Anita Dodson, CH2M HILL Navy Program Chemist

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SAP Worksheet #32—Assessment Findings and CA Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings	Timeframe of Notification	Nature of CA Response Documentation	Individual(s) Receiving CA Response	Timeframe for Response
Offsite Laboratory Technical Systems Audit	Written Audit Report	Rita Amin, GPL Laboratories QA Officer Lisa Reyes, CAS-Rochester Laboratory QA Officer	Within 2 months of audit	Memorandum	NFESC Auditor, TBD	Within 2 months of receipt of initial notification.

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SAP Worksheet #33—QA Management Reports Table

Type of Report	Frequency	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation	Report Recipient(s)
Field Progress Report(s)	Daily	Week of daily reporting will be submitted to Navy POC the following Monday.	Site Superintendent	Report(s) will be included as an Attachment to the SI Report. SI Report distribution will include the Navy, EPA, and MDE.
SI Report	Once results are received from data validator	Summer 2010	NSF-IH Igniter Area Team, CH2M HILL	Will be provided to the IHIRT and posted in CH2M HILL project file.

Data Validation:

- Performed by a third party.
- Provide a data validation narrative.

The following will be addressed in the QA/QC section of SI report:

- Summary of project QA/QC programs and trainings
- Conformance of project activities to SAP requirements and procedures
- Status of project and schedule delays
- Deviations from approved SAP and approved amendments to SAP
- Description and findings of audits
- Results of data review activities in terms of amount of usable data generated (results of the Chemist's QC Check on data prior to loading into CH2M HILL's database)
- Required CAs and effectiveness of CA implementation
- Data usability assessments in terms of accuracy, precision, representativeness, completeness, comparability and sensitivity.
- Limitations on use of measurement data generated.

The report will also include data quality concerns:

- Narrative and timelines of project activities summary of PQO development
- Reconciliation of project data with PQOs
- Summary of major problems encountered and their resolution
- Data summary, including tables, charts, graphs, with appropriate sample identification or station location numbers, concentration units, percent solids (not applicable), and data quality flags
- Conclusions and recommendations

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SAP Worksheet #34—Verification (Step I) Process Table

Verification Input	Description	Internal / External	Responsible for Verification (name, organization)
Field Notebooks	Field notebooks will be reviewed internally and placed into the project file for archival at project closeout.	Internal	PM: Margaret Kasim/CH2M HILL
COC and Shipping Forms	COC forms and shipping documentation will be reviewed internally upon their completion and verified against the packed sample coolers they represent. The shipper's signature on the COC form will be initialed by the reviewer, a copy of the form retained in the site file, and the original and remaining copies taped inside the cooler for shipment.	Internal	FTL (TBD)/CH2M HILL Project EIS: Emma Brower/CH2M HILL
Sample Condition upon Receipt	Any discrepancies, missing, or broken containers will be communicated to the Project EIS in the form of laboratory log-ins.	Internal	Project EIS: Emma Brower/CH2M HILL
Sample Chronology	Holding times from collection to extraction or analysis and from extraction to analysis will be considered by the Data Validator during the data validation process.	External	Data Validation Subcontractor: Laura Maschoff/DataQual Environmental Services, LLC
Documentation of Laboratory Method Deviations	Laboratory method deviations will be discussed and approved by the Project Chemist. Documentation will be incorporated into the case narrative which becomes part of the final hardcopy data package.	Internal	Project Chemist: Michael Zamboni/CH2M HILL
Electronic Data Deliverables	Electronic data deliverables will be compared against hardcopy laboratory results (10% check).	Internal	Project EIS: Emma Brower/CH2M HILL
Case Narrative	Case narratives will be reviewed by the Data Validator during the data validation process.	External	Data Validation Subcontractor: Laura Maschoff/DataQual Environmental Services, LLC
Laboratory Data	All laboratory data packages will be verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal. All received data packages will be verified externally by the third-party validator. Also, the data will be verified for completeness by an EIS. A chemist will perform a data quality evaluation.	Internal and External	Laboratory QA Officer/GPL Laboratories, LLLP Laboratory QA Officer/CAS-Rochester Data Validation Subcontractor: Laura Maschoff/DataQual Environmental Services, LLC Project EIS: Emma Brower/CH2M HILL Project Chemist: Michael Zamboni/CH2M HILL

SAP Worksheet #34—Verification (Step I) Process Table (continued)

Verification Input	Description	Internal / External	Responsible for Verification (name, organization)
Audit Reports	Upon report completion, a copy of all audit reports will be placed in the site file. If CAs are required, a copy of the documented CA taken will be attached to the appropriate audit report in the QA site file. Periodically, and at the completion of site work, site file audit reports and CA forms will be reviewed internally to ensure that all appropriate CAs have been taken and that CA reports are attached. If CAs have not been taken, the site manager will be notified to ensure action is taken.	Internal	PM: Margaret Kasim/CH2M HILL Project Chemist: Michael Zamboni/CH2M HILL
CA Reports	CA reports will be reviewed by the Project Chemist or PM and placed into the project file for archival at project closeout.	Internal	Project Chemist: Michael Zamboni/CH2M HILL PM: Margaret Kasim/CH2M HILL

SAP Worksheet #35—Validation (Steps IIa and IIb) Process Table

Step IIa / IIb	Validation Input	Description	Responsible for Validation (name, organization)
IIa	Laboratory Methods	Ensure the laboratory analyzed samples using the correct methods.	Project Chemist: Michael Zamboni/CH2M HILL
IIa	Target Compound List and TAL	Ensure the laboratory reported all analytes from each analysis group unless a site-specific requirement dictates a different list.	Project Chemist: Michael Zamboni/CH2M HILL
IIa / IIb	Reporting Limits	Ensure the laboratory met the PQLs. If QLs were not met, the reason will be identified and documented.	Project Chemist: Michael Zamboni/CH2M HILL
IIa	Field SOPs	Ensure that all field SOPs were followed.	FTL (TBD)
IIa	Laboratory SOPs	Ensure that approved analytical laboratory SOPs were followed.	Laboratory QA Officer/GPL Laboratories, LLLP Laboratory QA Officer/CAS-Rochester
IIa	Raw Data	10 percent review of raw data to confirm laboratory calculations.	Data Validation Subcontractor: Laura Maschoff/DataQual Environmental Services, LLC
IIb	Onsite Screening	All non-analytical field data will be reviewed against QAPP requirements for completeness and accuracy based on the field calibration records.	FTL (TBD)
IIa	Documentation of Method QC Results	Establish that all required QC samples were run and met required limits.	Data Validation Subcontractor: Laura Maschoff/DataQual Environmental Services, LLC
IIb	Documentation of field QC Sample Results	Establish that all required QAPP QC samples were run and met required limits	Project Chemist: Michael Zamboni/CH2M HILL Data Validation Subcontractor: Laura Maschoff/DataQual Environmental Services, LLC
IIb	NFESC Evaluation	Ensure that each laboratory is NFESC-Evaluated for the analyses they are to perform. Ensure evaluation timeframe does not expire.	Project Chemist: Michael Zamboni/CH2M HILL

[1]IIa=compliance with methods, procedures, and contracts [see Table 10, page 117, UFP-QAPP manual, V.1, March 2005.]

IIb=comparison with measurement performance criteria in the SAP [see Table 11, page 118, UFP-QAPP manual, V.1, March 2005]

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SAP Worksheet #36—Analytical Data Validation (Steps IIa and IIb) Summary Table

Step IIa / IIb	Matrix	Analytical Group	Validation Criteria	Data Validator (title and organizational affiliation)
IIa and IIb	SD	METAL	Analytical methods and laboratory SOPs, as presented in this UFP-SAP, will be used to evaluate compliance against QA/QC criteria. Data may be qualified if QA/QC exceedances have occurred. Data qualifiers will be those presented in *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses* (EPA Region III, April 1993). Guidance and qualifiers from *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA, Rev. Final, October, 2004) may also be applicable.	Data Validation Subcontractor: Laura Maschoff/DataQual Environmental Services, LLC
	SD	EXPLO	Analytical methods and laboratory SOPs, as presented in this UFP-SAP, will be used to evaluate compliance against QA/QC criteria. Data may be qualified if QA/QC exceedances have occurred. Data qualifiers will be those presented in *Region III Modifications to National Functional Guidelines for Organic Data Review* (EPA, September, 1994). Guidance and qualifiers from *Contract Laboratory Program National Functional Guidelines for Organic Data Review* (EPA, October, 1999) may also be applicable.	

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SAP Worksheet #37—Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used:

- The data will be evaluated to see if the project required QLs listed in Worksheet #15 were achieved for non-detected constituents.
- If verification and validation are not acceptable, the data will be qualified by the validator. The data may be qualified for minor QC deviations that do not affect the data usability (i.e., estimated flags such as J, UJ), or the data may be rejected for major QC deviations affecting data usability. The use and implications of estimated data will be discussed in the project report. Rejected data will not be used. The impact of data qualified as rejected due to analytical deficiencies will be discussed with the project team and will be evaluated to determine the need for any CAs. Depending on the analytical deficiency and the intended use of the data, the project team may or may not agree that the data of sufficient quality to support project decisions.
- For statistical comparisons, non-detect values will be represented by a concentration equal to one-half the QL. Where duplicates are collected, the greater of the two concentrations will be used.
- The data will not be evaluated for outliers. It is anticipated that the data will have significant variations because of localized sources.
- Analytical data will be checked to ensure that they are accurately transferred to the electronic project database and GIS.
- Laboratory and field precision, as computed from duplicate samples will be assessed. These computations will be based on calculation of RPD. RPD = (Difference of two results) / (average of two results) * 100%. Field and laboratory QC limits for precision are defined in Worksheets #12 and #28, respectively.
- Deviations from the procedures outlined in this UFP-SAP will be reviewed to assess whether the deviations were significant enough to compromise the attainment of project objectives.

Describe the evaluative procedures used to assess overall measurement error associated with the project:

- The validated data will be reconciled with the method performance criteria to determine whether sufficient data of acceptable quality are available for decision making. A series of evaluations and statistical analyses will be performed to estimate the data characteristics. The statistical evaluations will include, for each target constituent or group: maximum concentration, minimum concentration, number of samples with non-detected results, number of samples with positive results, and the proportion of samples with detected and non-detected results

SAP Worksheet #37—Usability Assessment (continued)

- If an exceedance occurs for lab or field precision (as defined in Worksheets #12 and #28 and as calculated using the formula, above), the cause will be investigated, described, and interpreted for their impact on decision making.
- If significant biases are detected (represented by low or high matrix spike, LCS, or surrogate recoveries), this will be noted and evaluated for impact on decision making. The tendency will be to emphasize low biases more than high biases unless biased results are near action levels. Low biases will be emphasized more because they are likely to represent an inability to detect compounds that are present at the site and, on a percentage basis, generally represent a greater proportion of the reported values.

Identify the personnel responsible for performing the usability assessment:

- The CH2M HILL PM, Project Chemist, and other CH2M HILL team members will compile project data and make recommendations pertaining to the usability of the data. The data will be provided to the project team for discussion and review, and the project team as a whole will weigh in on the usability of the data.

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:

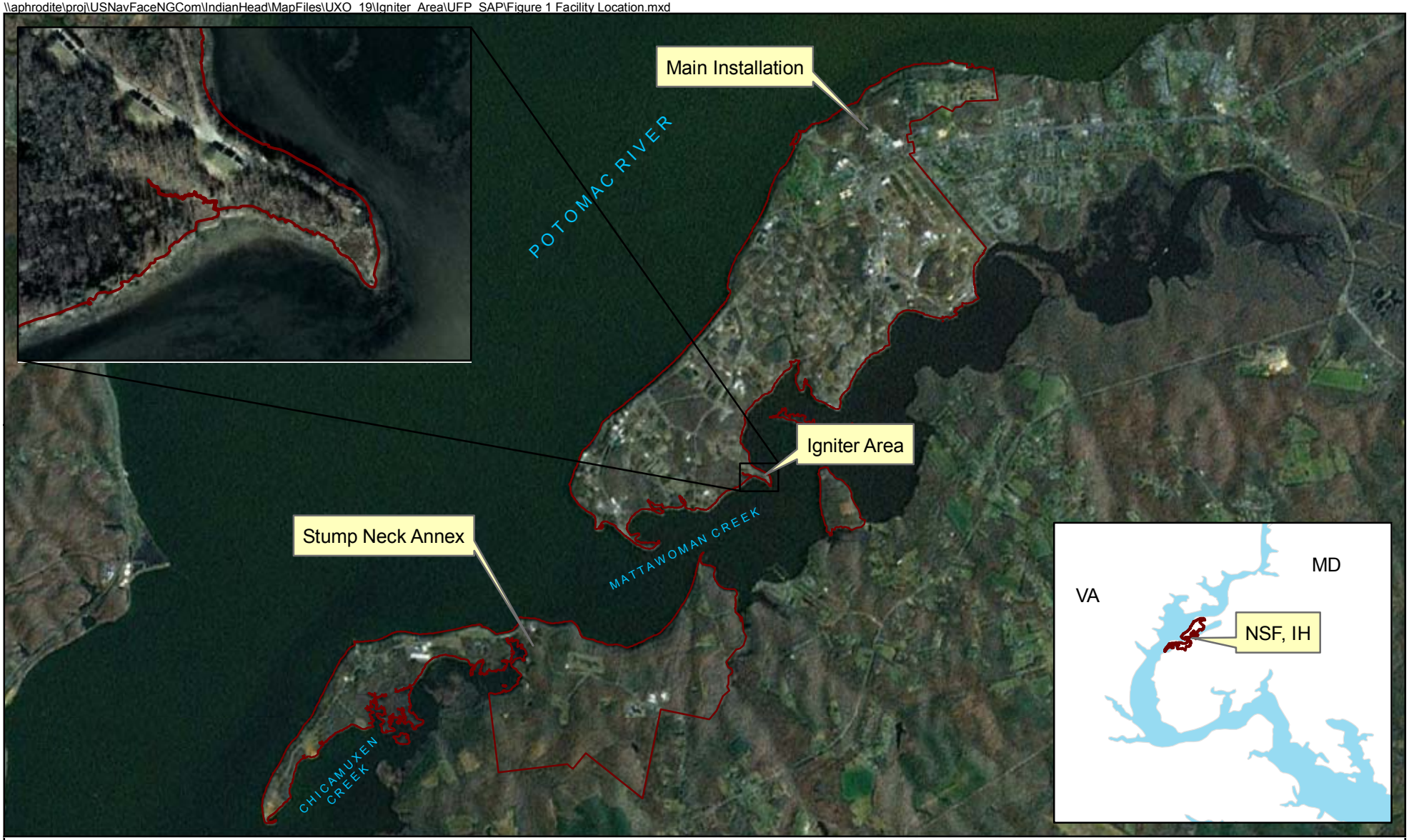
- The data will be presented in tabular format in the report. Data qualification such as estimation (J, UJ) or rejection (R) will be presented. Specific qualifiers are defined below. Written documentation will be provided to support any non-compliance, or rejected data results. The project report will identify and describe the data usability limitations and suggest corrective actions.
  - U: Not detected.
  - [CLEAR]: Confirmed identification.
  - R: Unreliable result.
  - N: Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
  - J: Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
  - K: Consider present. Reported value may be biased high. Actual value is expected to be lower.
  - L: Consider present. Reported value may be biased low. Actual value is expected to be higher.
  - UJ: Not detected. Quantitation limit may be inaccurate or imprecise.
  - UL: Not detected. Quantitation limit is probably higher.
  - NJ: Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
  - I: Interferences present which may cause the result to be biased high.

SAP Worksheet #37—Usability Assessment (continued)

- A description of the precision and bias evaluations described above will be included in the Field Investigation report. This will include a summary with supporting documentation. Significant deviations or deficiencies will be conveyed to the Navy RPM for consideration.

Figures

\\aphrodite\proj\USNavFaceNGCom\IndianHead\MapFiles\UXO_19\Igniter_Area\UFP_SAP\Figure 1 Facility Location.mxd



Legend

Installation Boundary

N

0 2,300 4,600 9,200 Feet

Figure 1
Facility Location
UFP-SAP for Igniter Area - UXO 19
NSF-IH, Indian Head, Maryland

CH2MHILL

\\aphrodite\proj\USNavFaceNGCom\IndianHead\MapFiles\UXO_19\Igniter_Area\UFP_SAP\Figure 2 Site Map.mxd

Legend

- Proposed Site Inspection Area
- Igniter Area Boundary in the Preliminary Assessment
- Buildings
- Installation Boundary

N

0 75 150 300 Feet

Figure 2
Site Map
UFP-SAP for Igniter Area - UXO 19
NSF-IH, Indian Head, Maryland

CH2MHILL

\\aphrodite\proj\USNavFaceNGCom\IndianHead\MapFiles\UXO_19\Igniter_Area\UFP_SAP\Figure 3 Proposed Site Injection Area.mxd

Note:
1. Site inspection consists of MEC and MC
2. Site inspection area is approximately 20 feet by 300 feet
3. The proposeed sample locations are equidistant along the shoreline. Based on the results from the MEC investigation, the proposed sediment sample locations may be revised. Sediment sample locations will be biased around identified MEC/igniter items.

Legend
- Proposed Sediment Sample Locations
- Proposed Site Inspection Area
- Igniter Area Boundary in the Preliminary Assessment
- Buildings
- Installation Boundary

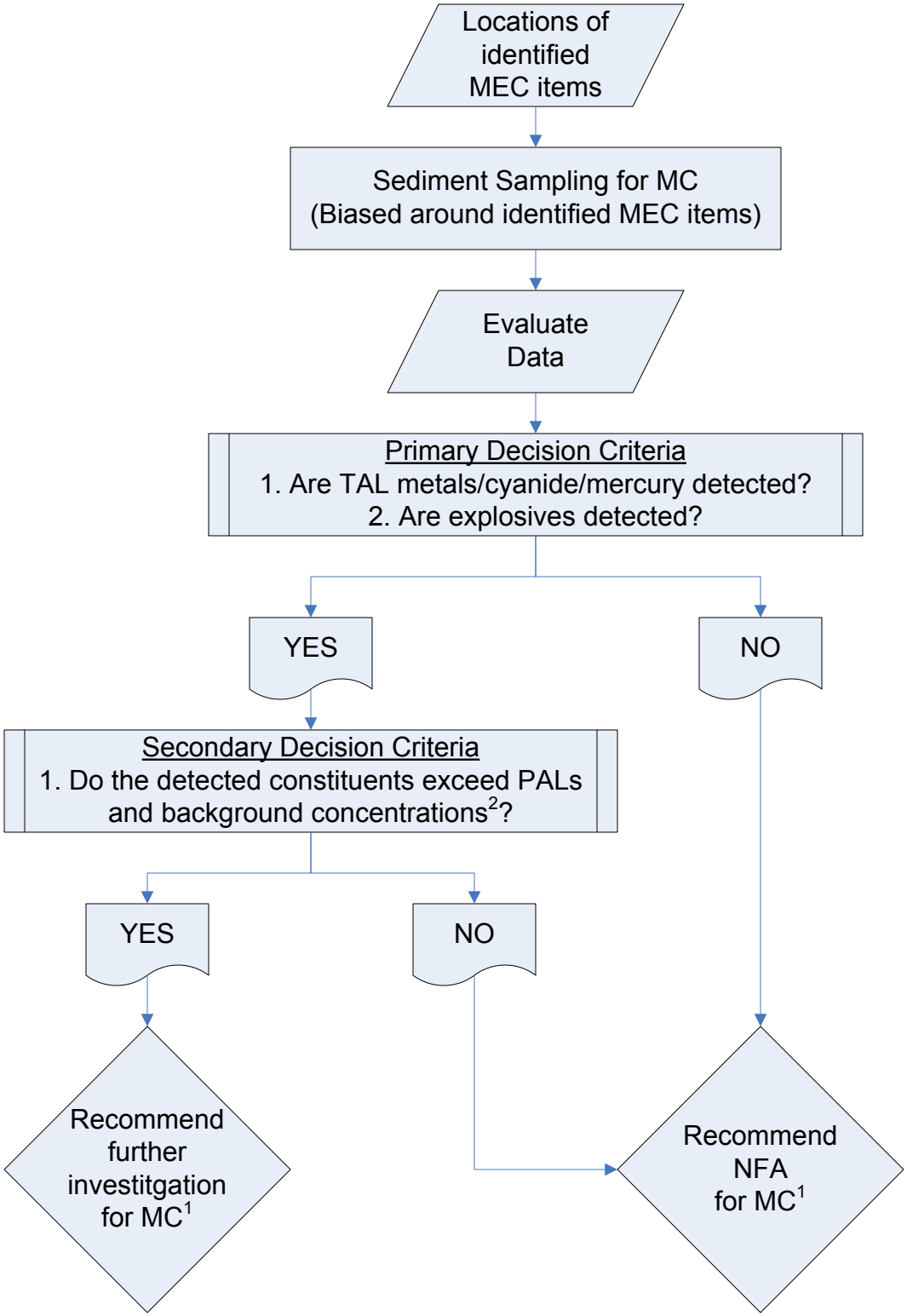
N

0 75 150 300
Feet

Figure 3
Proposed Site Injection Area
UFP-SAP for Igniter Area - UXO 19
NSF-IH, Indian Head, Maryland

CH2MHILL

MC Investigation



Notes:
IHIRT – Indian Head Installation Restoration Team
MC – Munitions Constituents
MEC – Munitions and Explosives of Concern
NFA – No Further Action
NSF – Naval Support Facility
PAL – Project Action Limit
TAL – Target Analyte List
[1] Final decisions will be determined by IHIRT
[2] Background concentrations will be used where available

Figure 4
Decision Tree
UFP-SAP for Igniter Area - UXO 19
NSF-IH, Indian Head, Maryland

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Attachment A
Field Standard Operating Procedures

STANDARD OPERATING PROCEDURE

Chain-of-Custody

I Purpose

The purpose of this SOP is to provide information on chain-of-custody procedures to be used under the CLEAN Program.

II Scope

This procedure describes the steps necessary for transferring samples through the use of Chain-of-Custody Records. A Chain-of-Custody Record is required, without exception, for the tracking and recording of samples collected for on-site or off-site analysis (chemical or geotechnical) during program activities (except wellhead samples taken for measurement of field parameters). Use of the Chain-of-Custody Record Form creates an accurate written record that can be used to trace the possession and handling of the sample from the moment of its collection through analysis. This procedure identifies the necessary custody records and describes their completion. This procedure does not take precedence over region specific or site-specific requirements for chain-of-custody.

III Definitions

Chain-of-Custody Record Form - A Chain-of-Custody Record Form is a printed two-part form that accompanies a sample or group of samples as custody of the sample(s) is transferred from one custodian to another custodian. One copy of the form must be retained in the project file.

Custodian - The person responsible for the custody of samples at a particular time, until custody is transferred to another person (and so documented), who then becomes custodian. A sample is under one's custody if:

- It is in one's actual possession.
- It is in one's view, after being in one's physical possession.
- It was in one's physical possession and then he/she locked it up to prevent tampering.
- It is in a designated and identified secure area.

Sample - A sample is physical evidence collected from a facility or the environment, which is representative of conditions at the point and time that it was collected.

IV Responsibilities

Project Manager - The Project Manager is responsible for ensuring that project-specific plans are in accordance with these procedures, where applicable, or that other, approved procedures are developed. The Project Manager is responsible for development of documentation of procedures which deviate from those presented herein. The Project Manager is responsible for ensuring that chain-of-custody procedures are implemented. The Project Manager also is responsible for determining that custody procedures have been met by the analytical laboratory.

Field Team Leader - The Field Team Leader is responsible for determining that chain-of-custody procedures are implemented up to and including release to the shipper or laboratory. It is the responsibility of the Field Team Leader to ensure that these procedures are implemented in the field and to ensure that personnel performing sampling activities have been briefed and trained to execute these procedures.

Sample Personnel - It is the responsibility of the field sampling personnel to initiate chain-of-custody procedures, and maintain custody of samples until they are relinquished to another custodian, the sample shipper, or to a common carrier.

V Procedures

The term "chain-of-custody" refers to procedures which ensure that evidence presented in a court of law is valid. The chain-of-custody procedures track the evidence from the time and place it is first obtained to the courtroom, as well as providing security for the evidence as it is moved and/or passed from the custody of one individual to another.

Chain-of-custody procedures, recordkeeping, and documentation are an important part of the management control of samples. Regulatory agencies must be able to provide the chain-of-possession and custody of any samples that are offered for evidence, or that form the basis of analytical test results introduced as evidence. Written procedures must be available and followed whenever evidence samples are collected, transferred, stored, analyzed, or destroyed.

V.1 Sample Identification

The method of identification of a sample depends on the type of measurement or analysis performed. When *in situ* measurements are made, the data are recorded directly in bound logbooks or other field data records with identifying information.

Information which shall be recorded in the field logbook, when in-situ measurements or samples for laboratory analysis are collected, includes:

- Field Sampler(s),
- Contract Task Order (CTO) Number,
- Project Sample Number,
- Sample location or sampling station number,

- Date and time of sample collection and/or measurement,
- Field observations,
- Equipment used to collect samples and measurements, and
- Calibration data for equipment used

Measurements and observations shall be recorded using waterproof ink.

V.1.1 Sample Label

Samples, other than for *in situ* measurements, are removed and transported from the sample location to a laboratory or other location for analysis. Before removal, however, a sample is often divided into portions, depending upon the analyses to be performed. Each portion is preserved in accordance with the Sampling and Analysis Plan. Each sample container is identified by a sample label (see Attachment A). Sample labels are provided, along with sample containers, by the analytical laboratory. The information recorded on the sample label includes:

- Project - CTO Number.
- Station Location - The unique sample number identifying this sample.
- Date - A six-digit number indicating the day, month, and year of sample collection (e.g., 01/21/08).
- Time - A four-digit number indicating the 24-hour time of collection (for example: 0954 is 9:54 a.m., and 1629 is 4:29 p.m.).
- Medium - Water, soil, sediment, sludge, waste, etc.
- Sample Type - Grab or composite.
- Preservation - Type and quantity of preservation added.
- Analysis - VOA, BNAs, PCBs, pesticides, metals, cyanide, other.
- Sampled By - Printed name of the sampler.
- Remarks - Any pertinent additional information.

Using only the work assignment number of the sample label maintains the anonymity of sites. This may be necessary, even to the extent of preventing the laboratory performing the analysis from knowing the identity of the site (e.g., if the laboratory is part of an organization that has performed previous work on the site). The field team should always follow the sample ID system prepared by the project EIS and reviewed by the Project Manager.

V.2 Chain-of-Custody Procedures

After collection, separation, identification, and preservation, the sample is maintained under chain-of-custody procedures until it is in the custody of the analytical laboratory and has been stored or disposed of.

V.2.1 Field Custody Procedures

- Samples are collected as described in the site Sampling and Analysis Plan. Care must be taken to record precisely the sample location and to ensure that the sample number on the label matches the Chain-of-Custody Record exactly.

- The person undertaking the actual sampling in the field is responsible for the care and custody of the samples collected until they are properly transferred or dispatched.

- When photographs are taken of the sampling as part of the documentation procedure, the name of the photographer, date, time, site location, and site description are entered sequentially in the site logbook as photos are taken. Once downloaded to the server or developed, the electronic files or photographic prints shall be serially numbered, corresponding to the logbook descriptions; photographic prints will be stored in the project files. To identify sample locations in photographs, an easily read sign with the appropriate sample/ location number should be included.

- Sample labels shall be completed for each sample, using waterproof ink unless prohibited by weather conditions (e.g., a logbook notation would explain that a pencil was used to fill out the sample label if the pen would not function in freezing weather.)

V.2.2 Transfer of Custody and Shipment

Samples are accompanied by a Chain-of-Custody Record Form. A Chain-of-Custody Record Form example is shown in Attachment B. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the Record. This Record documents sample custody transfer from the sampler, often through another person, to the analyst in the laboratory. The Chain-of-Custody Record is filled out as given below:

- Enter header information (CTO number, samplers, and project name).

- Enter sample specific information (sample number, media, sample analysis required and analytical method grab or composite, number and type of sample containers, and date/time sample was collected).

- Sign, date, and enter the time under "Relinquished by" entry.

- Have the person receiving the sample sign the "Received by" entry. If shipping samples by a common carrier, print the carrier to be used in this space (i.e., Federal Express).

- If a carrier is used, enter the airbill number under "Remarks," in the bottom right corner;

- Place the original (top, signed copy) of the Chain-of-Custody Record Form in a plastic zipper-type bag or other appropriate sample-shipping package. Retain the copy with field records.

- Sign and date the custody seal, a 1-inch by 3-inch white paper label with black lettering and an adhesive backing. Attachment C is an example of a custody seal. The custody seal is part of the chain-of-custody process and is used to prevent tampering with samples after they have been collected in the field. Custody seals shall be provided by the analytical laboratory.

- Place the seal across the shipping container opening (front and back) so that it would be broken if the container were to be opened.

- Complete other carrier-required shipping papers.

The custody record is completed using waterproof ink. Any corrections are made by drawing a line through and initialing and dating the change, then entering the correct information. Erasures are not permitted.

Common carriers will usually not accept responsibility for handling Chain-of-Custody Record Forms; this necessitates packing the record in the shipping container (enclosed with other documentation in a plastic zipper-type bag). As long as custody forms are sealed inside the shipping container and the custody seals are intact, commercial carriers are not required to sign the custody form.

The laboratory representative who accepts the incoming sample shipment signs and dates the Chain-of-Custody Record, completing the sample transfer process. It is then the laboratory's responsibility to maintain internal logbooks and custody records throughout sample preparation and analysis.

VI Quality Assurance Records

Once samples have been packaged and shipped, the Chain-of-Custody copy and airbill receipt become part of the quality assurance record.

VII Attachments

A. Sample Label
B. Chain of Custody Form
C. Custody Seal

VIII References

USEPA. *User's Guide to the Contract Laboratory Program*. Office of Emergency and Remedial Response, Washington, D.C. (EPA/540/P-91/002), January 1991.

Attachment A

Example Sample Label

QAL

Quality Analytical Laboratories, Inc.
2567 Fairlane Drive
Montgomery, Alabama 36116
PH. (334)271-2440

Client _____
Sample No. _____
Location _____
_____
Analysis _____
_____
Preservative HCL
Date _____ By _____

CEIMIC
CORPORATION
10 Dean Knauss Drive, Narragansett, R.I. 02882 • (401) 782-8900

SITE NAME	**DATE**
ANALYSIS	**TIME**
	PRESERVATIVE

SAMPLE TYPE

☐ **Grab** ☐ **Composite** ☐ **Other** _____

COLLECTED BY:

Attachment B

Example Chain-of-Custody Record

CH2MHill

APPLIED SCIENCES LABORATORY

CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES

CH2M Hill Project # ␣␣␣␣␣␣␣␣.␣␣.␣␣

Purchase Order #

Project Name

Company Name CH2M HILL Office

Project Manager & Phone #
Mr. [ ]
Ms. [ ]
Dr. [ ]

Report Copy to:

Requested Completion Date:

Sampling Requirements: SDWA ☐ NPDES ☐ RCRA ☐ OTHER ____

Sample Disposal: Dispose ☐ Return ☐

Sampling Date	Sampling Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	Matrix AIR	CLIENT SAMPLE ID (9 CHARACTERS)	# OF CONTAINERS

LAB TEST CODES

ANALYSES REQUESTED

SHADED AREA– FOR LAB USE ONLY

Lab 1 #

Lab 2 #

Quote #

Kit Request #

Project #

No. of Samples

Page of

Login

LIMS Ver

REMARKS	LAB 1 ID	LAB 2 ID

Sampled By & Title (Please sign and print name) — Date/Time

Received By (Please sign and print name) — Date/Time

Received By (Please sign and print name) — Date/Time

Received By (Please sign and print name) — Date/Time

Work Authorized By (Please sign and print name)

Relinquished By (Please sign and print name) — Date/Time

Relinquished By (Please sign and print name) — Date/Time

Relinquished By (Please sign and print name) — Date/Time

Shipped Via UPS BUS Fed-Ex Hand Other ____

Shipping #

Remarks

QC Level: 1 2 3 Other: ____

COC Rec	ICE
Ana Req	TEMP
Cust Seal	Ph

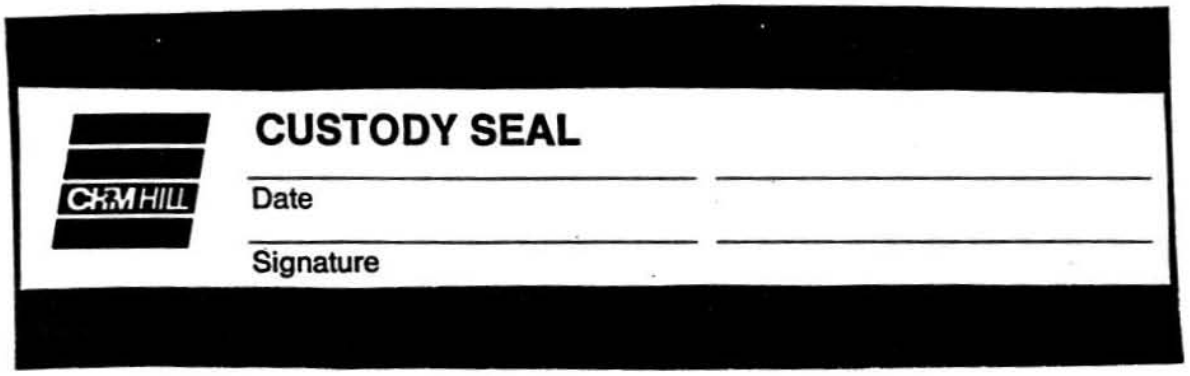
Instructions and Agreement Provisions on Reverse Side

DISTRIBUTION: Original - LAB, Yellow - LAB, Pink - Client

REV 3/94 FORM 340

Attachment C

Example Custody Seal


CH2M HILL
CUSTODY SEAL
Date
Signature

STANDARD OPERATING PROCEDURE

Homogenization of Soil and Sediment Samples

I. Purpose

The homogenization of soil and sediment samples is performed to minimize any bias of sample representativeness introduced by the natural stratification of constituents within the sample.

II. Scope

Standard techniques for soil and sediment homogenization and equipment are provided in this SOP. These procedures do not apply to aliquots collected for VOCs or field GC screening; samples for these analyses should NOT be homogenized.

III. Equipment and Materials

Sample containers, stainless steel spoons or spatulas, and stainless steel pans.

IV. Procedures and Guidelines

Soil and sediment samples to be analyzed for semivolatiles, pesticides, PCBs, metals, cyanide, or field XRF screening should be homogenized in the field. After a sample is taken, a stainless steel spatula should be used to remove the sample from the split spoon or other sampling device. The sampler should not use fingers to do this, as gloves may introduce organic interferences into the sample.

Samples for VOCs should be taken immediately upon opening the spoon and should not be homogenized.

Prior to homogenizing the soil or sediment sample, any rocks, twigs, leaves, or other debris should be removed from the sample. The sample should be placed in a decontaminated stainless steel pan and thoroughly mixed using a stainless steel spoon. The soil or sediment material in the pan should be scraped from the sides, corners, and bottom, rolled into the middle of the pan, and initially mixed. The sample should then be quartered and moved to the four corners of the pan. Each quarter of the sample should be mixed individually, and then rolled to the center of the pan and mixed with the entire sample again.

All stainless steel spoons, spatulas, and pans must be decontaminated following procedures specified in SOP *Decontamination of Personnel and Equipment* prior to homogenizing the sample. A composite equipment rinse blank of homogenization equipment should be taken each day it is used.

V. Attachments

None.

VI. Key Checks and Items

- Take VOC samples immediately and do not homogenize the soil.
- Homogenize soil for analyses other than VOCs in a clean, stainless steel bowl.

STANDARD OPERATING PROCEDURE

Preparing Field Log Books

I. Purpose

To provide general guidelines for entering field data into log books during site investigation and remediation field activities.

II. Scope

This is a general description of data requirements and format for field log books. Log books are needed to properly document all field activities in support of data evaluation and possible legal activities.

III. Equipment and Materials

- Log book
- Indelible pen

IV. Procedures and Guidelines

Properly completed field log books are a requirement of much of the work we perform under the Navy CLEAN contract. Log books are legal documents and, as such, must be prepared following specific procedures and must contain required information to ensure their integrity and legitimacy. This SOP describes the basic requirements for field log book entries.

A. PROCEDURES FOR COMPLETING FIELD LOG BOOKS

1. Field notes commonly are kept in bound, orange-covered logbooks used by surveyors and produced, for example, by Peninsular Publishing Company and Sesco, Inc. Pages should be water-resistant and notes should be taken only with water-proof, non-erasable permanent ink, such as that provided in Sanford Sharpie® permanent markers.

2. On the inside cover of the log book the following information should be included:

    - Company name and address
    - Log-holders name if log book was assigned specifically to that person

- Activity or location
- Project name
- Project manager's name
- Phone numbers of the company, supervisors, emergency response, etc.

3. All lines of all pages should be used to prevent later additions of text, which could later be questioned. Any line not used should be marked through with a line and initialed and dated. Any pages not used should be marked through with a line, the author's initials, the date, and the note "Intentionally Left Blank."

4. If errors are made in the log book, cross a single line through the error and enter the correct information. All corrections shall be initialed and dated by the personnel performing the correction. If possible, all corrections should be made by the individual who made the error.

5. Daily entries will be made chronologically.

6. Information will be recorded directly in the field log book during the work activity. Information will not be written on a separate sheet and then later transcribed into the log book.

7. Each page of the log book will have the date of the work and the note takers initials.

8. The final page of each day's notes will include the note-takers signature as well as the date.

9. Only information relevant to the subject project will be added to the log book.

10. The field notes will be copied and the copies sent to the Project Manager or designee in a timely manner (at least by the end of each week of work being performed).

B. INFORMATION TO BE INCLUDED IN FIELD LOG BOOKS

1. Entries into the log book should be as detailed and descriptive as possible so that a particular situation can be recalled without reliance on the collector's memory. Entries must be legible and complete.

2. General project information will be recorded at the beginning of each field project. This will include the project title, the project number, and project staff.

3. Scope: Describe the general scope of work to be performed each day.

4. Weather: Record the weather conditions and any significant changes in the weather during the day.

5. Tail Gate Safety Meetings: Record time and location of meeting, who was present, topics discussed, issues/problems/concerns identified, and corrective actions or adjustments made to address concerns/ problems, and other pertinent information.

6. Standard Health and Safety Procedures: Record level of personal protection being used (e.g., level D PPE), record air monitoring data on a regular basis and note where data were recording (e.g., reading in borehole, reading in breathing zone, etc). Also record other required health and safety procedures as specified in the project specific health and safety plan.

7. Instrument Calibration; Record calibration information for each piece of health and safety and field equipment.

8. Personnel: Record names of all personnel present during field activities and list their roles and their affiliation. Record when personnel and visitors enter and leave a project site and their level of personal protection.

9. Communications: Record communications with project manager, subcontractors, regulators, facility personnel, and others that impact performance of the project.

10. Time: Keep a running time log explaining field activities as they occur chronologically throughout the day.

11. Deviations from the Work Plan: Record any deviations from the work plan and document why these were required and any communications authorizing these deviations.

12. Heath and Safety Incidents: Record any health and safety incidents and immediately report any incidents to the Project Manager.

13. Subcontractor Information: Record name of company, record names and roles of subcontractor personnel, list type of equipment being used and general scope of work. List times of starting and stopping work and quantities of consumable equipment used if it is to be billed to the project.

14. Problems and Corrective Actions: Clearly describe any problems encountered during the field work and the corrective actions taken to address these problems.

15. Technical and Project Information: Describe the details of the work being performed. The technical information recorded will vary significantly between projects. The project work plan will describe the specific activities to be performed and may also list requirements for note taking. Discuss note-taking expectations with the Project Manager prior to beginning the field work.

16. Any conditions that might adversely affect the work or any data

obtained (e.g., nearby construction that might have introduced excessive amounts of dust into the air).

17. Sampling Information; Specific information that will be relevant to most sampling jobs includes the following:

- Description of the general sampling area – site name, buildings and streets in the area, etc.
- Station/Location identifier
- Description of the sample location – estimate location in comparison to two fixed points – draw a diagram in the field log book indicating sample location relative to these fixed points – include distances in feet.
- Sample matrix and type
- Sample date and time
- Sample identifier
- Draw a box around the sample ID so that it stands out in the field notes
- Information on how the sample was collected – distinguish between "grab," "composite," and "discrete" samples
- Number and type of sample containers collected
- Record of any field measurements taken (i.e. pH, turbidity, dissolved oxygen, and temperature, and conductivity)
- Parameters to be analyzed for, if appropriate
- Descriptions of soil samples and drilling cuttings can be entered in depth sequence, along with PID readings and other observations. Include any unusual appearances of the samples.

C. SUGGESTED FORMAT FOR RECORDING FIELD DATA

1. Use the left side border to record times and the remainder of the page to record information (see attached example).

2. Use tables to record sampling information and field data from multiple samples.

3. Sketch sampling locations and other pertinent information.

4. Sketch well construction diagrams.

V. Attachments

Example field notes.

(47) MAY 12, 2003 EXAMPLE

0715 ARRIVE ON SITE AT XYZ SITE.
CH2M HILL STAFF:
JOHN SMITH: FIELD TEAM LEADER
BOB BUILDER: SITE SAFETY COORD.
WEATHER: OVERCAST + COOL, 45°F
CHANCE OF LATE SHOWERS
SCOPE: • COLLECT GROUNDWATER SAMPLES FOR LTM WORK AT SITE 14
• SUPERVISE SURVEY CREW AT SITE 17

0725 BB ~~CON~~ ~~JS~~ (JS) CALIBRATES PID: 101 ppm / 100 ppm ok
PID MODEL #, SERIAL #

0730 BB CALIBRATES HORIBA METER
MODEL #, SERIAL #
→ LIST CALIBRATION RESULTS

0738 SURVEY CREW ARRIVES ON SITE
→ LIST NAMES

0745 BB HOLDS H+S TALK ON SLIPS, TRIPS, FALLS, TICKS + AIR MONITORING
JS + SURVEY CREW ATTEND
NO H+S ISSUES IDENTIFIED AS CONCERNS. ALL WORK IS IN "LEVEL D."

0755 JS CONDUCTS SITE-WIDE AIR MONITORING
ALL READINGS = 0.0 ppm IN

JS 5-12-03

MAY 12, 2003 EXAMPLE (48)

SITE 14 LTM
BREATHING ZONE (BZ)

0805 MOBILIZE TO WELL MW-22 TO SAMPLE, SURVEYORS SETTING UP AT SITE 17

0815 PM (PAUL PAPER PUSHER) CALLS AND INFORMS JS TO COLLECT GW SAMPLE AT WELL MW-44 TODAY FOR 24 hour TAT ANALYSIS OF VOC'S

0820 PURGING MW-22
→ RECORD WATER QUALITY DATA

JS 5-12-03

0843 COLLECT SAMPLE AT MW-22 FOR TOTAL TAL METALS AND VOC'S. NO DISSOLVED METALS NEEDED PER PM

0905 JS + BB MOBILIZE TO SITE 17 TO SHOW SURVEYORS WELLS TO SURVEY.

0942 MOBILIZE TO WELL MW-22 TO COLLECT SAMPLE

0950 CAN NOT ACCESS WELL MW-22 DUE TO BASE OPERATIONS; CONTACT PAUL PAPERPUSHER AND HE STATED HE WILL CHECK ON GAINING ACCESS WITH BASE CONTACT.

0955 MOBILIZE TO WELL MW-19

JS 5-12-03

STANDARD OPERATING PROCEDURE

Sediment Sampling

I. Purpose

These general outlines describe the collection and handling of sediment samples during field operations.

II. Scope

The sediment sampling procedures generally describe the equipment and techniques needed to collect representative sediment samples. Operators manual , if available, should be consulted for specific details

III. Equipment and Materials

- Sample collection device (hand corer, scoop, dredge, grab sampler, or other suitable device)
- Stainless steel spoon or spatula for media transfer
- Measuring tape
- Log book
- Personal protection equipment (rubber or latex gloves, boots, hip waders, etc.)
- Materials for classifying soils, particularly the percentage of fines
- Sample jars, including jars for Total Organic Carbon and pH, as appropriate

IV. Procedures and Guidelines

1. Field personnel will start downstream and work upstream to prevent contamination of unsampled areas. In surface water bodies that are tidally influenced, sampling will be performed at low tide and under low flow conditions to minimize the dilution of possible contaminants. Sediment sampling activities will not occur immediately after periods of heavy rainfall.
2. Make a sketch of the sample area that shows important nearby river features and permanent structures that can be used to locate the sample points on a map. Whenever possible, include measured distances from such identifying features. Also include depth and width of waterway, rate of flow, type and consistency of sediment, and point and depth of sample removal (along shore, mid-channel, etc).

3. Note in the field book any possible outside sources of contamination. For example, the outlet to a drainage culvert in the water body near your sampling location.

4. Transfer sample into appropriate sample jars with a stainless steel utensil. Be especially careful to avoid the loss of the very fine clay/silt particles when collecting the sample. The fine particles have a higher adsorption capacity than larger particles. Minimize the amount of water that is collected within the sample matrix. Decant the water off of the sample slowly and carefully to maximize retention of the very fine particles. The sampler's fingers should never touch the sediment since gloves may introduce organic interference into the sample. Classify the soil type of the sample using the Unified Soil Classification System, noting particularly the percentage of silt and clay.

5. Samples for volatile organics should immediately be placed in jars. Rocks and other debris should be removed before placement in jars.

6. For channel sampling, be on the alert for submerged hazards (rocks, tree roots, drop-offs, loss silt and muck) which can make wading difficult.

7. Sample sediment for TOC and pH also, to give context to organic and inorganic data during the risk assessment.

8. Follow the site safety plan designed for the specific nature of the site's sampling activities and locations.

9. Decontaminate all sampling implements and protective clothing according to prescribed procedures.

V. Attachments

None.

VI. Key Checks and Items

- Start downstream, work upstream.
- Log exact locations using permanent features.
- Beware of hidden hazards.

CLICK HERE FOR ATTACHMENTS

Explosives Usage and Munitions Response (MR) Standard of Practice HSE&Q-610

1.0 Applicability and Scope

1.1 Applicability

This Standard of Practice (SOP) applies to:

(1) CH2M HILL employees who enter areas known or suspected of having munitions,

(2) Areas where explosives are used for construction or demolition purposes, and

(3) Managers who may be responsible for oversight of a subcontractor's explosives usage, MR operations, or Controlled Detonation Chamber (CDC) operations.

Explosives usage or MR operations may be conducted on active, inactive, closed, transferring, or transferred ranges; former battlefields; disposal sites; munitions manufacturing and storage sites; and construction sites.

1.2 Scope

This SOP provides information regarding the spectrum of hazards and issues to be addressed during each phase of a project associated with operations involving the use of explosives. Hazardous situations addressed in this SOP include exposure to explosives used for construction or demolition work; munitions and explosives of concern (MEC), which include unexploded ordnance (UXO), discarded military munitions (DMM), and material that presents a potential explosive hazard (MPPEH); chemical warfare materiel (CWM), or munitions constituents (MC) contaminated soil and groundwater; munitions demilitarization operations; Controlled Detonation Chamber (CDC) operations; and operations to locate, identify, remove, and dispose of munitions.

CH2M HILL employees who enter areas where explosives may be encountered or used must take precautions to avoid these hazards and be aware of associated safe work practices.

As described in SOP HSE-215, Contracts, Subcontracts, & HSE&Q Management Practices, responsibilities for health, safety, and environmental (HS&E) protection are expressly defined through subcontract terms and conditions. CH2M HILL's HS&E practices in the field are determined on the basis of these defined responsibilities. Consistent with HSE-215, the subcontractor must determine how to operate safely, comply with applicable HS&E regulations and industry standards, and correct any deficiencies.

1.3 Regulatory Review

Projects involving the use of explosives are often complex (may require the acquisition, receipt, storage, and use of explosives to include insurance, permits/license, public safety,

etc.) and have a myriad of regulatory requirements to ensure safety. A brief description of the major requirements follows:

U.S. Department of Defense (DOD) Ammunition and Explosives Safety Standards, DOD 6055.9-STD, establishes uniform safety standards that apply to ammunition and explosives, to associated personnel and property, and to unrelated personnel and property exposed to the potential damaging effects of an accident involving ammunition and explosives during their development, manufacturing, testing, transportation, handling, storage, maintenance, demilitarization, and disposal. Additional regulatory requirements are: Title 18 U. S. Code, 842, Safe Explosives Act, 27 CFR Part 555.1 Explosives, 29 CFR 1910.109 Explosives and Blasting Agents, National Fire Protection Association 495 Explosive Materials Code, 49 CFR Parts 100–199, Hazardous Materials Transportation.

The U.S. Environmental Protection Agency (EPA) regulates the disposal of military munitions, and of waste that contains military munitions, through the Military Munitions Rule (MMR) (62 Federal Register [Fed. Reg.] 6621, February 12, 1997; 40 Code of Federal Regulations [CFR] Part 260 et seq.) under authority of the Resource Conservation and Recovery Act (RCRA). The rule has two functions: (1) it identifies when conventional and chemical military munitions become a solid waste, and (2) it provides criteria for storing and transporting such waste, including a conditional exemption if the munitions are managed under DOD rules.

This SOP incorporates by reference the guidelines and requirements for MR operations that are published by the U.S. Army Corps of Engineers (USACE) Engineering Support Center, Huntsville, Alabama. These are generally accepted industry standards, similar to voluntary consensus standards published by such organizations as the National Fire Protection Association (NFPA) and the American National Standards Institute (ANSI).

2.0 Project Planning

2.1 Planning Requirements

Compliance with the applicable governing laws and regulations is the responsibility of the Project Manager. The Project Manager will contact the MR Operations Manager, or in his absence the MR Safety Officer or the Munitions Response Market Segment Director, prior to and post MR ORE approval and subsequent GO/NO GO decision for determination of applicable governing laws and regulations and to assist with planning and executing support for such activities as blasting operations, hazardous toxic radiological waste (HTRW) support, construction support, MR actions, handling of CWM or explosive-contaminated soils, and munitions demilitarization. The following types of support may be needed for MR operations:

- For on-site visits with known or suspected MEC, an Abbreviated Accident Prevention Plan (AAPP) (See **Attachment 1**) must be prepared. This AAPP is to be used only for non-intrusive site visits, and it must be approved by the MR Safety Officer, or in his absence either the MR Operations Manager or MR Market Segment Director, before the field visit starts. All team members must read and comply with the AAPP and attend the safety briefings. The UXO Safety Officer (UXOSO) shall ensure that the Safety Briefing Checklist and the Plan Acceptance forms are filled out before the site visit begins.

- On an HTRW site with known or suspected MEC, MEC support involves implementing anomaly avoidance techniques to avoid any potential surface MEC and any subsurface anomalies. A Site Safety & Health Plan (SSHP) must be prepared. This SSHP is to be used only for non-intrusive anomaly avoidance activities, and it must be approved by the MR Safety Officer, or in his absence the MR Operations Manager or the MR Market Segment Director prior to the start of fieldwork. All team members must read and comply with the SSHP and attend the safety briefings. The UXOSO shall ensure that the Safety Briefing Checklist and Plan Acceptance Form are filled out prior to the start of the site work.

- On a construction site with known or suspected MEC, support must be provided by qualified UXO personnel during construction activities. The level of MEC support required depends on the probability of encountering MEC, determined on a project-by-project basis. This will be identified during the MR ORE.

- MR actions in which the intent is to locate, identify, excavate, remove, and dispose of MEC may require a Senior UXO Supervisor, UXO Safety Officer, and UXO Quality Control Specialist, to oversee UXO Teams performing operations.

- On an MR site that has MC contamination of soil or groundwater, MEC support may include both anomaly avoidance techniques and MEC construction support for excavating and/or treating MC-contaminated soil and groundwater.

- On ordnance demilitarization projects, MEC support is required to identify, handle, disassemble, process, certify, transport, and treat or dispose of munitions components.

- On projects where explosives waste is transported or disposed of off range, the MR Operations Manager and the BG Environmental Compliance Coordinator (ECC) may assist in identifying the applicable regulations and permits required.

- On projects where munitions debris (MD), material presenting a potential explosive hazard (MPPEH), or inert ordnance is recovered and processed for disposal as scrap, the MR Operations Manager and the BG ECC may determine whether treatment and certification is required, along with any permitting requirements.

- For drilling activities at project sites suspected of MEC contamination, the UXO team shall conduct a reconnaissance and MEC avoidance to provide clear access routes to each site before drilling crews enter the area. The procedures listed in HSE- 204, *Drilling*, apply and shall be implemented.

- For excavation activities at project sites suspected of MEC contamination, the UXO team shall conduct a reconnaissance and MEC avoidance to provide clear access routes to each site before excavation crews enter the area. The procedures listed in HSE-307, *Excavations*, apply and shall be implemented.

- Safety and quality control (QC) audits shall be included in developing cost estimates for any MR or explosives usage project that will last more then two weeks.

- On projects that include intrusive activities to investigate MEC or use of explosives (blasting), an Explosive Safety Submission (ESS), an Explosive Siting Plan (ESP), and an Explosive Management Plan (EMP) may be required. The MR Operations Manager, or in

his absence the MR Safety Officer or MR Market Segment Director, shall assist in evaluating project requirements and coordinate with others as appropriate.

The project UXOQCS or in his/her absence one the following, MR Program Quality, MR Quality Manager, MR Safety Officer or the MR Market Segment Director, shall verify subcontractor training, personnel qualifications, and current medical examinations prior to the start of field operations. Any identified shortfalls in qualifications should be reported to the MR Operations Manager or in his absence to the MR Safety Officer or the Market Segment Director for resolution.

2.2 Opportunity and Risk Evaluation (ORE)

Every project or task involving the usage of explosives or a Munitions Response (MR) requires completion of paragraph 17 of the ORE form in **Attachment 2**. The most current form and assistance in filling out the form can be obtained from the MR Safety Officer, MR Operations Manager, or MR Market Segment Director. This document is a living form and should be updated as a project is developed and executed or upon change of scope of work (SOW), identification of previously unknown hazards, etc. Final acceptance of the MR portion (paragraph 17) of the ORE is done by the MR Safety Officer.

2.3 Alcohol, Tobacco, Firearms, and Explosives (ATF&E) Background Investigation

The "Safe Explosives Act of 2002" requires the employer (CH2M HILL) to submit to ATF&E identifying information, fingerprints, and photographs for all "Responsible Persons" and "Possessors of Explosives."

All personnel designated as Responsible Persons or Possessors of Explosives involved in explosives usage and MR projects must provide a 2-inch by 2-inch color picture and an ATF Form 5400.28 filled out for submission by the ATF&E License Holder (contact MR Operations for assistance) who will forward them to ATF&E so that a background investigation can be conducted to establish eligibility to work with explosives.

Under the "Safe Explosives Act," a "Responsible Person" and a "Possessor of Explosives" are defined as follows:

Responsible Person: An individual who has the power to direct the management and policies of the applicant pertaining to explosive materials. Generally the term includes partners, sole proprietors, project managers, site managers, corporate officers and directors, and majority shareholders.

Possessor of Explosives: An individual who has actual physical possession or constructive possession, which means the person has dominion or control over explosives. For example, persons who are physically handling explosive materials would be considered to be possessors of explosives. This would include employees who handle explosive materials in order to ship, transport, or sell them; and employees, such as blasters, who actually use explosive materials. Other examples of possessors include a supervisor at a construction site who keeps keys for magazines in which explosives are stored, or who directs the use of explosive materials by other employees; and an employee of a licensee or permittee transporting explosive materials from a licensed distributor to a purchaser.

Assistance in filling out required forms can be obtained from the MR Operations Manager, or in his absence the MR Safety Officer or the MR Market Segment Director. Submission of completed forms to ATF&E is the responsibility of the ATF&E License Holder. Upon submission of the required forms "responsible persons and possessors of explosives" may execute their duties pending completion of the background investigation.

ATF&E will notify employers in writing of the result of each background check and will supply the "responsible person" or "possessor of explosives" with a "Letter of Clearance" where appropriate. The custodian of the ATF&E records will request a copy of this certificate from the employee.

2.4 Training Requirements

2.4.1 MR Projects

CH2M HILL employees and subcontractors who work on projects that involve MR must complete the following training:

- A one-time, 40-hour Hazardous Waste Operations and Emergency Response course, and a minimum of three days' actual field experience under the direct supervision of a trained supervisor as specified in 29 CFR §1910.120(e).
- An annual 8-hour hazardous waste refresher course, as specified in 29 CFR §1910.120(e) (8).
- Hazardous waste supervisory training (required for managers and supervisors only) as specified in 29 CFR §1910.120(e)(4).

All UXO technicians must be graduates of one of the following:

- U.S. Army Bomb Disposal School, Aberdeen Proving Ground, MD;
- U.S. Naval Explosive Ordnance Disposal (EOD) School, Indian Head, MD;
- U.S. Naval EOD School, Eglin Air Force Base (AFB), FL;
- EOD Assistants Course, Redstone Arsenal, AL;
- EOD Assistant Course, Eglin AFB; or
- An equivalent course as identified in Department of Defense Explosives Safety Board (DDESB) Technical Publication (TP) 18

The project UXOQCS or in his/her absence the MR Operations Manager, MR Safety Officer or the MR Market Segment Director, must review subcontractor personnel qualifications.

2.4.2 Commercial Blaster Requirements

Commercial blasting is most often done in support of construction projects to remove or reduce obstacles that interfere with the construction of new roads, bridges, tunnels, harbors, or other facilities.

In order to be qualified as a "Blaster," the individual shall be able to understand and give written and oral orders; be in good physical condition and not be addicted to narcotics, intoxicants, or similar types of drugs; and be qualified by reason of training, knowledge, or

experience in the field of transporting, storing, handling, and use of explosives, and have a working knowledge of state and local laws and regulations that pertain to explosives. A "Blaster" will be required to furnish satisfactory evidence of competency in handling explosives and performing in a safe manner the type of blasting that will be required. A Blaster must also be knowledgeable and competent in the use of each type of blasting method used.

Depending on the type and location of work performed, personnel that transport explosives may need to have a commercial driver's license (CDL) with a hazardous material endorsement in accordance with Department of Transportation Requirements specified in 49 CFR.

The following definitions provide an overview the types of explosives which may be used in commercial blasting:

Explosives -- any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion, i.e., with substantially instantaneous release of gas and heat, unless such compound, mixture, or device is otherwise specifically classified by the U.S. Department of Transportation; see 49 CFR Chapter I. The term "explosives" shall include all material which is classified as Class A, Class B, and Class C explosives by the U.S. Department of Transportation, and includes, but is not limited to dynamite, black powder, pellet powders, initiating explosives, blasting caps, electric blasting caps, safety fuse, fuse lighters, fuse igniters, squibs, cordeau detonant fuse, instantaneous fuse, igniter cord, igniters, small arms ammunition, small arms ammunition primers, smokeless propellant, cartridges for propellant-actuated power devices, and cartridges for industrial guns. Commercial explosives are those explosives which are intended to be used in commercial or industrial operations.

(i) ***Class A explosives***. Possessing, detonating, or otherwise having maximum hazard, such as dynamite, nitroglycerin, picric acid, lead azide, fulminate of mercury, black powder, blasting caps, and detonating primers.

(ii) ***Class B explosives***. Possessing flammable hazard, such as propellant explosives (including some smokeless propellants), photographic flash powders, and some special fireworks.

(iii) ***Class C explosives***. Includes certain types of manufactured articles which contain Class A or Class B explosives, or both, as components but in restricted quantities.

2.5 Medical Surveillance Requirements

All CH2M HILL employees who perform field work on MR sites must participate in a medical monitoring program in accordance with 29 CFR 1910.120 and HSE 113, *Medical Monitoring*.

Employees who terminate employment and who have performed field work at MR project sites may be required to undergo an exit examination.

Subcontractors are responsible for ensuring that their employees are enrolled in a medical surveillance or monitoring program that meets the requirements of 29 CFR 1910.120.

2.6 Drug Free Workplace Requirements

CH2M HILL employees who perform or oversee MR operations are subject to the provisions of HSE-105, *Drug-Free Workplace*.

Subcontractors are responsible for ensuring that their employees who perform MR operations on CH2M HILL projects are on a drug abuse surveillance program that meets the requirements of HSE-105.

2.7 Competent Person Requirements

2.7.1 Munitions Response

MR subcontractors are responsible for providing a competent person to oversee MR operations. A competent person may be a Senior UXO Supervisor, UXO Safety Officer, UXO Quality Control Specialist, or UXO Technician III. The competent person must meet the following minimum qualifications:

- Be a graduate of one of the schools and courses listed for all UXO technicians in Section 2.4.1 above,
- Have at least 8 years of combined active-duty military EOD experience and contractor UXO experience, and
- Have experience in MR operations and supervision of personnel.

CH2M HILL-competent person requirements are the same as for a subcontractor.

The MR Operations Manager, the MR Market Segment Director, and the MR Safety Officer will compose the Ammunition & Explosive Personnel Qualification and Certification Board for employees of CH2M HILL. This Board will review individual qualifications and experiences for determining who will be allowed to perform those duties and assignments associated with SUXOS, UXOQC, UXOSO, and CDC Chamber Operator.

2.7.2 Blasting

Blasting subcontractors are responsible for providing a competent person to oversee blasting operations. A competent person may be a state licensed blaster. The competent person must be qualified through a license or permit issued by a state or local jurisdiction based on testing, extensive knowledge, training, and experience with an ability to solve or resolve problems related to blasting, and must meet the following requirements:

- Able to understand and give written and oral orders.
- In good physical condition and not be addicted to narcotics, intoxicants, or similar types of drugs.
- Required to furnish satisfactory evidence of competency in handling explosives and performing in a safe manner the type of blasting that will be required.
- Knowledgeable and competent in the use of each type of blasting method used.

2.8 Safety Equipment

Subcontractors are responsible for providing all necessary personal protective equipment (PPE) for their employees. CH2M HILL will provide PPE only for its own employees. Other

safety equipment will be provided as delineated in the subcontract and documents referenced by the subcontract. The MR Safety Officer, or in his absence the MR Operations Manager or the MR Market Segment Director, must review subcontractor work plans and site-specific HS&E plans to ensure that appropriate safety equipment has been included to meet the requirements of the scope of work (SOW).

Personnel who will be handling explosives will not wear outer or inner garments having static electricity-generating characteristics. These include clothing made of 100 percent polyester, nylon, silk, and wool, which are all highly static producing.

Protective shoes worn by personnel performing explosives operations should be constructed of nonferrous materials (e.g., fiberglass) to prevent interference with sensitive geophysical instruments.

UXO Technicians are required to wear hard hats when an overhead hazard exists or when specified in the site-specific HS&E plan. Hard hats should *not* be worn, however, when investigating suspect MEC. A hard hat can create an unsafe condition by falling off the technician's head at a critical moment. Also, if a MEC is accidentally detonated (the worst-case accident scenario), the hard hat will not protect the technician from fragments and may worsen the injury by reflecting fragments into the head of the technician. This is consistent with safety guidance from the Corps of Engineers, Huntsville Center, Military Munitions Center of Expertise (MM-CX).

2.9 Subcontractor Selection

Subcontractors are selected based on their past performance in working for CH2M HILL, safety record, experience, and compliance with federal, state, and local jurisdiction licensing and permitting.

Additional criteria may be developed, depending upon the specific SOW requirements for the subcontractor. When oversight is required by HSE -215, the CH2M HILL MR Safety Officer, or in his absence the MR Operations Manager or MR Market Segment Director, shall use these developed criteria to review the explosives procedures submitted by the sub-contractor.

3.0 Definitions

Please see **Attachment 3** for definitions.

4.0 Project Execution

4.1 Safe Work Practices

Management is responsible to control and eliminate unsafe work conditions through training and engineering out the hazard. The requirements of this section are to be followed by all personnel where explosives are used, regardless of the company performing the operations. These requirements also pertain to subcontractor personnel.

4.2 MR Operations

On MR project sites, the MR Operations Manager will be contacted to establish requirements.

4.3 Regulations and Industry Standards

As described in HSE -215, the MR Safety Officer or MR Quality Control Manager may be required to oversee a subcontractor's field activities. Subcontractors retain control over their practices, and CH2M HILL's oversight does not relieve them of their own responsibility for effective implementation and enforcement of HS&E requirements. The following subsections provide the minimum regulatory and industry standards for operations.

The Military Munitions Response Program (MMRP) is a maturing program with different levels of regulatory oversight within each service component. Unless a service component has issued written regulations/guidance for execution of MR actions, then the default regulations/guidance followed will be those issued by the Department of Defense Explosive Safety Board (DDESB) and the U.S. Army Corps of Engineers. For commercial blasting operations, the following guidelines shall apply: ATF&E federal explosive laws and regulations (ATF P5400.7); ANSI A10.7, Safety Requirements for Transportation, Storage, Handling and Use of Explosives; and NFPA 495, Explosive Material Code.

4.3.1 General Safety Concerns and Procedures

Operations, including site visits, shall not be conducted until a complete plan for the site is prepared and approval for use is given by the CH2M HILL MR Safety Officer, MR Operations Manager, or MR Market Segment Director. These plans will be based upon the cardinal rule of explosive safety which is to limit exposure to the minimum number of personnel, for the minimum amount of time, to the least amount of explosives hazards consistent with safe and efficient operations.

Only UXO-qualified personnel shall perform MEC procedures. Non-UXO personnel may be used to perform MEC-related procedures when supervised by a UXO Technician III. All personnel engaged in field operations shall be thoroughly trained and capable of recognizing the specific hazards of the procedures being performed. To ensure that these procedures are performed to standards, all field personnel shall be under the direct supervision of a UXO Technician III or a Senior UXO Supervisor (SUXOS).

4.3.2 Explosives Safety Precautions

Comply with the cardinal rule for explosives safety: expose the minimum number of people to the minimum amount of explosives for the minimum amount of time. Project-specific explosives safety precautions shall be developed prior to field activities and included in Work Plans and Health & Safety Plans that must be reviewed and approved by the MR Safety Officer and the MR Operations Manager, or in their absence the MR Market Segment Director.

4.3.3 Recognize, Retreat, and Report MEC

Any CH2M HILL project located on a present or former Department of Defense (DOD) facility, even if it is now under the control of a city, state, or private owner, should plan on the potential to encounter MEC/MPPEH. A contingency plan developed during pre-mobilization that addresses the three Rs of MEC/MPPEH (recognize the potential hazard, retreat upwind a safe distance, and report in accordance with approved plans) will lesson the impact to the project and enhance employee safety if MEC/MPPEH is encountered. Assistance in developing this contingency plan should be obtained from the MR Safety Officer, or in his absence the MR Operations Manager or the MR Market Segment Director.

4.3.4 Explosives Management

Management of explosives material under the "Safe Explosives Act of 2002" implements stringent requirements that must be followed. Management of explosives is a process that, if in compliance with federal, state, and local jurisdiction, will reduce, control, or eliminate civil and criminal penalties, disciplinary actions, and potential risk to personnel, the public, and the environment. Details of explosives management are developed on a site-specific basis and included in a site-specific explosives management plan. These details are based on federal, state, and local jurisdiction requirements and on contractual specifications by the client.

4.3.5 Explosives Security

Security of explosives will conform to the requirements set forth by federal, state, and local jurisdictions. Provisions for explosives security during interstate or intrastate shipment will be performed by transportation vendors. Project site and overnight explosives security will conform to 49 CFR 171-173, transportation security requirements. Details of explosives security requirements are included in the explosives management plan for each project.

4.3.6 Controlled Detonation Chamber Operations

A Controlled Detonation Chamber (CDC) is capable of repeated controlled detonations of a suite of energetic materials that are currently demilitarized by open burn/open detonation (OB/OD). On CDC projects, the MR Operations Manager will be contacted to establish requirements.

4.3.7 Explosive Waste Disposal

When used or fired munitions are managed off range (i.e., transported off range and stored, reclaimed, treated, or disposed) or disposed of on range (i.e., buried without treatment), it is subject to regulation as a solid waste under RCRA. This means it may also be subject to regulation as a hazardous waste. Also, munitions that land off range and are not promptly retrieved are solid wastes. Table 4-1 describes how solid wastes may be characterized as hazardous in these situations. All characterization must be based on field observations by qualified MR personnel who are trained to properly identify waste munitions items and meet the requirements for an emergency response expert under RCRA. In the event that the explosive waste is regulated as hazardous waste, refer to SOP HSE 409, Waste Handling: Hazardous Waste for RCRA hazardous waste management requirements.

TABLE 4-1
Waste Characterization

Item	Characterization	Waste Code
Uncontaminated metal debris	If visual inspection determines that the item does not contain waste residue, then waste is non-hazardous scrap metal excluded from RCRA regulation under 40 CFR §261.6(a)(3). Waste may be subject to further incineration and certification requirements.	None
Contaminated metal debris	If visual inspection determines that the item contains hazardous waste residue, then manage it as potential hazardous waste.	Potential D003 and/or D008
Ordnance items less than 0.50 caliber	Small-arms ammunition is not considered reactive hazardous waste in accordance with EPA policy (November 30, 1984 Memorandum, John Skinner, OSWER Director).	None
Ordnance items greater than 0.50 caliber	Untreated MEC is presumed to be reactive hazardous waste using generator knowledge under 40 CFR §261.23.	D003

4.3.8 Forms and Permits

(1) **Type-20 Manufacturer of High Explosives License/Permit** issued by the ATF&E is required to purchase, store, and use high explosives including on-site use of binary explosives in support of MR operations, construction projects, and demolition and deactivation (D&D) projects. The following must be done prior to execution of field activities:

- Explosives will not be ordered, shipped, stored, or used without the review and approval of the ATF&E License Holder.
- The ATF&E License Holder must review and approve all Explosive Siting Plans (ESPs) and Explosives Management Plans (EMPs) to ensure compliance with ATF&E regulations.
- Following compliance with the above, the ATF&E License Holder will provide procurement/contracting with a certified copy of our Type 20 license and the authorization letter (responsible persons & possessors of explosives) to procure explosives.
- Written authorization designating the "Responsible Persons" and "Possessors of Explosives" who can order, receive, store, and use explosives must be provided by the ATF&E License Holder to explosives supplier.
- A copy of the CH2M HILL ATF&E Type 20 Manufacturer of High Explosives license must be posted on the project site.
- A copy of the ESP must be provided through the ATF&E License Holder to the ATF&E Office that inspects the CH2M HILL records and to the nearest ATF&E Office to the project site.

Additional details are provided in **Attachment 4**, Explosives Management Check List, including required records that must be forwarded to the CH2M HILL ATF&E Type 20 License Holder upon completion of work.

(2) State and local explosives permits may be required for CH2M HILL and individuals to purchase, store, and use explosives in support of MR operations, CDC operations, construction projects, and D&D projects. In addition there may be local requirements to notify law enforcement or fire department agencies when establishing explosives storage.

5.0 Attachments

The following attachments are included with this SOP:

Attachment 1 Abbreviated Site Safety and Health Plan (ASSHP)

Attachment 2 Opportunity Risk Evaluation (ORE)

Attachment 3 Glossary, Acronyms, and Abbreviations

Attachment 4 Explosives Management Check List

CH2MHILL

Explosives Usage and Munitions Response (MR)
Standard of Practice HSE&Q-610

Attachment 1: Abbreviated Accident Protection Plan (AAPP)

For:

Site name _____

Site location _____

Purpose of visit _____

AAPP prepared by _____

Office _____

Address _____

Telephone _____

Date prepared _____

Signature and date _____

AAPP reviewed and approved by:

Safety office: _____ Date: _____

NOTE: This AAPP is to be used only for non- intrusive site visits or for intrusive activities (e.g. geophysical prove-outs) where anomaly avoidance is to be performed prior to intrusive activity. All team members must read and comply with this AAPP and attend the safety briefings. The UXO escort shall ensure that the Safety Briefing Checklist and Plan Acceptance Form are filled out prior to the start of the site visit.

I. Site Description and Previous Investigation

A. Site Description

Size: _____ acres

Present usage:

( ) Military	( ) Recreational	( ) Other
( ) Residential	( ) Commercial	( )_____
( ) Natural area	( ) Industrial	( ) _____
( ) Agricultural	( ) Landfill	( ) _____
( ) Secured	( ) Active	( ) Unknown
( ) Unsecured	( ) Inactive	

B. Past Uses

All members of the site visit team have been provided with a copy of the ASR.

Yes No –

C. Surrounding Population

( ) Rural	( ) Residential (outside base fence)	( ) Other (specify)
( ) Urban	( ) Industrial	( ) _____
	( ) Commercial	( ) _____

D. Previous Sampling and Investigation Results

1. MEC Encountered within anticipated boundaries of site

2. Samples (air, water, soil, and/or vegetation)

Chemical	Concentration	Medium	Location

II. Description of On-Site Activities

( ) Walk-through	( ) Drive-through	( ) Other
( ) On-road	( ) Off-road	( )_____
( ) On-path	( ) Off-path	( )_____
( ) Other	( ) Other	( )_____

III. Site Personnel and Responsibilities

Project Manager –

Office _____

Address _____

Phone _____

Responsibilities _____

Team Leader –

Office _____

Address _____

Phone _____

Responsibilities Responsible for documenting site visit.

UXO Safety Officer –

Office _____

Address _____

Phone _____

Responsibilities Responsible for all aspects of site safety during operations covered under this AAPP

IV. Hazard Analysis

A. Safety and Health Hazards Anticipated

( ) Chemical (be specific and include warning signs and symptoms of overexposure)

( ) Ordnance (specify)

( ) Heat stress	( ) Cold stress	( ) Tripping hazard
( ) Noise	( ) Electrical	( ) Falling objects
( ) Foot hazard	( ) Biological	( ) Overhead hazard
( ) Radiological	( ) Confined space	( ) Water hazard
( ) Explosive	( ) Climbing hazard	( ) Sunburn
( ) Flammable	( ) Other	

B. Overall Hazard Evaluation

( ) High ( ) Moderate ( ) Low ( ) Unknown

Justification

V. Accident Prevention

A. General Precautions

Before the on-site visit, all team members are required to read this AAPP and sign the form acknowledging that they have read and will comply with it. In addition, the UXO Safety Officer (escort) - shall hold a brief tailgate meeting in which site-specific topics regarding the day's activities are discussed. The buddy system shall be enforced at all times. If unanticipated hazardous conditions arise, team members are to stop work, leave the immediate area, and notify the UXO Safety Officer.

VI. Standard Operation Safety Procedures, Engineering Controls, and Work Practices

A. Site Rules and Prohibitions

At any sign of unanticipated hazardous conditions, stop tasks, leave the immediate area, and notify the UXO Safety Officer. Smoking, eating, and drinking are allowed in designated areas only.

B. Material-Handling Procedures

Do not handle.

C. Drum-Handling Procedures

Do not handle.

D. Confined Space Entry

Do not enter.

E. Ignition Source and Electrical Protection

Smoke in designated areas only. Team members are not to carry matches or lighters into the site.

F. Spill Containment

N/A

G. Excavation Safety

N/A

H. Illumination

Work during daylight hours only.

I. Sanitation

Use existing sanitary facilities.

J. Buddy System

Two persons shall be on site maintaining constant contact with each other; this shall be adhered to at all times.

K. Engineering Controls

N/A

L. Heat Stress

Dress appropriately, take sufficient breaks, and drink plenty of fluids. Watch for signs and symptoms of heat stress.

M. Poisonous Snakes or Insects

(1) Do NOT handle any snakes even those that appear to be dead.

(2) Avoid areas of limited visibility such as tall grass or heavy vegetation.

(3) Roll sleeves down and use insect repellant.

N. Material Potentially Presenting an Explosive hazard (MPPEH).

1. General Information

a. The cardinal principle to be observed involving explosives, ammunition, severe fire hazards, or toxic materials is to limit the exposure of a minimum number of personnel, for the minimum amount of time, to a minimum amount of hazardous material, consistent with a safe and efficient operation.

b. The age or condition of an ordnance item does not decrease its effectiveness. MPPEH that has been exposed to the elements for extended periods of time becomes more sensitive to shock, movement, and friction because the stabilizing agent in the explosive may be degraded.

c. When chemical agents may be present, further precautions are necessary. If the munitions item has green markings, leave the area immediately, since it may contain a chemical filler.

d. Consider MPPEH that has been exposed to fire as extremely hazardous. Chemical and physical changes may have occurred to the contents which render it more sensitive than it was in its original state.

2. On-Site Instructions

a. DO NOT touch or move MPPEH regardless of the marking or apparent condition.

b. DO NOT visit an MPPEH site if an electrical storm is occurring or approaching. If a storm approaches during a site visit, leave the site immediately and seek shelter.

c. DO NOT use radio or cellular phones in the vicinity of suspected MPPEH.

d. DO NOT walk across an area where the ground cannot be seen. If dead vegetation or animals are observed, leave the area immediately due to the potential of contamination by a chemical agent.

e. DO NOT drive a vehicle into a suspected MPPEH area; use clearly marked lanes.

f. DO NOT carry matches, cigarettes, lighters, or other flame-producing devices into an MPPEH site.

g. DO NOT rely on color code for positive identification of ordnance items or their contents.

h. Always assume that MPPEH contains a live charge until it can be determined otherwise.

3. Specific Actions upon Locating MPPEH

a. DO NOT touch, move, or jar MPPEH regardless of its apparent condition.

b. The UXO Safety Officer may approach the item cautiously; take photographs and a full description. Take notes of the markings or any other identifiers.

c. DO NOT be misled by markings on the item stating "practice bomb," "dummy," or "inert." Even practice bombs have explosive charges that are used to mark or spot the point of impact; or the item could be miss-marked.

d. DO NOT roll the item over or scrape the item to identify the markings.

e. The location of any MPPEH found during site investigation should be clearly marked so it can be easily located and avoided.

f. Notify PM upon location of any MPPEH. See Section VIII for phone number.

O. Other

Specify: _____

VII. Site Control and Communications

A. Site Map

Attach copy.

B. Site Work Zones

N/A

C. Buddy System

To be adhered to at all times.

D. Communications

1. On Site

Use verbal communications among team members to communicate to each other on site. If this communication is not possible, develop and use hand signals. Here are some examples:

Hand gripping throat:	"Breathing problems, can't breathe."
Thumbs up:	"OK, I'm all right, I understand."
Thumbs down:	"No, negative."
Hand(s) on top of head:	"Need assistance."
Grab buddy's wrist:	"Evacuate site now, no questions."
One long horn blast:	"Evacuate site to assembly point."
Two short horn blasts:	"Condition under control, return to site."

2. Off Site

Off-site communications shall be established on every site. Communications may be established by using an on-site cellular phone or by locating the nearest public or private phone that may be readily accessed. Mark the appropriate box:

( ) Cellular phone
( ) Public or private phone
( ) Other: _____

3. Emergency Signals

In the case of small groups, a verbal signal for emergencies shall suffice. The emergency signal for large groups (i.e., air horn) should be incorporated at the discretion of the UXO Safety Officer. Mark the appropriate box:

( ) Verbal
( ) Nonverbal (specify) _____

VIII. Emergency Response

A. Alert Procedures

Team members are to be alert to the hazards associated with the site at all times. If an unanticipated hazardous condition arises, stop work, evacuate the immediate area, and notify the UXO Safety Officer. Practice MEC avoidance. If a suspected MEC is encountered during field activities, the team leader will contact local authorities and USACE Project Manager. The local authorities will contact military EOD. The suspected item will be marked with colored tape (or equivalent) by on-site UXO Safety Officer (escort).

B. First Aid

A first aid kit and emergency eyewash (as applicable) will be located in the UXO Safety Officer's field car. If qualified persons (i.e., a fire department, medical facility, or physician) are not accessible within five minutes of the site, at least one team member shall be qualified to administer first aid and cardiopulmonary resuscitation (CPR).

C. Emergency Telephone Numbers

1. **Medical Facility**
2. **Fire Department**

   _____

3. **Police Department**

   _____

4. **Poison Control Center:**

   (800) 222-1222

5. **Local EOD**

   _____

6. **Project Manager(s)**

   _____

D. Hospital and Medical Facility Information

Route to hospital: (Attach a map with the route to the hospital marked; if a map is not available, then provide clear, written instructions.)

IX. Monitoring Equipment and Procedures

A. Exposure Monitoring

For non-intrusive on-site activities such as site visits, air monitoring is typically not required. However, if the site situation dictates the need for monitoring, then complete the following information on a separate page and attach the page to this AAPP.

Monitoring equipment to be utilized

Documentation of equipment calibration and results

Action levels

B. Heat and Cold Stress Monitoring

If heat stress monitoring is necessary, the monitoring criteria published in Chapter 8 of *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (NIOSH/OSHA/USCG/EPA, October 1985) shall be followed. If cold stress monitoring is necessary, it shall be conducted in accordance with the most current American Conference of Governmental Industrial Hygienists (ACGIH) cold stress standard.

X. Personal Protective Equipment

A. General

Typically, for non-intrusive site visits, Level D PPE is required. Hard hats shall be worn if an overhead hazard exists, safety shoes if a foot hazard exists, and safety glasses if an eye hazard exists. If a higher level of protection is to be used initially or as a contingency, attach a brief discussion.

B. Non-intrusive Site Visit

Level of Protection

Initial:	( ) C	( ) D	( ) Modified (specify)
Contingency:	( ) C	( ) D	( ) Modified (specify)
	( ) Evacuate site if higher level of protection is needed.		

XI. Decontamination Procedures

If decontamination is required, attach an additional sheet with the requirements.

Decontamination procedures are not anticipated for this site investigation. Team members are cautioned not to walk, kneel, or sit on any surface with potential leaks, spills, or contamination.

XII. Training

All site personnel shall have completed the training required by EM 385-1-1 and 29 CFR §1910.120 (e). The Project Manager shall ensure, and the UXO Safety Officer shall verify, that all on-site persons have completed appropriate training prior to submitting the plan to the safety office for review. Additionally, the UXO Safety Officer shall inform personnel, before they enter the site, of any potential site-specific hazards and procedures.

XIII. Medical Surveillance Program

The Project Manager shall ensure, and the UXO Safety Officer shall verify, that all on-site personnel are in the Medical Surveillance Program meeting the requirements of 29 CFR §1910.120.

XIV. Logs, Reports, and Recordkeeping

A Site Log will be maintained by the team leader. This record will include historical data, personnel authorized to visit the site, all records, standard operating procedures, the AAPP submitted, any air monitoring logs, SOPs, and attachments to plans. All logs are to be maintained and available for inspection.

XV. General

The number of persons visiting the site shall be held to a minimum. No more than 8 people per UXO Safety Officer shall be allowed on-site. The more persons on site, the greater the potential for an accident. The UXO Safety Officer may modify this AAPP if site conditions warrant it and if it does not risk the safety and health of the team members. This modification shall be coordinated with the team members, and the UXO Safety Officer shall notify PM of the change as the situation allows.

XVI. Natural Resources

The following is a list of threatened and endangered species:

Safety Briefing Checklist
(Check subjects discussed)

Location: _____ Date: _____

General Information

Purpose of visit: _____

Identify key site personnel: _____

Training and medical requirements: _____

Specific Information

Site description and past uses: _____

Results of previous studies: _____

Potential site hazards: _____

MEC safety procedures: _____

Site SOPs: _____

Site control and communications: _____

( ) Emergency Hand Signals

Emergency Response: _____

( ) Location of First Aid Kit

( ) Emergency Phone Numbers and Location

( ) Location of Nearest Medical Facility and Location of Map to Facility

PPE and Decontamination: _____

Note: Stress the following during the briefings: If an unanticipated hazardous condition arises, stop work, evacuate the immediate area, and notify the UXO Safety Officer.

Plan Acceptance Form:
Abbreviated Accident Prevention Plan

For:

I have read and agree to abide by the contents of this Abbreviated Accident Prevention Plan and I have attended the Safety Briefing for the aforementioned site.

Name (printed)	Office	Signature	Date

Person presenting the safety briefing:

Signature Date

Equipment List

(The following items may be necessary to support the site visit)

1. Boots or sturdy leather work shoes.
2. First aid kit.
3. Sun screen lotion.
4. Bug and/or insect repellant.
5. Rain / cold weather protection.
6. Potable water.

Attachment 2: Opportunity Risk Assessment (ORE)

1.0 Projects Involving or Potentially Involving the Use of Explosives, Materials Potentially Presenting an Explosive Hazard (MPPEH), Munitions and Explosives of Concern (MEC) and Related Activity.

Administrative Information

Project Name:
Project Number:
Project Location: (Address, City, State, Zip Code, Country)
Address:
City:
State:
Zip Code:
Country:
Project Manager - CH2M HILL:
Contracting Organization:
Client Organization:
☐ Department of Defense
☐ Department of State
☐ Department of Energy
☐ Department of Interior
☐ Other
Client Organization Name:
Contract Type
☐ Time and Materials (T&M)
☐ Cost Plus (CP)
☐ Firm Fixed Price (FFP)
☐ Target Cost Incentive Fee (TCIF)
☐ Guaranteed Fixed Price with Insurance (GFPI)
☐ Other

Brief Outline of the Scope of Work.

)

Number and Type of MR Personnel Needed to Support Project.

Any point value of 3, 4 or 5 in Sections A, B, C or D requires that you provide a risk management strategy as indicated. If unable to do so, you may wait until the formal MR ORE is conducted, then add the agreed to strategy at that time. Examples of strategies include, engineering controls, contractual protections, procedures, insurance and bonding, etc.

Level of effort should include MR Group Safety/Quality Control Audits for project over two weeks in field.

If you are unsure of which answer to use, leave blank and the question will be evaluated at length during the MR ORE process.

Upon completion of this form, email to those identified and schedule a telephonic conference call with them to review this document.

Part A:

Common Questions for Explosives Usage, Munitions Response (MR) and Controlled Detonation Chamber (CDC) Projects

Scoring Criteria

0 = none, 1 - 2 = Low Risk 3 Moderate Risk 4 - 5 High Risk

17.A1 Type of Reactive Materials?

Project Risk Category?	Check (x)	Point Value
Small Arms (<.50 cal) Ammunition	☐	1
Commercial Explosives	☐	3
Military Explosives (bulk)	☐	3
Energetics	☐	4
Munitions and Explosives of Concern (MEC)	☐	5
Pyrotechnics (including fire-works, etc.)	☐	5

RISK MANAGEMENT STRATEGY:

17.A2 Client – End Land Use

Which factor best describes the project end land use?	Check (x)	Point Value
Like Use -	☐	0
Not Yet Determined -	☐	1
Limited Public Access - livestock grazing/wildlife preserve/historic area	☐	2
Public Access - Farming/Agriculture	☐	3
Unrestricted - Commercial	☐	4
Unrestricted - Residential	☐	5

RISK MANAGEMENT STRATEGY:

17.A3 Chemical Warfare Material (CWM)

Which factor best describes this risk factor?	Check (x)	Point Value
None	☐	0
No-specific reference - but possible	☐	3
CWM Known or Suspected	☐	5

RISK MANAGEMENT STRATEGY:

)

17.A4 Who will write the Work & Safety Plans?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
CH2M HILL	☐	1
Don't Know	☐	3
Client / Subcontractor	☐	5

RISK MANAGEMENT STRATEGY:

17.A5 Does Client acknowledge that it will retain ownership of, and responsibility for MEC & wastes?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
Yes.	☐	1
Don't Know	☐	3
No.	☐	5

RISK MANAGEMENT STRATEGY:

17.A6 Does the Project Delivery Team have a history of successful execution of this type of project?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
Yes.	☐	1
Don't Know?	☐	3
No.	☐	5

RISK MANAGEMENT STRATEGY:

17.A7 Is the Client responsible for obtaining necessary permits such as utility locator, state authorizations, rights of entry, etc.?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
Yes.	☐	1
Don't Know	☐	3
No.	☐	5

RISK MANAGEMENT STRATEGY:

17.A8 Will there be a range debris, munition debris, etc., recovery effort?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
No	☐	1
Don't Know	☐	3
Yes	☐	5

RISK MANAGEMENT STRATEGY:

17. A9 Will CH2M HILL subcontract MR or explosive operational actions?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
No.	☐	1
Don't Know	☐	3
Yes	☐	5

RISK MANAGEMENT STRATEGY:

17.A10 For "removal" activities, will "blow-in-place" (BIP) be permitted?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
No.	☐	1
Don't Know	☐	3
Yes	☐	5

RISK MANAGEMENT STRATEGY:

17.A11 Is CH2M HILL responsible for the preparation of client-owned solid waste and hazwaste? (with Client's manifest)?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
No	☐	1
Don't Know	☐	3
Yes	☐	5

RISK MANAGEMENT STRATEGY:

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17.A12 Will we need to order explosives for this project?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
No	☐	1
Don't Know	☐	3
Yes	☐	5

RISK MANAGEMENT STRATEGY:

17.A13 Is explosives storage required and/or available on site?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
No	☐	1
Don't Know	☐	3
Yes	☐	5

RISK MANAGEMENT STRATEGY:

17.A14 Could weather conditions effect this project?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
No	☐	1
Don't Know	☐	3
Yes.	☐	5

RISK MANAGEMENT STRATEGY:

17.A15 Is geophysical prove-out required on this project?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
No	☐	1
Don't Know	☐	3
Yes	☐	5

RISK MANAGEMENT STRATEGY:

)

17.A16 Are there public transportation routes, airport, mariners operations, rail roads, etc., within 2000 ft. to the site? If so, provide distances in feet.

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
No	☐	1
Don't Know	☐	3
Yes	☐	5

RISK MANAGEMENT STRATEGY:

17.A17 Are two types of communications available on this project site?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
Yes	☐	1
Don't Know	☐	3
No	☐	5

RISK MANAGEMENT STRATEGY:

17.A18 Are there emergency response services in close (5 minutes) proximity to project site (e.g., fire, hospital)?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
Yes.	☐	1
Don't Know	☐	3
No.	☐	5

RISK MANAGEMENT STRATEGY:

17.A19 Are there sensitive environment issues that need to be considered?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
No	☐	1
Don't Know	☐	3
Yes	☐	5

RISK MANAGEMENT STRATEGY:

PART B:

Explosives Usage Project Questions

17.B1 Source of explosives

Which factor best describes the source?	Check (x)
Vendor - Authorized ATF&E Dealer	☐
Government Furnished	☐
Client Furnished	☐
Subcontractor Provided	☐
Transferred from another CH2M HILL project	☐

RISK MANAGEMENT STRATEGY:

17.B2 Explosive operations general RISK requirements/concerns

Which factors apply to regulatory conformance risk factor?	Check (x)
State Blasting License (Individual)	☐
State Blasting License (Corporation)	☐
State Explosive Storage Permit (Fire Marshal Inspection)	☐
Vehicle Inspection (state of registration) for hazard materials transportation	☐
Hazard Materials License (federal and or state)	☐
Operator – Commercial Drivers License with Hazmat Endorsement	☐
Airport/flight paths – Notice to Airmen (NOTAM) – Airspace	☐
Navigable Waterways – Notice to Mariners (NOTM)	☐
Power lines/ Radar/ Microwave tower/Antenna – Electro Magnetic Radiation Hazards	☐
Military - training corridor/area/test area/research and development area	☐
Need to establish a Temporary Open Detonation Area	☐
Need to establish an Explosive Holding Area	☐
Need to establish an Explosive Inspection Area for MPPEH/MD	☐
Need to establish a storage area for MEC	☐
Need to establish a storage area for MPPEH	☐

RISK MANAGEMENT STRATEGY:

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17.B3 Explosive storage risk factors

Which factor best describes this risk factor - Magazine Condition?	Check (x)	Check (x)
Not Applicable.	☐	0
Fire Inspector Permit/electrical grounding tests, ventilator and doors and locks and hasps IAW NFPA Code 495	☐	1
Do Not Know	☐	3
Unknown construction (material, etc.)	☐	5

RISK MANAGEMENT STRATEGY:

17.B4 Explosive transportation

Which factor best describes this risk factor?	Check (x)	Check (x)
Not Applicable.	☐	0
Within project area – private roads	☐	1
Public Roads	☐	3
Federal Roads (interstate - DOT) or over water (USCG)	☐	5

RISK MANAGEMENT STRATEGY:

17.B5 Explosive security

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
Provided by Military	☐	1
Provided by Others	☐	3
Don't Know	☐	3
Provided by CH2M HILL	☐	5

RISK MANAGEMENT STRATEGY:

17.B6 Is underwater work required?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
No	☐	1
Don't Know	☐	3
Yes	☐	5

RISK MANAGEMENT STRATEGY:

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PART C:

Munitions Response Project Questions

17.C1 Type of Munitions Response (MR) project.

Which factor best describes this risk factor?	Check (x)	Point Value
Desk top studies – no site visit	☐	0
Escort and/or Avoidance Activities – (site visit, reconnaissance, sediment sampling, develop wells, perform O&M, land survey, area preparation, design work, etc.)	☐	1
Construction Support – Direct Push, Trenching, Excavation, Soil Sifting, Insitu-treatment, Demolition, Land Clearing/grubbing etc.)	☐	2
Demilitarization/ MPPEH/ Blasting/	☐	3
Removal Action	☐	4
Demining, Improvised Explosive Devices (IED)	☐	5

RISK MANAGEMENT STRATEGY:

17.C2 Is "over water" (on boat, bridge, etc.) work required?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
No	☐	1
Unknown	☐	3
Yes	☐	5

RISK MANAGEMENT STRATEGY:

17.C3 Type of Munitions Constituents (MC) contaminated soil and/or groundwater

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
Low concentrations of explosives measured in ppb/ppm.	☐	1
High Concentrations of explosives measured in ppb/ppm.	☐	2
High Concentrations of explosives measured in ppb/ppm - No explosive hazard.	☐	3
Soil with 5% to 10% Energetic Material by Weight - Initiation Hazard.	☐	4
Soil with >10% Energetic Material by Weight - Explosive Hazard.	☐	5

RISK MANAGEMENT STRATEGY:

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17.C4 Type of munitions demilitarization.

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
Discarded Military Munitions (DMM).	☐	1
MEC Unfuzed.	☐	2
MEC Fuzed	☐	3
Munitions requiring disassembly prior to demilitarization.	☐	4
Deteriorated material.	☐	5

RISK MANAGEMENT STRATEGY:

17.C5 Are we to submit an Explosive Safety Submition (ESS) for the Client? (CSS for RCWM).

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
No	☐	1
Don't Know	☐	3
Yes	☐	5

RISK MANAGEMENT STRATEGY:

17.C6 Is the Munitions Response Area (MRA) secured?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
Yes	☐	1
Don't Know	☐	3
No	☐	5

RISK MANAGEMENT STRATEGY:

PART D:

Controlled Detonation Chamber (CDC) Project Questions

17.D1 Type of MEC Hazard

Which factor best describes this risk factor?	Check (x)	Point Value
Small Arms Ammunition < 0.50 cal.	☐	0
Demilitarization	☐	1
MPPEH/MEC/Bulk Explosives	☐	3
Fireworks/pyrotechnics	☐	4
CWM	☐	5

RISK MANAGEMENT STRATEGY:

17.D2 Quality and Completeness of Inventory

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
Inspection and Verification by CH2M HILL.	☐	1
Inspection/Certification/Verification by Others	☐	3
Client Statement.	☐	5

RISK MANAGEMENT STRATEGY:

17.D3 MPPEH/MEC

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
Meets CDC ESS limitations	☐	1
CWM	☐	3
Munitions requiring disassembly (i.e., water cutting, etc.)	☐	5

RISK MANAGEMENT STRATEGY:

17.D4 Will CH2M HILL provide CDC operator services?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
Yes.	☐	1
Don't Know	☐	3
No.	☐	5

RISK MANAGEMENT STRATEGY:

17.D5 If CDC leased to Owner, will CH2M HILL train Client operators?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
Yes.	☐	1
Don't Know	☐	3
No.	☐	5

RISK MANAGEMENT STRATEGY:

17.D6 Will Owner accept CH2M HILL rejection of MEC deemed unsuitable for CDC destruction?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
Yes.	☐	1
Don't Know	☐	3
No.	☐	5

RISK MANAGEMENT STRATEGY:

17.D7 Are all items of type, size and condition previously destroyed in CDC?

Which factor best describes this risk factor?	Check (x)	Point Value
Not Applicable.	☐	0
Yes.	☐	1
Don't Know	☐	3
No.	☐	5

RISK MANAGEMENT STRATEGY:

Attachment 3: Glossary, Acronyms, and Abbreviations

Active munitions inventory (or stockpile): The supply of chemical and conventional military munitions that is available for issue and use for combat, training, demonstrations, research, development, testing, or evaluation. (See **munitions stockpile** and **demilitarization inventory**.)

Active range: An operational military range that is currently in service and being regularly used for training, demonstrations, research, development, testing, or evaluation.

AEDA: ammunition, explosives, and dangerous articles.

Anomaly avoidance: Techniques employed by EOD or UXO personnel at sites with known or suspected MEC to avoid any potential surface MEC or subsurface anomalies. This usually occurs at mixed-hazard sites when HTRW investigations must occur before an MEC removal action is executed. Intrusive anomaly investigations are not authorized during ordnance avoidance operations.

Anomaly: Any item that is seen as a subsurface irregularity after geophysical investigation. This irregularity should deviate from the expected subsurface ferrous and nonferrous material at a site.

AP: armor piercing: Munitions that may or may not contain HE and are designed to penetrate hard targets.

APERS: antipersonnel munitions: May be loaded with high explosives or incendiary fillers and are designed to kill, wound, or obstruct personnel.

APT: armor-piercing tracer: Munitions, designed to penetrate hard targets, that contain a pyrotechnic element that produces bright light and/or smoke to aid in visual tracking of the munitions in flight.

ATV: all-terrain vehicle.

Authorized Visitors: Government or contractor personnel conducting project or mission related functions, e.g., Quality Assurance Representatives (QAR's) safety and quality inspectors (including geophysicists performing quality assurance functions) and project management. Authorized visitors must be escorted while in the EZ and be approved for entry into the EZ. No more than two visitors will be permitted in the EZ at any one time.

BD: base detonating: Impact fuse designed to function when the projectile comes in contact with the surface of the target. The fuse is located in the base or tail of the munitions.

bgs: below ground surface.

BRAC: Base Realignment and Closure.

CAD: cartridge-actuated device: An explosive device designed to produce gas pressure to expel or eject an item.

Cal: caliber: The diameter of a projectile or the bore of a weapon (i.e., .50-cal, 3-inch, 90-millimeter).

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act.

Chemical warfare materiel (CWM): An item configured as ammunition, containing a chemical substance intended to kill, seriously injure, or incapacitate a person through its physiological effects. Also includes V- and G-series nerve agents, H-series blister agent, and lewisite in other-than-munitions configurations. Due to their hazards, prevalence, and military-unique application, chemical agent identification sets (CAIS) are also considered CWM. CWM does not include riot control agents, chemical herbicides, smoke- and flame-producing items, or soil, water, debris, or other media contaminated with a chemical agent.

Closed range: A military range that has either been taken out of service as a range and has been put to new uses that are incompatible with range activities, or that is no longer considered to be a potential range area. A closed range is still under the control of a DOD component.

Construction support: Support provided by qualified UXO personnel during construction activities at potential MR sites to ensure the safety of construction personnel from the harmful effects of MEC. When it is determined that the probability of encountering MEC is low (current or previous land use leads to a determination that MEC may be present), a two-person UXO team will stand by in case the construction contractor encounters a suspected MEC. When it is determined that the probability of encountering a MEC is moderate to high (current or previous land use leads to a determination that MEC was employed or disposed of in the parcel of concern, e.g., open burn and open detonation areas), UXO teams are required to conduct subsurface MEC clearance for the known construction footprint, either in conjunction with the construction contractor or before construction.

Controlled detonation chamber (CDC): Also known as the Donovan Blast Chamber (DBC), the CDC is a system for controlled detonation of MEC and MEC-related materials. It is capable of repeated controlled detonations of a suite of energetic materials that are currently demilitarized by OB/OD. This offers the DOD an alternative to OB/OD while at the same time increasing throughput, efficiency, and safety and controlling air, soil, water, and noise pollution. The CDC system meets all state and federal air discharge regulations.

CQC: Contractor Quality Control.

CTT: closed, transferring, and transferred (refers to a subset of military ranges).

DAC: Defense Ammunition Center.

DDESB: Department of Defense Explosives Safety Board.

DERP: Defense Environmental Restoration Program.

Demilitarization ("demil"): The process that removes the military characteristics from unused munitions that are either unsuitable for continued storage, excess to DOD needs, or

about to be released from DOD control. Demilitarization applies equally to munitions in unserviceable or serviceable condition. Used (i.e., fired) munitions items also sometimes undergo demilitarization. There are many demilitarization methods, such as recovery, recycling, remanufacture, disassembly, reclamation, mutilation, alteration, melting, burning, detonating, destruction, treatment, and disposal. Methods involving R3 currently constitute approximately two-thirds of the DOD demilitarization programs.

Demilitarization (demil) inventory: The demilitarization inventory consists of excess, obsolete, and unserviceable munitions. Munitions are moved from the active inventory to the demilitarization inventory after it is determined that they are not economically repairable, they are obsolete, or they are excess to DOD needs and cannot be sold under the Foreign Military Sales program. (Also see **active munitions inventory** and **munitions stockpile**.)

DENIX: Defense Environmental Network and Information Exchange.

Department of Defense Components: The Office of the Secretary of Defense, the Military Departments and Services, the Joint Staff, the Unified and Specified Combatant Commands, the Defense Agencies, the DOD Field Activities, and the National Guard.

Department of Defense Explosives Safety Board (DDESB): A Joint Service board comprising a chairperson, voting representatives from each of the Armed Services, and a permanent military and civilian secretariat to perform operational and administrative functions. The DDESB provides impartial and objective advice to the Secretary of Defense and DOD components on explosives safety matters. (See DOD 6055.9-STD for a detailed assignment of DDESB functions.)

DGPS: differential global positioning system.

Discarded military munitions (DMM): Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations. (10 U.S.C. 2710(e)(2))

DLA: Defense Logistics Agency.

DMM: discarded military munitions.

DOD: U.S. Department of Defense.

DODD: Department of Defense Directive.

DODIG: Department of Defense Inspector General.

DOI: U.S. Department of Interior.

DRMO: Defense Reutilization and Marketing Office.

DRMS: Defense Reutilization and Marketing Service.

EBS: environmental baseline survey.

Emergency response (to munitions- or explosives-related or UXO emergencies): An immediate response by explosives and munitions emergency response personnel (i.e., DOD EOD personnel) to control, mitigate, or eliminate the actual or potential threat encountered during an explosives or munitions emergency. The response action may include in-place or on-site render-safe procedures, treatment, or destruction of the explosives or munitions or their transport to another location where these operations may be conducted. (See 40 CFR Part 260 et seq., the Military Munitions Rule.)

Energetic material: A component or item of ammunition that is designed to produce the necessary energy required for ignition, propulsion, detonation, fire, or smoke, thus enabling the item to function. Also a material (e.g., corrosive or oxidizer) that is inherently dangerous and capable of causing serious damage and that requires regulated handling to avoid accidents in connection with its existence and use.

EOD: explosive ordnance disposal.

EPA: U.S. Environmental Protection Agency.

EPCRA: Emergency Planning and Community Right-to-Know Act.

ERGM: extended-range guided munitions.

ESCA: Environmental Services Cooperative Agreement.

ESOH: Environmental, Safety, and Occupational Health.

ESOHPB: Environmental, Safety, and Occupational Health Policy Board.

Essential personnel. Personnel whose duties require them to remain within an ESQD arc for one or more of the following reasons:

a. Government and project personnel necessary for the safe and efficient completion of field operations conducted in an EZ. This is limited to: contractor work teams members including the Unexploded Ordnance (UXO) Safety Officer (UXOSO), UXO Quality Control Specialist, Senior UXO Supervisor and a USACE Ordnance and Explosives (OE) Safety specialist.

b. Personnel not UXO qualified must be identified in the work plan by name and/or position.

ESTCP: Environmental Security Technology Certification Program.

Exclusion zone (EZ): A safety zone established around an MR work area. Only project personnel and authorized, escorted visitors are allowed within the EZ. Examples of EZs are safety zones around MEC-intrusive activities and safety zones where MEC is intentionally detonated. (See DDESB-KO, 27 January 1990.)

Explosive Equivalent. The amount of a standard explosive which, when detonated, will produce a blast effect comparable to that which results at the same distance from the detonation or explosion of a given amount of the material for which performance is being evaluated. It is usually expressed as a percentage of the total net weight of all reactive materials contained in the item or system. For the purpose of this manual, TNT is used for comparison.

Explosive Ordnance Disposal (EOD): Includes detecting, identifying, field evaluating, rendering safe, and final disposing of MEC.

Explosive Ordnance Disposal (EOD) Personnel: Military members who have graduated from the Naval School, EOD. They have received highly specialized training to provide time-critical MEC hazard mitigation services during both peacetime and wartime. EOD personnel are trained and equipped to perform render-safe procedures (RSP) on nuclear, biological, chemical, conventional, and improvised explosive devices. (Note that EOD personnel are distinguished from UXO Technicians, who are civilian contractor or government personnel with specialized training and qualifications in the long-term remediation of MEC.)

Explosive Safety Quantity Distance (ESQD): The prescribed minimum distance between sites storing or handling hazard Class 1 explosive material and specified exposures (i.e., inhabited buildings, public highways, public railways, other storage or handling facilities, or ships, aircraft, etc.) to afford an acceptable degree of protection and safety to the specified exposure. The size of the ESQD arc is proportional to the NEW present.

Explosive Safety Submission (ESS): The document that serves as the specifications for conducting work activities at the project. The ESS details the scope of the project, the planned work activities, potential hazards, and the methods for their control.

Explosive Siting Plan (ESP): The document that serves as a DDESB Permit approving the site-specific storage locations, quantities, and safe distances for explosive operations.

Explosive soil: Mixtures of explosives in soil, sand, clay, or other solid media at concentrations such that the mixture itself is explosive. The following also defines an explosive soil: The concentration of a particular explosive in soil necessary to present an explosion hazard depends on whether an explosive is classified as "primary" or "secondary." Primary explosives are those extremely sensitive explosives (or mixtures thereof) that are used in primers, detonators, and blasting caps. They are easily detonated by heat, sparks, impact, or friction. Examples of primary explosives include lead azide, lead styphnate, and mercury fulminate. Secondary explosives are bursting and boostering explosives (i.e., they are used as the main bursting charge or as the booster that sets off the main bursting charge). Secondary explosives are much less sensitive than primary explosives. Soil containing 10 percent or more by weight of any mixture of secondary explosives is considered "explosive soil." Soil containing propellants (as opposed to primary or secondary high explosives) may also present explosion hazards.

°F: degrees Fahrenheit.

FAR: Federal Acquisition Regulations.

FFA: Federal Facilities Agreement.

FFCA: Federal Facilities Compliance Act.

FOST: finding of suitability to transfer.

Frag: fragment or fragmentation: Munitions material projected away from the point of detonation at a high velocity.

Free from explosive hazard: Material that has been inspected for explosives and determined not to present a danger of explosion or combustion from explosive or energetic materiel.

FUDS: formerly used defense site.

GIS: geographic information system.

GPS: global positioning system.

Hazardous waste: A solid waste that meets the following criteria: (1) is or contains a hazardous waste listed in 40 CFR Part 261, or (2) exhibits characteristics of ignitability, corrosivity, reactivity, and/or toxicity. (Refer to 40 CFR § 261.3 for further explanation.)

HE: high explosive: Explosive that normally detonates rather than burns.

HEAT: high-explosive antitank: Ordnance designed to defeat armor by the use of a shaped charge.

HEI: high-explosive incendiary: High-explosive-filled ordnance with additional ingredients to give a fire-producing effect.

HQMC: Headquarters, U.S. Marine Corps.

ICM: improved conventional munition.

Impact area: The identified area within a range intended to capture or contain ammunition, munitions, or explosives and resulting debris, fragments, and components from various weapon system employments. In simple terms, normally the target area where live-fire rounds or bombs impact the earth.

Improved conventional munition (ICM): ICMs or submunitions, cluster bombs, and cargo rounds are considered sensitive-fused munitions and require special authority to enter contaminated areas.

Inactive range: An operational military range that is not currently being used but is still under military control, and which the military both considers to be a potential range area and has not put to a new use that is incompatible with range activities. A potential range area is defined as meeting one of three criteria:

(1) Mobilization and force projection: ranges that are held by a DOD component for the purpose of preparing individuals and units for worldwide deployment, redeployments, or demobilization in response to war, stability, and support operations or projected training requirements that would exceed current active range capabilities;

(2) Force structure: ranges held as inactive during realignment, reorganization, stationing, or reequipping of units projected to use these ranges under new training requirements; or

(3) Future: ranges that are held by DOD components for future use in support of National Security Policy or DOD component doctrine that ensures the capability to produce, establish, and maintain conditions needed for operational success.

Inhabited Building Distance (IBD): The minimum distance permitted between an inhabited building and an ammunition or explosives location for the protection of

administration, quarters, industrial, and other similar areas within a naval shore establishment. Inhabited building distances shall be provided between ammunition or explosives locations and the boundary of a shore establishment of the nearest point beyond the boundary where such inhabited structures could be erected.

Integrated Training Area Management (ITAM): A U.S. Army program designed to improve range conditions by inventorying and monitoring land conditions, determining carrying capacity of the land in terms of the training requirements, and providing for land rehabilitation and maintenance measures.

Intentional detonation: An intentional detonation is a planned, controlled detonation.

Intrusive activity: An activity that involves or results in the penetration of the ground surface at an area known or suspected to contain MEC. Intrusive activities can be of an investigative or removal action nature.

IR: Installation Restoration.

ITAM: Integrated Training Area Management (a U.S. Army program).

JOCG: Joint Ordnance Commanders Group.

JUXOCO: Joint UXO Coordination Office.

Material that presents a potential explosive hazard (MPPEH): Military munitions, including: their components; munitions packaging material; residues from research, development, testing, and evaluation (RDT&E), production, use (to include range scrap), operational and quality testing, or demilitarization of munitions; or any other materials, equipment, or facilities potentially contaminated with explosives. MPPEH includes both end items and residues derived from processing end-items within United Nations Organization (UNO) Hazard Class (HC). It also includes munitions-related items, pieces, models, training aids, etc., that are suspected but not confirmed to be wholly inert.

Maximum credible event (MCE): The worst single event that could occur at any time with maximum release of a chemical agent from a munition, container, or process as a result of an unintended, unplanned, or accidental occurrence.

MEC: munitions and explosives of concern. Distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) Unexploded Ordnance (UXO), (B) Discarded military munitions (DMM), (C) Munitions Constituents (MC).

MIL SPECS/STDS: military specifications and standards.

Military munitions: All ammunition products and components produced or used by or for the DOD or the U.S. Armed Services for national defense and security, including military munitions under the control of the DOD, the U.S. Coast Guard, the U.S. DOE, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries used by DOD components, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. It does

not include: wholly inert items; improvised explosive devices; and nuclear weapons, devices, and components thereof. However, it does include nonnuclear components of nuclear devices, managed under DOE's nuclear weapons program after all required sanitation operations under the Atomic Energy Act of 1954, as amended, have been completed.

Military range: A designated land or water area set aside, managed, and used to conduct research on, develop, test, and evaluate military munitions and explosives, other ordnance, or weapon systems, or to train military personnel in their use and handling. Ranges include firing lines and positions, maneuver areas, test pads, detonation pads, impact areas, and buffer zones with restricted access and exclusionary areas.

MLLW: mean lower low water.

Most probable event (MPE): The most likely event, as a result of an accidental, unplanned, or unintended detonation of an item of ordnance, that could occur during MR activities. The event must be realistic, with reasonable probability of occurrence.

MPPEH: munitions that present a potential explosive hazard.

MT: mech time or mechanical time: fuses designed usually for airburst. MT fuses are located in the nose of the munition.

Munitions and explosives of concern (MEC): Military munitions that are UXO or have been abandoned, as defined in the EPA Munitions Rule. Also includes soil, facilities, equipment, or other materials contaminated with a high enough concentration of explosives that it presents an explosive hazard.

Munitions constituents (MC): Any materials originating from military munitions, including explosive and/or non-explosive materials, and emission, degradation, or breakdown products. [The following additional explanation is offered for purposes of this SOP: Munitions constituents are the substances or chemical residues that result from the proper functioning or use of munitions (e.g., residues created and remaining in the soil, water, or air from the burning or explosion of energetic material) or that are present in MEC. Such constituents may or may not present an immediate risk of acute physical injury from fire or explosion resulting from accidental or unintentional detonation or ignition of MEC or energetic materials. Similarly, such constituents may or may not result in environmental contamination requiring a response (i.e., response action).]

Munitions Debris (MD): Metal fragments resulting from the intended use of munitions or detonations.

Munition with the Greatest Fragmentation Distance (MGFD). The munition with the greatest fragment distance that is reasonably expected (based on research or characterization) to be encountered in any particular munition response area (MRA) or munitions response site (MRS).

Munitions Response Area (MRA): Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. A munitions response area is comprised of one or more munitions response sites.

Munitions Response Site (MRS): A discrete location within a MRA that is known to require a munitions response.

Munitions Rule Implementation Policy: Detailed guidance and procedures issued by the Services that explains how DOD will implement and comply with the EPA Military Munitions Rule.

Munitions stockpile: Munitions in the active and demilitarization inventories as well as unused waste munitions as defined in the EPA's Military Munitions Rule (MMR). (See **active munitions inventory** and **demilitarization inventory**.)

Munitions: see **military munitions**.

Net Explosive Weight (NEW): The actual weight of explosive mixture or compound including the TNT equivalent of other energetic material which is used in the determination of explosive limits and ESQD arcs.

Non-stockpile chemical warfare materiel: CWM (defined above) that is not included in the chemical stockpile. Non-stockpile CWM is divided into five categories: (1) buried CWM; (2) recovered chemical weapons (items recovered during range clearing operations, from chemical burial sites, and from research and development testing); (3) former chemical weapon production facilities; (4) binary chemical weapons; and (5) miscellaneous CWM (unfilled munitions and devices and equipment specially designed for use directly in connection with employment of chemical weapons).

OB: open burn.

OCR: Office(s) of Collateral Responsibility.

OD: open detonation.

ODEP: Office of Defense Environmental Programs.

ODUSD (I&E): Office of the Deputy Under Secretary of Defense (Installations and Environment).

OE Safety Specialist: a USACE employee involved in the execution, supervision, or oversight of ordnance-related activities inside the exclusion zone who has graduated from the U.S. Naval EOD School, Indian Head, MD. An OE Safety Specialist shall be on-site each day during intrusive and MEC destruction activities. The OE Safety Specialist is on-site to ensure that the contractor establishes the appropriate daily safety routines at the beginning of UXO field operations, to perform quality assurance oversight, to verify contractor employee UXO qualifications, to advise the contractor on UXO procedures, to coordinate with the PM, and to facilitate EOD response when needed.

OEESCM: Operational and Environmental Executive Steering Committee for Munitions.

Open burn (OB): A controlled open-air process by which excess, unserviceable, and obsolete munitions are destroyed to eliminate their inherent explosives safety hazards. DOD OB units contain the munitions with pans or pads to minimize environmental contamination. DOD OB units are permitted as "miscellaneous units" in EPA's environmental permitting process.

Open detonation (OD): A process used for the treatment of unserviceable, obsolete, and/or waste munitions whereby an explosive donor charge initiates the munitions to be detonated. Although surface detonations can be performed under certain circumstances, most munitions are treated in 4- to 6-foot-deep pits for safety purposes. Most OD sites are permitted as miscellaneous units as part of the EPA environmental permitting process. DOD's units are generally permitted as combined OB/OD facilities.

Operational range: A military range that is currently under military control and management; includes both active ranges (currently in service or use) and inactive ranges (not in current use or service).

OPR: Office(s) of Primary Responsibility.

OSD: Office of the Secretary of Defense.

OU: Operable Unit.

OUSD (AT&L): Office of the Under Secretary of Defense (Acquisition, Technology, and Logistics).

PD: point detonating: impact fuse, designed to function when the projectile comes in contact with the surface of a target; located in the nose of the munition.

Potential Explosion Site (PES): The location of a quantity of explosives that will create a blast, fragment, thermal, and/or debris hazard in event of an accidental explosion of its contents. Quantity limits for ammunition/explosives at a PES are determined by the distance to an exposed site.

POL: petroleum, oil, and lubricants.

PPE: personal protective equipment.

Primer: Small, sensitive explosive component used as the first element in the explosive train.

Proj: projo or projectile: A weapon that is projected through a tube or barrel into the air toward a target.

PSE: preliminary source evaluation.

PTT: powder train time fuse: Fuses designed usually for airburst, normally used with illumination rounds to light up the battlefield.

QA: quality assurance.

QC: quality control.

Quantity-distance (Q-D): the quantity of explosives material and distance separations that provide defined types of protection. These relationships are based on levels of risk considered acceptable for the stipulated exposures and are tabulated in the appropriate Q-D tables provided in DOD 6055.9-STD. Separation distances are not absolute safe distances but are relative protective safe distances. Greater distances than those shown in the Q-D tables shall be used whenever possible.

R&D: research and development.

RAB: Restoration Advisory Board.

RAC: Remedial Action Contract.

Range clearance: An operation or procedure conducted to remove and properly dispose of munitions or munitions fragments. (e.g., MEC, "duds," etc.). Several types or degrees of clearance may be conducted (e.g., surface clearance based on visual inspection of the surface; shallow clearance where an area is systematically swept with detectors—normally to a depth of 20-24 inches; etc.) Range clearance, though technically applicable to any range category (closed, transferred, active, etc.) is often considered as occurring only at active, operational ranges. Clearance operations at these active ranges are normally conducted as part of range maintenance activities to maintain or enhance operational safety conditions at the range facility. Even though it is possible for MEC to cause environmental contamination (pollution of soil, surface water, groundwater, etc., from the chemical constituents present in munitions), range clearance is focused on removing and safely disposing of munitions/ordnance items or fragments—not the removal or treatment of any chemical residues or constituents from the munitions or associated environmental contamination. Cleanup of environmental contamination or pollution is normally achieved by removal or remedial actions.

Range: see **military range**.

RCRA: Resource Conservation and Recovery Act.

RCWM: recovered chemical warfare material.

RDT&E: research, development, test, and evaluation.

Regional Environmental Coordinator (REC): A senior military officer or DOD civilian assigned to one of ten EPA regions who is responsible for the dissemination of information and coordination of environmental matters and public affairs among military installations and environmental regulatory organizations within their respective region. RECs have a liaison role and fully adhere to the Services' chain of command.

Remedial actions/remediation/remedial action process: Longer-term activities that complete the cleanup of contamination (or a contaminated site or location) if a removal action has not achieved or cannot achieve the required degree of cleanup for the contamination problem. A distinction is sometimes made between the control or cleanup measures to be implemented, which are called "remedial actions," and the identification, evaluation, decision-making, and design and construction steps required to implement the control measures. These steps collectively are called the "remedial action process."

Removals/removal action(s): Relatively quick actions designed to address imminent threats to human health and the environment posed by releases or spills of hazardous substances. Removals should satisfy one or more of the following tests:

(1) **Imminent threat:** the site or situation poses an imminent threat to public health.

(2) **Source control:** the removal action either removes the source of contamination off-site or effectively contains it on-site so that continuing releases to the environment are prevented or reduced.

(3) **Access limitation:** the removal action substantially reduces the possibility of human exposure to hazardous substances. The EPA has categorized removal actions as emergency, time-critical, and non-time-critical. Each of these categories possesses its own criteria and procedural requirements.

Resource recovery and recycling (R3): Technologies and processes used by DOD to demilitarize military munitions. These include reuse, sale "as is" (e.g., Foreign Military Sales), conversion to a commercial product for sale or industrial use, or disassembly, modification, and partial or whole use for a military application.

Response(s) or response action(s): Responses or response actions are broadly defined in environmental law and regulations as any scientific or engineering investigation, evaluation, decision-making, design, or implementation step taken in response to (i.e., to clean up) a release or spill of hazardous substances. Removals and remedial actions (or remedial action processes) are subcategories of response actions. Procedural requirements (established in environmental regulations) for these two types of actions differ substantially, but their definitions are almost as broad as for "responses," allowing the terms to be used almost interchangeably. The various terms are best defined by the procedural requirements imposed on them by the applicable environmental regulations.

RI/FS: remedial investigation/feasibility study.

ROD: Record of Decision.

Senior UXO Supervisor (SUXOS): Supervises all contractor on-site UXO activities. This individual must be a graduate of the U.S. Army Bomb Disposal School, Aberdeen Proving Ground, MD, or the U.S. Naval EOD School, Indian Head, MD. Must have at least 15 years of combined active-duty military EOD and contractor UXO experience, to include at least 10 years in supervisory positions.

SERDP: Strategic Environmental Research and Development Program.

SHPO: State Historic Preservation Officer.

Single Manager for Conventional Ammunition (SMCA): A DOD executive agent responsibility performed by the U.S. Army Operations Support Command. The Secretary of the Army is DOD's SMCA. The U.S. Army OSC is the day-to-day operator of the SMCA and serves as the central program manager for the execution of most of DOD's demilitarization requirements. The objectives and responsibilities of the SMCA can be found in DOD Directive 5160.65.

Sustainable range management: Management of a military range in a manner that supports national security objectives and maintains the operational readiness of the Armed Forces and ensures the long-term viability of the range while protecting human health and the environment. [The following additional explanation is offered for purposes of this SOP: A comprehensive DOD approach that develops and implements the policies, plans, practices, and procedures necessary to achieve sustainable ranges. Sustainable ranges are managed and operated in a manner that supports their long-term viability and utility to meet the national defense mission. Sustainable ranges will implement the planning, management, coordination, and public outreach necessary to ensure viable continuity of test and training

operations and long-term coexistence with neighboring communities and natural ecosystems.]

Sustainable use: Actions taken to ensure that ranges maintain the ability to conduct training, research, development, testing, and evaluation of munitions in support of the national defense mission while minimizing adverse effects to human health and the environment.

SUXOS: Senior UXO Supervisor.

SWMU: solid waste management unit.

TNT equivalent: Considering the peak overpressure produced by detonation of a given weight of TNT as 100 percent, the TNT equivalency of an explosive is the amount of overpressure produced by detonation of an identical quantity of propellant under comparable conditions, expressed as a percentage.

Transferred range: A military range that is no longer under the control of a DOD component and has been leased, transferred, or returned to another entity (including other federal, non-DOD entities) for use.

Transferring range: A military range that is proposed to be leased or transferred from DOD to another entity or disposed of by conveying title to a non-federal entity. An active range will not be considered a "transferring range" until the transfer is imminent.

TRI: Toxic Release Inventory (required by the EPCRA).

Unexploded ordnance (UXO): Military munitions that have been primed, fused, armed, or otherwise prepared for use and that have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or materiel and that remain unexploded by malfunction, design, or any other cause. UXO presents an immediate risk of acute physical injury from fire or explosion resulting from accidental or unintentional detonation.

Unintentional detonation: A detonation not planned in advance.

USACE: U.S. Army Corps of Engineers.

Used or fired military munitions: Those military munitions that meet the following criteria: (1) have been primed, fused, armed, or otherwise prepared for use, and have been fired, dropped, launched, projected, placed, or otherwise used; (2) munitions fragments, (e.g., shrapnel, casings, fins, and other components, to include arming wires and pins) that result from the use of military munitions; or (3) malfunctions or misfires (e.g., fail to properly fire or detonate).

USFWS: U.S. Fish and Wildlife Service.

USGS: U.S. Geological Survey.

UST: underground storage tank.

UTM: Universal Transverse Mercator.

UXO: unexploded ordnance.

UXO personnel: Contractor personnel who have completed specialized military training in EOD methods and have satisfactorily performed the EOD function while serving in the military. Various grades and contract positions are established based on skills and experience.

UXO Quality Control Specialist (UXOQCS): Contractor personnel with the responsibility of enforcing the contractor's Quality Control Program for all MR-related evolutions; conducting quality control inspections of all UXO and explosives operations for compliance with established procedures; and directing and approving all corrective actions to ensure that all MR-related work complies with contractual requirements.

UXO Safety Officer (UXOSO): Contractor personnel with the responsibility of enforcing the contractor's SSHP. This individual must, therefore, be in the field whenever possible to observe operations. Must have the same minimum qualifications as the UXO Technician III. In addition, must have the specific training, knowledge, and experience necessary to implement the SSHP and verify compliance with applicable safety and health requirements.

UXO Technician II: must be a graduate of the U.S. Army Bomb Disposal School, Aberdeen Proving Ground, MD; the U.S. Naval EOD School, Indian Head, MD; U.S. Naval EOD School, Eglin AFB, FL; or a DOD-equivalent certified course. Must have a minimum of five years of military EOD or contractor UXO experience.

UXO Technician III: supervises a UXO team. Must be a graduate of the U.S. Army Bomb Disposal School, Aberdeen Proving Ground, MD; the U.S. Naval EOD School, Indian Head, MD; U.S. Naval EOD School, Eglin AFB, FL; or a DOD-equivalent certified course. This individual must have a minimum of ten years of military EOD or contractor UXO experience.

UXO: unexploded ordnance.

UXOQCS: UXO Quality Control Specialist.

UXOSO: UXO Safety Officer.

Waste military munitions: A military munition that is a solid waste per 40 CFR §266.202. Such a waste military munition may also be a hazardous waste if it meets the definition found in 40 CFR §261.3. Waste munitions are hazardous wastes when they exhibit the hazardous waste characteristic of ignitability, corrosivity, reactivity, or toxicity, or are listed as hazardous wastes.

WP: white phosphorus: A screening smoke that burns on contact with air and can be used as an incendiary.

Attachment 4: Explosives Management Check List

Date	Check List Item	PM Date Completed	MR Ops Review Date	MR QC NTP Date
	Contract Terms and Conditions			N/A
	Scope of Work			N/A
	Completed: Opportunity Risk Evaluation (ORE), Paragraph 17 MR Projects and CDC Projects			
	Explosive Management Plan (*)			
	Explosive Siting Plan (*)			
	Obtain State/local (if required) Explosive Permit* for CH2M HILL to use high explosives within the state and or local jurisdiction.			
	Obtain State/local (if required) Permit* for CH2M HILL to site explosives magazine within the state and or local jurisdiction.			
	Identify CH2M HILL HILL HILL licensed Blaster* (if self-performing)			
	CH2M HILL ATF&E “Request to Order Explosives” form for Review and obtain authorization signature of ATF Permittee			
	Original signature of ATF&E Type 20 Explosives Manufacture License* from CH2M HILL License Holder			
	“Authorization Letter*” identifying “Responsible Persons” and “Possessor of Explosives” that are authorized to order, receive, store, and use explosives under the CH2M HILL ATF&E Type 20 Explosives Manufacturer License			
	Vender Identified by contracting (If sole source - justification is required)			N/A
	Vender required to provide a copy of their ATF&E License* to CH2M HILL ATF&E files			
STOP!!! MANDATORY MUNITIONS RESPONSE QC CHECK				
	Purchase Order* provided to vender with a copy of ATF&E Type 20 Manufacturer of High Explosives License, with endorsement			

Date	Check List Item	PM Date Completed	MR Ops Review Date	MR QC NTP Date
	Purchase Order* provided to vender with Authorization Letter for Responsible Persons and Employee Possessor of Explosives			
	Award the purchase order to the selected vender - - Hold authorization for Vendor to ship explosives			
	Notify Vendor of CH2M Possessor of Explosives authorized to receive explosives at the project site, telephone number and address of receiving location			
	Vender accepts purchase order and holds for contracting release of explosives shipment			
	Vender identifies carrier and provides a shipment schedule with copy of manifest* to CH2M HILL contracting and contracting notifies the Project Manager			
	Establish Explosives Storage Area (Security, Lightening Protection, Grounding)			
	Schedule State and or local jurisdiction site inspection for “Explosive Storage” (Magazines) if required.			
	Magazine storage area inspected and approved* for storage by local jurisdictions (if required).			
	CH2M HILL contracting notifies vender to release explosives shipment			
	Notify ATF&E servicing office for CH2M HILL ATF&E License*, local ATF&E office*, and local jurisdictions* of storage of explosives and provide an Explosives Siting Plan that includes ATF Form 5400.13/5400.16, Explosives Storage Magazine Description Worksheet* (as required).			
	Post CH2M HILL ATF&E Type 20 License on the project site			
	CH2M HILL “Responsible Person” or Possessor of Explosives” person receives shipment (presents identification to transporter, verifies manifest, and inventories shipment to ensure accuracy between purchase order and manifest. Discrepancies should be resolved IAW the project Explosive Management Plan)			
	Explosive materials are properly inventoried (date shift codes, acquisition dealer, license address, POC), and stored IAW project Explosives Management Plan			
	Material Safety Data Sheets (MSDS) for explosives materials are on-site			

Date	Check List Item	PM Date Completed	MR Ops Review Date	MR QC NTP Date
	Magazine Data Cards (Daily Summary of Magazine Transactions*) are completed and maintained IAW project Explosives Management Plan			
	Magazine has two mortise type 5 (or equivalent) pin high security locks			
	Security Checks conducted a minimum of every 72 hours and documented or IAW work plan approved methods*			
	Responsible person or possessor of explosives has control of keys to magazines (IAW local procedures).			
	Daily Usage (Shot) Log* maintained for expenditure of explosive materials including target materials			
	Weekly inventories of all explosives materials conducted and documented*			
	PM to notify local jurisdictions and ATF&E offices when explosives materials are no longer being stored*			
	*Project Manager to provide to the ATF&E License Holder completed purchase orders, manifest documents, inventories, magazine data cards, usage logs, and any other associated information for ordering, storage and use of explosives material along with an end user certification that all explosives materials have been accounted for.			
	MR Safety Officer shall conduct a quality control audit of the project explosives management plan with ATF&E requirements and report on the conformance of the Project Manager & License Holder.			
	* Indicates documents that upon completion of project will be forwarded to the License Holder and copy to Safety Office			

REQUEST to ORDER EXPLOSIVES		
Instructions: Enter information for the procurement of one (1) Explosive Class/Product Trade Name per request form.		
Block 1.	Block 2.	Block 3.
Project Name	Project Number	Date of Request mm/dd/yyyy
Block 4.	Block 5.	Block 6.
Project Manager (First, Middle, Last)	Office Location/Symbol	Project Manager Telephone Number
Block 7.	Block 8.	Block 9.
Delivery Date mm/dd/yyyy	Delivery Address	Delivery Telephone Number
Street		Block 10.
City		Receiving Person (First, Middle, Last)
County/province		
State		Block 11.
Postal Code		Receiving Person Telephone Number
Country		
Block 12.	Block 13.	Block 14.
Vendor/Supplier/Organization	Vendor ATF License	Vendor ATF License
Block 15.	Block 16.	Block 17.
Vendor/Supplier/Organization		Vendor Telephone Number
Street		
City		Block 18.
County/province		Vendor Point of Contact Person
State		
Postal Code		Primary Tel. #:
Country		2nd Tel.#:
Block 19.	Block 20.	Block 21.
Product Trade Name	Product Unit of Issue (EA, LB, FT, RL,BX)	Product Quantity Requested (Number)
Block 22.	Block 23.	Block 24.
Vendor Lot Number	Vendor Date Shift Code	Vendor MSDS Product Name
Block 25.	Block 26.	Block 27.
DOT EX Number	UN Number	DOT Hazard Class/Division
Block 28.	Block 29.	Block 30.
Estimated Product Cost	Estimated Shipping Cost	Estimated Total Cost
AUTHORIZATION FOR PURCHASING TO ORDER EXPLOSIVES		
ATF Licensee Signature		
Date		

Attachment B
Laboratory Standard Operating Procedures

Attachment B – Laboratory SOPs is proprietary and confidential and is not provided as part of this document. It can be obtained by request.