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FINAL ANOMALY ACQUISITION AND INVESTIGATION WORK PLAN MRP AREA UXO 1 ST  
JULIENS CREEK ANNEX VA  
6/1/2012  
CH2MHILL



Final

# Anomaly Acquisition and Investigation Work Plan MRP Area UXO 1

St. Juliens Creek Annex  
Chesapeake, Virginia  
June 2012

Contract No. N62470-11-D-8012 | CTO-WE11

prepared by **CH2MHILL.**

**Final**

**Anomaly Acquisition and Investigation Work Plan  
MRP Area UXO 1**

**St. Juliens Creek Annex  
Chesapeake, Virginia**

**Contract Task Order WE11**

**June 2012**

Prepared for

**Department of the Navy  
Naval Facilities Engineering Command  
Mid-Atlantic**

Under the

**NAVFAC CLEAN 8012 Program  
Contract N62470-11-D-8012**

Prepared by



**Virginia Beach, Virginia**

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# Acronyms and Abbreviations

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AOC	area of concern
ARAR	applicable or relevant and appropriate requirement
ATF&E	Bureau of Alcohol, Tobacco, Firearms, and Explosives
CAP	Corrective Action Plan
CAR	Corrective Action Request
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-term Environmental Action—Navy
CTO	Contract Task Order
DDESB	Department of Defense Explosives Safety Board
DFOW	definable features of work
DGM	digital geophysical mapping
DMM	discarded military munitions
DoD	Department of Defense
DOT	Department of Transportation
ECC	Emergency Coordination Center
EMP	Explosives Management Plan
EOD	explosive ordnance disposal
ESQD	explosive safety quantity distance
EZ	exclusion zone
FAR	Federal Acquisition Regulations
FCR	Field Change Request
FTL	Field Team Leader
GPS	global positioning system
H&S	health and safety
HE	high explosive
HFD	hazardous fragment distance
HSM	Health and Safety Manager
HSP	Health and Safety Plan
IAS	Initial Assessment Study
IDW	investigation-derived waste
iNFADS	Internet Navy Facility Assets Data Store
IRP	Installation Restoration Program
MC	munitions constituents
MCE	maximum credible event
MDAS	material documented as safe
MEC	munitions and explosives of concern
MGFD	munition with the greatest fragmentation distance
mm	millimeter
MPPEH	material potentially presenting an explosive hazard
MR	munitions response
MRP	Munitions Response Program
NAVFAC	Naval Facilities Engineering Command
Navy	United States Navy

NEESA	Naval Engineering and Environmental Support Activity
NEW	net explosive weight
NFA	no further action
NOSSA	Naval Ordnance Safety and Security Activity
PA	Preliminary Assessment
PCB	polychlorinated biphenyl
PM	Project Manager
POC	point of contact
PPE	personal protective equipment
QA	quality assurance
QC	quality control
QCP	Quality Control Plan
RPM	Remedial Project Manager
RRR	Relative Risk Ranking
SI	Site Inspection
SJCA	St. Juliens Creek Annex
SOP	Standard Operating Procedure
SSA	Site Screening Assessment
SSC	Site Safety Coordinator
STC	Senior Technical Consultant
SUXOS	Senior Unexploded Ordnance Supervisor
SVOC	semivolatile organic compound
TCLP	Toxicity Characteristic Leaching Procedure
TP	Technical Paper
UFP-SAP	Unified Federal Policy Sampling and Analysis Plan
USACE	United States Army Corps of Engineers
USAESCH	United States Army Engineering Support Center, Huntsville
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UXO	Unexploded Ordnance
UXOSO	Unexploded Ordnance Safety Officer
UXOQCS	Unexploded Ordnance Quality Control Specialist
VDEQ	Virginia Department of Environmental Quality
VOC	volatile organic compound

# Introduction

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This work plan presents the technical approach to the Anomaly Acquisition and Investigation (hereafter referred to as the investigation) activities to be conducted by CH2M HILL under the United States Navy (Navy) Munitions Response Program (MRP) at St. Juliens Creek Annex (SJCA) MRP Area Unexploded Ordnance (UXO) 1. Investigation activities include recovery and inspection of geophysical anomaly sources from the sediment at Area UXO 1 to determine whether discarded military munitions (DMM) are present at the site. The investigation is being conducted under the Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic, Comprehensive Long-term Environmental Action—Navy (CLEAN) 1000, Contract Task Order (CTO) WE10 and CLEAN 8012 CTO WE11.

## 1.1 Project Objectives and Scope

The Area UXO 1 wharfs were used for historical loading of military barges with munitions and other materials and unloading of materials and supplies for the facility. One objective of this investigation is to evaluate the presence or absence of DMM in the sediment of the Southern Branch of the Elizabeth River (the river) at Area UXO 1. To accomplish this objective, selected geophysical anomaly sources will be acquired from the site sediment and investigated to determine if the anomaly sources represent DMM. A second objective of this investigation is to evaluate the presence or absence of munitions constituents (MC) in site sediment. To accomplish this objective, sediment samples will be collected and analyzed to determine whether select MC are present in site sediment.

An underwater digital geophysical mapping (DGM) survey conducted during the first phase of the Site Inspection (SI) at Area UXO 1 identified 1,651 geophysical anomalies within the river sediment (CH2M HILL, 2010). Further investigation is necessary to determine if the sources of the anomalies are munitions and explosives of concern (MEC), which are anticipated to be DMM, and whether there have been releases of environmental contaminants associated with the DMM. Potential risks associated with the site include the potential explosive hazard from DMM that may be present and exposure to MC that could be leaching from any DMM that is present.

The scope of work to be completed for this investigation includes the following:

- Acquire anomaly sources from the sediment at 15 locations that were selected based on the results of the DGM investigation and inspect the anomaly sources to determine if DMM is present.
- Collect sediment samples from the 15 locations where the anomaly sources are being investigated and analyze for select MC.
- Properly manage and dispose of recovered DMM, non-munitions-related metallic debris, and excess dredged sediment and other materials at qualified waste disposal and/or recycling facilities in accordance with state and federal regulations.

The data from this investigation will be used to determine if a remedial investigation is necessary. Additional actions may be recommended if a release is identified either by the presence of DMM or MC at concentrations that present a potential risk to human health or the environment. These recommendations will be documented in a SI Addendum Report.

## 1.2 Work Plan Organization

This work plan is divided into sections providing information on the detailed approach to conducting the investigation. Appendixes to the work plan provide supporting documentation that details specific procedures for the project. The Health and Safety Plan (HSP) (CH2M HILL, 2012c), which provides an interface with CH2M HILL's overall health and safety (H&S) program, has been prepared as a separate document.

This work plan is organized as follows:

- **Section 1, Introduction** – This section provides the objectives and scope of the investigation activities and details the document format.

- **Section 2, Site Description and Background** – This section provides a site description and background information related to historic site use and previous investigations at Area UXO 1.
- **Section 3, Technical Management Plan** – This section identifies the technical approach, methods, and operational procedures that will be used to execute the investigation activities.
- **Section 4, Field Investigation Plan** – This section presents the overall approach to munitions response (MR) activities, identifies the areas of concern (AOCs) at the site, and provides MEC/material potentially presenting an explosive hazard (MPPEH) identification, handling, and disposal procedures.
- **Section 5, Quality Control Plan** – This section provides details of the approach, methods, and operational procedures to be employed for quality control (QC) of the investigation at Area UXO 1.
- **Section 6, Explosives Management Plan** – This section addresses the management of explosives in accordance with applicable regulations.
- **Section 7, Explosives Siting Plan** – This section provides explosives safety criteria for planning and siting explosives operations.
- **Section 8, Environmental Protection Plan** – This section describes the approach, methods, and operational procedures to be employed to protect the natural environment during the performance of all tasks at Area UXO 1.
- **Section 9, References** – This section includes references that are cited throughout this work plan.
- **Appendix A, Crane and Barge Operation Plan** – This section includes the procedures to be implemented for all crane and barge operations during this project.
- **Appendix B, Quality Control Forms** – The QC forms are provided to be used in the field as a method of assuring that the highest level of quality is maintained.
- **Appendix C, Applicable or Relevant and Appropriate Requirements** – Applicable or relevant and appropriate requirements (ARARs) for protection of the environment are summarized in this section.

# Site Description and Background

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## 2.1 Site Description and Location

SJCA is approximately 490 acres and is situated at the confluence of St. Juliens Creek and the Southern Branch of the Elizabeth River in the City of Chesapeake in southeastern Virginia (**Figure 2-1**). Most surrounding areas are developed and include residences, schools, recreational areas, and shipping facilities for several large industries.

SJCA was one of the largest ammunition depots in the United States involving wartime transfer of ammunitions to other naval facilities. Specific ordnance operations and processes conducted at SJCA included stockpiling Explosive D (ammonium picrate, or picrate acid) for use in projectiles, manufacturing Mark VI mines, assembling small-caliber guns and ammunition, storing torpedoes, filling shells, testing ordnance, distributing and receiving ammunition, and acting as a test loading facility for new ammunition types for the Bureau of Ordnance. Ammunition loading and unloading operations were conducted on three wharfs. Wharf 1 and Wharf 2 (also referred to as the southern wharf area) were constructed by 1903 (**Figure 2-2**). In 1917, SJCA installed a third wharf, Wharf 3 (also referred to as the northern wharf), and equipment for loading Mark VI mines. By 1975, all ordnance operations had been transferred to Naval Weapons Station Yorktown. As a result, decontamination was performed in, around, and under ordnance-handling facilities at SJCA in 1977.

SJCA has also provided non-ordnance services, including degreasing operations; operation of paint shops, machine shops, vehicle and locomotive maintenance shops, pest control shops, battery shops, print shops, electrical shops, boiler plants, wash racks, and potable water and salt water fire-protection systems; firefighter training; and storage of oil and chemicals.

Activity at SJCA has decreased in recent years and many of the aging structures are being demolished. The current primary mission of SJCA is to provide a radar-testing range and various administrative and warehousing facilities for nearby Norfolk Naval Shipyard and other local naval activities. SJCA also provides administrative offices, light industrial shops, and storage facilities for several tenant commands, including Defense Reutilization and Marketing Office storage, Space and Naval Warfare Systems Command, Fleet and Industrial Supply Center, Norfolk Integrated Logistics Support, and a cryogenics school.

## 2.2 Previous Site Investigations

### 2.2.1 Initial Assessment Study (NEESA, 1981)

The Initial Assessment Study (IAS) Report indicated that explosive ordnance disposal (EOD) divers visually searched the northern wharf area (at that time defined as Installation Restoration Program [IRP] Site 20) and identified metal and thick silt deposits near the former wharf (shown on **Figure 2-1**). The IAS report indicated that it was a reasonable assumption that ordnance had been dropped into the sediment adjacent to the former wharf area during loading and unloading operations. The assumed ordnance presence was not considered a hazard as long as the sediment was not disturbed.

### 2.2.2 Relative Risk Ranking (CH2M HILL, 1996a)

During the Relative Risk Ranking (RRR), a site reconnaissance, a magnetic anomaly survey, and sediment sampling were conducted at IRP Site 20 (northern wharf area). Approximately 68 magnetic anomalies were identified from the magnetic anomaly survey in three areas around the former wharf pilings; however, magnetic anomalies can be the result of all types of buried metallic objects and do not necessarily indicate the presence of DMM. No visual confirmation of the magnetic anomaly sources was made. One volatile organic compound (VOC), multiple semivolatle organic compounds (SVOCs), one pesticide, one explosive (1,3-dinitrobenzene), and multiple inorganics were detected in the sediment. The locations of the identified magnetic anomaly area and sediment samples are shown on **Figure 2-3**.

### 2.2.3 Site Screening Assessment (CH2M HILL, 1996b)

As part of the Site Screening Assessment (SSA), the analytical results from the IRP Site 20 sediment samples collected during the RRR were used to conduct human health and ecological risk screenings. No unacceptable risk to human receptors was identified. Ecological risk was identified for benthic organisms in the sediment; however, based on the risk screening, the risk was considered minimal and no further evaluation of ecological risk was recommended. During a July 2001 partnering team site visit, the partnering team reached a consensus for no further action (NFA) for IRP Site 20 (northern wharf area) under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) program based on the findings of the human health and ecological risk screenings and the fact that potential risk from DMM would be addressed under the Navy's Range Program. The NFA decision was documented in the SSA.

Based on recommendations in the SSA, signs were posted in the area to prohibit intrusive activities, and the United States Army Corps of Engineers (USACE) was notified of the potential presence of UXO. A note has been added to the SJCA Wharf Property Record Cards in the Internet Navy Facility Assets Data Store (iNFADS) stating: "Unexploded ordnance may exist along all of the St. Juliens Creek Annex Wharfs." Additionally, the area is identified in the Environmental Restoration Plan Geographic Information System, which identifies AOCs, is used during operational planning and decision-making at the facility, and is updated annually or when conditions change. The Navy's Range Program was never fully implemented and ordnance sites are now addressed under the MRP. Because site history indicates there may be DMM present, in 2008 the wharf areas (northern and southern) were included under the MRP and identified as Area UXO 1.

### 2.2.4 Sonar Imagery (United States Naval Underwater Construction Team, 2008)

In 2008 the Navy performed a sonar imagery survey of portions of the wharf areas. The investigation consisted of side scans using sonar technology to identify features of the sediment surface and physical anomaly sources. The northern area of interest (Wharf 3 area) was oriented in a circle in the vicinity of the pilings still present; the investigation area is shown on **Figure 2-3**. The southern wharf area of interest (Wharfs 1 and 2) was oriented in a large rectangle adjacent to the wharf and extending into the channel. The investigation detected ten physical anomalies along the bottom of the river in the immediate vicinity of the southern wharf.

### 2.2.5 Preliminary Assessment (CH2M HILL, 2009)

The Preliminary Assessment (PA) Report addressed the history of munitions use at the wharf areas that make up Area UXO 1. Onsite and offsite sources were researched to determine the potential for munitions to have been dropped into the water during ordnance loading operations from 1898 to the late 1970s. Although no documentation was found to confirm the presence of munitions in the vicinity of the wharf areas, anecdotal evidence obtained through individual interviews indicated there was a potential for munitions to have been dropped during loading operations, which may have resulted in DMM being present in the sediment along the wharf areas. No site visits or sampling were performed as part of the PA because Area UXO 1 is underwater.

Based upon information obtained during the PA and the hazards associated with potential DMM that may be present, the PA recommended further investigation at the site. The PA suggested that the subsequent investigation should include anomaly detection and investigation in both the northern and southern wharf areas.

### 2.2.6 Site Inspection (CH2M HILL, 2010)

An initial SI was conducted to further assess whether previous site activities may have resulted in munitions being dropped into the water at the site. The initial SI consisted of a bathymetric survey to determine the depth of the river (**Figures 2-4**) and an underwater geophysical survey using DGM techniques within the northern and southern wharf areas. Based on the evaluation of data from the initial SI, a total of 1,651 individual ferrous anomaly sources were detected at Area UXO 1. The locations of the anomaly sources detected at the site are shown on **Figures 2-5 and 2-6**. The recommendation of the initial SI was to collect and visually inspect a subset of the anomaly sources identified during the underwater DGM survey and from areas where data could not be collected.



**Legend**  
 [Dashed Line] SJCA Boundary  
 [Orange Outline] Area UXO 1 Boundary  
 [Green Outline] IR Site 20

Southern Wharf: 4.49 acres  
 Northern Wharf: 1.70 acres

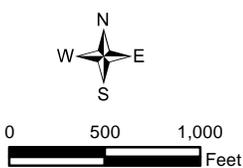


Figure 2-1  
 Base and Site Location  
 Area UXO 1 Work Plan  
 St. Juliens Creek Annex  
 Chesapeake, Virginia



Northern Wharf Area

Southern Wharf Area

- Legend**
- SJCA Boundary
  - Wharf 1 (also Dock 2)
  - Wharf 2 (also Dock 1)
  - Wharf 3
  - Demolished Building

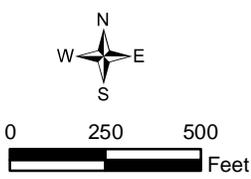
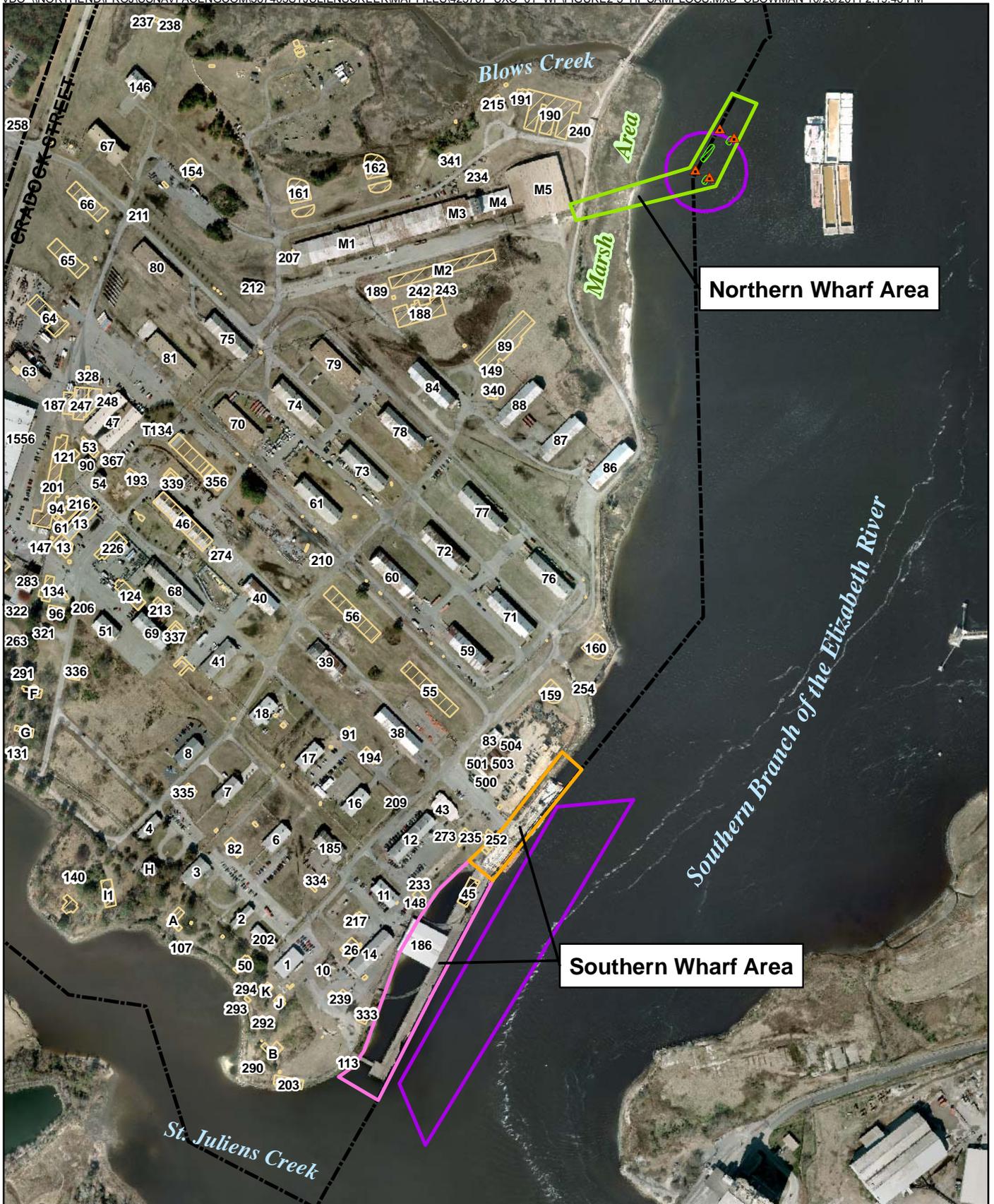


Figure 2-2  
Site Features  
Area UXO 1 Work Plan  
St. Juliens Creek Annex  
Chesapeake, Virginia



**Legend**

- SJCA Boundary
- Wharf 1 (also Dock 2)
- Wharf 2 (also Dock 1)
- Wharf 3
- Previous Sediment Sample Locations
- Magnetic Anomaly Concentration Areas (from 1996 Magnetic Anomaly Investigation)

- 2008 Side-scan Sonar Survey Area (approximated)
- Demolished Building

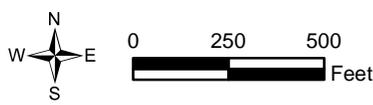
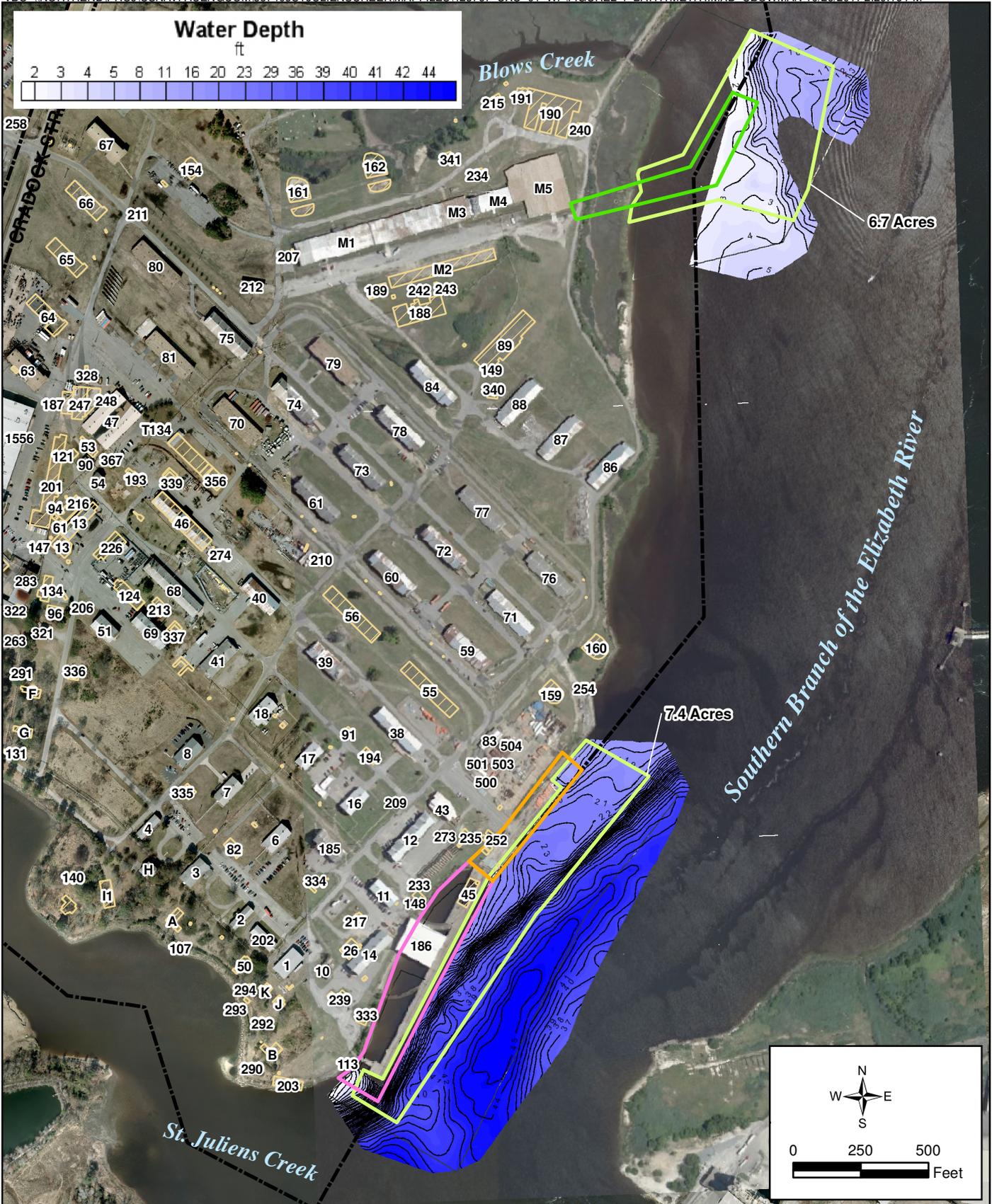


Figure 2-3  
 Historic Investigation and Sample Locations  
 Area UXO 1 Work Plan  
 St. Juliens Creek Annex  
 Chesapeake, Virginia



- Legend**
- SJCA Boundary
  - Wharf 1 (also Dock 2)
  - Wharf 2 (also Dock 1)
  - Wharf 3
  - Munitions Response Site
  - Demolished Building

Depths are relative to mean sea level.  
Contours are in feet.

Source: Final Site Inspection Report,  
MRP Area UXO 1, St. Juliens Creek Annex,  
Chesapeake, VA (September 2010)

Figure 2-4  
Bathymetric Survey Results  
Area UXO 1 Work Plan  
St. Juliens Creek Annex  
Chesapeake, Virginia



The locations selected for investigation may change during the investigation if site conditions prevent the team from safely acquiring items in the areas identified.



**Legend**

- Anomaly
- SJCA Boundary
- 2010 Site Inspection Investigation Area
- Unable to complete DGM survey
- DGM survey complete
- Location selected for further investigation/  
anomaly source acquisition and inspection

  Demolished Building

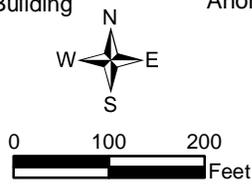
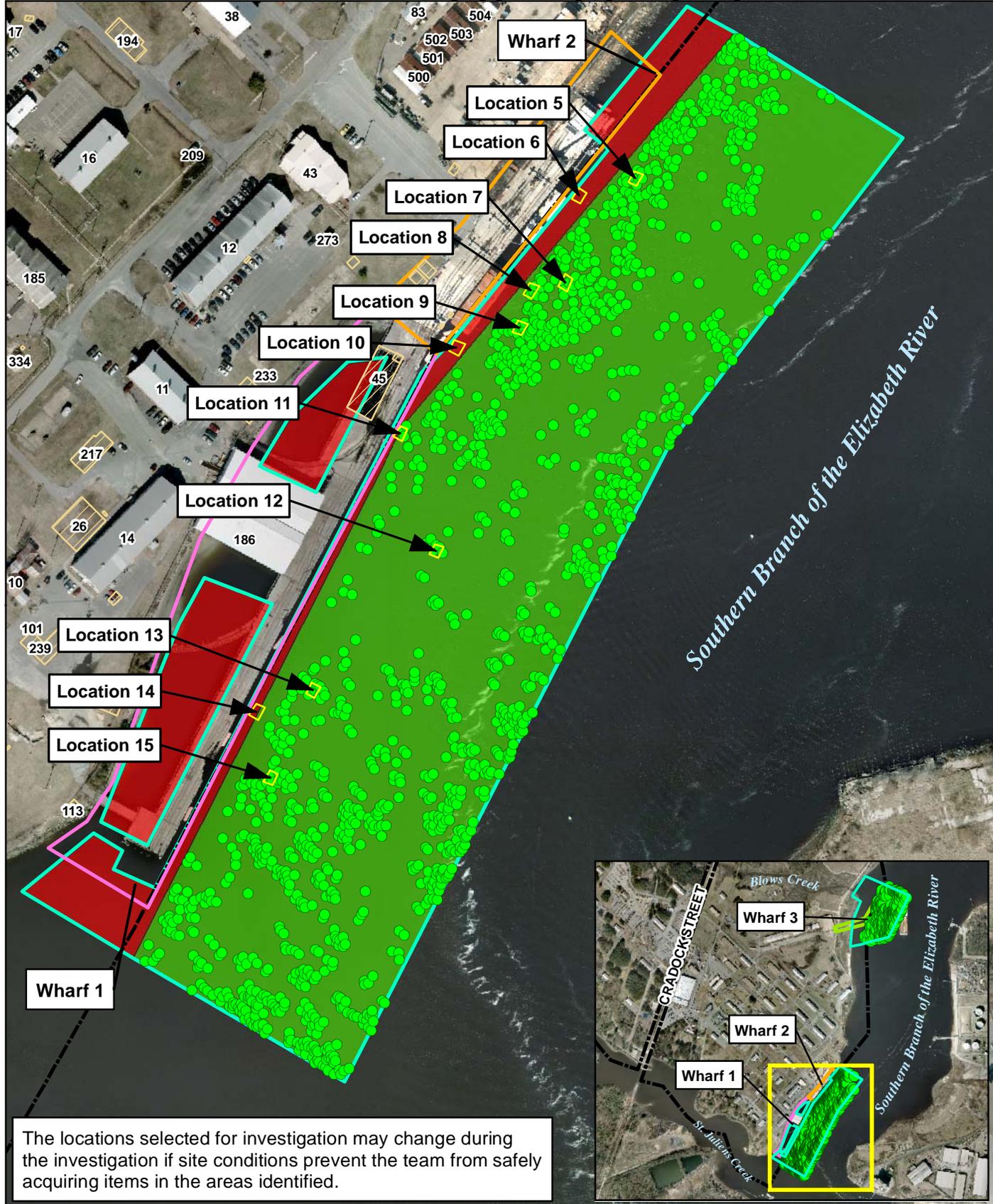


Figure 2-5  
Anomalies Selected for Further Investigation -  
Northern Area  
Area UXO 1 Work Plan  
St. Juliens Creek Annex  
Chesapeake, Virginia



**Legend**

- Anomaly
- SJCA Boundary
- 2010 Site Inspection Investigation Area
- Unable to complete DGM survey
- DGM survey complete
- Location selected for further investigation/  
anomaly source acquisition and inspection

  Demolished Building



0 100 200  
Feet

Figure 2-6  
Anomalies Selected for Further Investigation -  
Southern Area  
Area UXO 1 Work Plan  
St. Juliens Creek Annex  
Chesapeake, Virginia

# Technical Management Plan

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## 3.1 Project Organization, Personnel, and Schedule

### 3.1.1 Project Organization

The key organizations involved in this project are NAVFAC, Norfolk Naval Shipyard, SJCA, the United States Environmental Protection Agency (USEPA), Virginia Department of Environmental Quality (VDEQ), and CH2M HILL. CH2M HILL will issue subcontracts for MR support, anomaly source acquisition (includes boating, barge, crane, and electromagnet services), and investigation-derived waste (IDW) management and disposal. Project execution will be conducted by CH2M HILL and its subcontractors; specific duties for CH2M HILL and its subcontractors are described below.

#### 3.1.1.1. Prime Contractor

As the prime contractor, CH2M HILL is the primary point of contact with NAVFAC and SJCA. CH2M HILL will manage the overall project, providing day-to-day oversight and related program management support to execute the project successfully. Project duties controlled by CH2M HILL include the following:

- Project planning, implementation, and reporting
- Subcontractor selection, management, and control
- Program- and project-level QC
- Program- and project-level H&S
- Site management
- Technical direction for anomaly source acquisition operations and data management
- Data analysis, data validation, and reporting
- Project closeout

#### 3.1.1.2. Unexploded Ordnance Subcontractor

Qualified UXO technicians may be subcontracted to support the anomaly source acquisition effort and provide MR services during field operations at Area UXO 1. MR activities will include:

- Inspect and characterize material recovered during the anomaly source acquisition effort
- In the event that MEC or MPPEH is encountered, coordinate transportation of the MEC or MPPEH item from the barge to the detonation area located within SJCA
- Coordinate the on-call delivery of donor explosives, if required, for the explosive disposal of MEC/MPPEH
- Manage the material staging areas including material documented as safe (MDAS), and debris acquired during the site effort
- Properly dispose of MDAS and other debris generated during acquisition activities

The UXO subcontractor will provide the labor, equipment, and supplies required for the work described above. CH2M HILL MR personnel will provide oversight of all activities conducted.

#### 3.1.1.3. Anomaly Source Acquisition Subcontractor

The anomaly source acquisition subcontractor will provide services and equipment to conduct the anomaly source acquisition effort. The services and equipment provided by this subcontractor are as follows:

- Provide the crane and deck barges, support vessels, and licensed vessel operators required for execution of the project scope of work summarized in this work plan.
- Provide licensed vessel and equipment operators for boating and heavy equipment operations.

- Provide equipment including a raking apparatus capable of disturbing sediment on the river bottom to a depth of approximately five feet and an electromagnet to be used for anomaly source reacquisition that may be mounted to the excavator or crane, as deemed necessary by the water depth. Supply a silt curtain and all other equipment necessary for execution of the project scope.
- Investigate the 15 anomaly source locations identified during the initial SI activities by raking and deployment of the electromagnet to acquire metallic debris from the floor of the river.
- Coordinate with the UXO subcontractor for anomaly source inspection and segregation activities.
- Manage the material recovered during site activities in coordination with CH2M HILL personnel.

The anomaly source acquisition subcontractor will comply with all Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF&E), Department of Transportation (DOT) and United States Coast Guard (USCG) requirements for executing this project scope of work.

The anomaly source acquisition subcontractor will transport and dispose of scrap metal recovered during the anomaly source investigation. The anomaly source acquisition subcontractor will provide the labor, equipment, materials, and data tracking required to manage the scrap metal.

#### **Investigation-Derived Waste Subcontractor**

A transportation and disposal subcontractor will transport and dispose of IDW generated during the anomaly source investigation. The IDW subcontractor will provide the labor, equipment, materials, and data tracking required to manage the sediment and other sampling-derived IDW.

#### **Analytical Laboratory Subcontractor**

The analytical laboratory subcontractor will provide services for the laboratory analysis of sediment and IDW samples collected during the anomaly source acquisition effort. The analytical laboratory subcontractor is responsible for providing bottleware, facilities, and testing equipment that complies with testing standards and implementing an approved laboratory quality assurance (QA)/QC program.

### **3.1.2 Project Personnel**

The reporting relationship between key project personnel and the roles and responsibilities of the key personnel are discussed below. Contact information for key project personnel for project work at this site is shown in **Table 3-1**.

### **3.1.3 Project Schedule**

A detailed project schedule, including key milestones, is provided as **Figure 3-1**.

TABLE 3-1

Project Personnel Contact Information and Roles

Area UXO 1

St. Juliens Creek Annex,

Chesapeake, Virginia

Name/Title/Organization	Mailing Address	Telephone/Fax/E-mail	Role
Janna Staszak, P.E. Activity Manager CH2M HILL	5701 Cleveland Street Suite 200 Virginia Beach, VA 23462	757-671-8311 x46256 (office) 757-268-6136 (cell) 703-376-5992(fax) Janna.Staszak@ch2m.com	Coordinates the implementation of all SJCA projects, provides regional direction and leadership to project managers (PMs), ensures that information is shared between project teams, and communicates with the NAVFAC Remedial Project Manager (RPM).
Mike Skeean, P.E. PM CH2M HILL	11301 Carmel Commons Blvd. Suite 304 Charlotte, NC 28226	704-543-3285 (office) 704-206-0869 (cell) 678-579-8129 (fax) Mike.Skeean@ch2m.com	Has overall CH2M HILL responsibility for technical support and oversight, budget, schedule, invoice review, personnel resources planning and allocation, and project coordination.
Tim Garretson MR Senior Technical Consultant CH2M HILL	9428 Baymeadows Road Suite 300 Jacksonville, FL 32256	904-374-5633 (office) 757-287-5222 (cell) Timothy.Garretson@ch2m.com	Provides direction and oversight of the project implementation, specifically related to munitions response activities.
Tom Roth, P.E. Senior Technical Consultant CH2M HILL	1000 Abernathy Road Suite 1600 Atlanta, GA 30328	404-474-7640 (office) 404-259-6674 (cell) Tom.Roth@ch2m.com	Provides overall direction and oversight of project implementation, and ensures that appropriate reviews are conducted on all submittals.
George DeMetropolis, PhD, CMQ/OE, CQA Corporate MR Safety and QC Officer CH2M HILL	402 W. Broadway Ste. 1450 San Diego, CA 92101	619-687-0120 x37239 (office) 619- 564-9627 (cell) George.DeMetropolis@ch2m.com	Oversees implementation of the HSP and QC Plan to ensure that they meet the specific needs of the project and that appropriate H&S and QC requirements specifically related to MEC are defined and properly executed.
Mark Orman, CSP, CHMM, ARM Program H&S Manager CH2M HILL	135 South 84th Street Suite 325 Milwaukee, WI 53214	414-847-0597 (office) 414-712-4138 (cell) Mark.Orman@ch2m.com	Supports the implementation of the HSP to ensure that it meets all specific needs of the project and that appropriate H&S requirements are defined.
Richard Traver, P.E. Sediment Subject Matter Expert CH2M HILL	1717 Arch Street Suite 4400 Philadelphia, PA 19103	215-640-9105 (office) 609-410-1630 (cell) Richard.Traver@ch2m.com	Provides direction and oversight of the project implementation, specifically related to sediment and electromagnet activities.
Allen Dupont Dredging Subject Matter Expert CH2M HILL	One Lakeway 3900 N. Causeway Blvd. Suite 1250 Metairie, LA 70002	504-832-9509 (office) 504-432-2009 (cell) Allen.Dupont@ch2m.com	Provides direction and oversight of the project implementation, specifically related to barge crane, and dredging activities.
Renee Clore, P.E. Task Manager CH2M HILL	125 South Wacker Drive Suite 3000 Chicago, IL 60606	312-873-9758 (office) 704-877-3421 (cell) 312-873-9801 (fax) Renee.Clore@ch2m.com	Supports the PM in implementing specific project tasks, prepares and reviews subcontractor procurement packages, supports coordination of the field investigation and reporting activities.
Nate Price Field Team Leader (FTL)	5701 Cleveland Street Suite 200 Virginia Beach, VA 23462	757-671-6280 (office) 336-457-3094 (cell) 757-497-6885 (fax) Nathaniel.Price@ch2m.com	CH2M HILL's onsite representative to coordinate and oversee the activities of field support personnel and subcontractor personnel. The FTL is also responsible for implementation of and compliance with HSP and QC requirements during the field effort.

**Figure 3-1  
Project Schedule  
Area UXO 1 Work Plan  
St. Juliens Creek Annex**

ID	Task Name	Duration	Start	Finish	Predecessors	Qtr 1, 2012												Qtr 3, 2012				Qtr 1, 2013		
						ber	November			January		March		May		July		September		November		January		March
						B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
1	<b>Area UXO 1 Anomaly Acquisition Investigation</b>	505 days	Wed 10/26/11	Wed 3/13/13																				
2	<b>Site Inspection Addendum</b>	505 days	Wed 10/26/11	Wed 3/13/13																				
3	<b>ESS</b>	164 days	Wed 10/26/11	Fri 4/6/12																				
9	<b>Revised Anomaly Acquisition Investigation UFP-SAP</b>	191 days	Tue 11/29/11	Wed 6/6/12																				
10	Revised Draft UFP-SAP Submitted to Team	1 day	Tue 11/29/11	Tue 11/29/11																				
11	Navy Reivew of Revised Draft UFP-SAP	42 days	Wed 11/30/11	Tue 1/10/12	10																			
12	VDEQ Review of Revised Draft UFP-SAP (No EPA Comments, 2/3/12)	66 days	Wed 11/30/11	Fri 2/3/12	10																			
13	Resolve Comments	10 days	Sat 2/4/12	Mon 2/13/12	12,11																			
14	Final UFP-SAP	20 days	Fri 5/18/12	Wed 6/6/12	13FS+94 days																			
15	<b>Anomaly Acquisition Investigation Work Plan</b>	220 days	Mon 10/31/11	Wed 6/6/12																				
16	Draft Work Plan Submitted to Team	1 day	Mon 10/31/11	Mon 10/31/11																				
17	Regulatory/Navy Review of Draft Work Plan	60 days	Tue 11/1/11	Fri 12/30/11	16																			
18	RTC and Comment Resolution at Partnering Meeting	88 days	Mon 1/2/12	Thu 3/29/12	17FS+2 days																			
19	Incorporate Subcontractor Elements and Finalize Work Plan	20 days	Fri 5/18/12	Wed 6/6/12	18,34,30,32																			
20	<b>Accident Prevention Plan / Site-Specific Health and Safety Plan</b>	187 days	Tue 1/3/12	Sat 7/7/12																				
21	Draft APP/SSHP	120 days	Tue 1/3/12	Tue 5/1/12																				
22	Incorporate Subcontractor Elements	8 days	Fri 5/18/12	Fri 5/25/12	34,30,32,21																			
23	Navy Review of Draft APP/SSHP	30 days	Tue 5/29/12	Wed 6/27/12	22FS+3 days																			
24	RTC and Final APP/SSHP	10 days	Thu 6/28/12	Sat 7/7/12	23																			
25	<b>Subcontractor Procurement</b>	137 days	Mon 1/2/12	Thu 5/17/12																				
26	Prepare Scope of Work Packages	71 days	Mon 1/2/12	Mon 3/12/12																				
27	Solicit Bids	10 days	Tue 3/13/12	Thu 3/22/12	26																			
28	Award Lab Subcontract (Empirical, 8/16/11)	1 day	Fri 3/23/12	Fri 3/23/12	27																			
29	Award UXO Support Subcontract (OER)	6 days	Fri 3/23/12	Wed 3/28/12	27																			
30	OER Submits Explosives Management Plan, SOPs, AHAs	44 days	Thu 3/29/12	Fri 5/11/12	29																			
31	Award IDW Subcontract (Clearfield)	21 days	Fri 3/23/12	Thu 4/12/12	27																			
32	Clearfield Submits SOPs and AHAs	14 days	Fri 4/13/12	Thu 4/26/12	31																			
33	Award Crane/Barge Subcontract (Crofton)	35 days	Fri 3/23/12	Thu 4/26/12	27																			
34	Crofton Submits Crane/Barge Ops/Critical Lift Plan, SOPs, AHA	21 days	Fri 4/27/12	Thu 5/17/12	33																			
35	<b>Anomaly Investigation</b>	248 days	Mon 7/9/12	Wed 3/13/13	14																			
36	Notice to Proceed / Two Week Lead Time	14 days	Mon 7/9/12	Sun 7/22/12	8,24FS+1 day,14,19																			
37	Mobilization	5 days	Mon 7/23/12	Fri 7/27/12	36																			
38	Anomaly Investigation	10 days	Mon 7/30/12	Wed 8/8/12	37FS+2 days																			
39	Demobilization	5 days	Thu 8/9/12	Mon 8/13/12	38																			
40	Draft SI Addendum Report	120 days	Tue 8/14/12	Tue 12/11/12	39																			
41	Regulatory/Navy Review of Draft SI Addendum Report	60 days	Wed 12/12/12	Sat 2/9/13	40																			
42	RTC and Final SI Addendum Report	30 days	Tue 2/12/13	Wed 3/13/13	41FS+2 days																			

Date: Fri 6/15/12

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

Note: The review and submittal dates are based on the FFA Process Flow Charts or dates previously agreed upon and assume informal dispute resolution of Draft Final documents within a reasonable number of days. Page 1 of 1

# Field Investigation Plan

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## 4.1 Overview of Investigation Activities

The project objective is to evaluate the presence or absence of DMM in the sediment of the Southern Branch of the Elizabeth River at Area UXO 1. Project activities will be conducted in accordance with the Explosives Safety Submission for Area UXO 1 (CH2M HILL, 2012a). The detailed scope of activities for the anomaly source investigation includes:

- Notify the public and other stakeholders of anomaly source acquisition activities.
- Mobilization and site set-up.
- Enforcement of applicable explosive safety quantity distance (ESQD) arcs during site activities.
- Securing, modifying and preparing any project-specific components such as the raking system, electromagnet, shielded hopper, etc.
- Acquisition of anomaly sources from the sediment of the Southern Branch of the Elizabeth River at Area UXO 1 using a barge-mounted raking and electromagnet system.
- Abatement of suspended sediment in the Southern Branch of the Elizabeth River through the use of a silt curtain.
- Characterization of the recovered anomaly sources to determine whether DMM is present in site sediment.
- Transport of recovered metallic debris and sediment from the barge work area to the SJCA material storage area.
- Destruction of DMM encountered during site activities in accordance with the ESS and work plan.
- Management, storage, and disposal of recovered metallic debris and IDW in accordance with the ESS and work plan.
- Collection of sediment samples from the anomaly source acquisition areas to determine if MC is present in site sediment.

## 4.2 Regulatory Concerns

It is assumed that any MEC discovered within the facility boundary would be DMM and therefore subject to regulation as a hazardous waste having the characteristic of reactivity under the Resource Conservation and Recovery Act (RCRA). Based on the site configuration (**Figure 2-2**), there are onshore, onsite areas at the northern and southern areas of UXO-1, however the roadway between the northern and southern site boundaries is not an onsite area. It is anticipated that DMM will be staged in the southern area of the site, but transported from the southern area of the site to the northern area of the site for demolition. Since these items will be transported outside of the site boundary, their transportation is regulated by 9 VAC 20-60-262, which incorporates 40 Code of Federal Regulations (CFR) 262.20(f) by reference. Transportation of hazardous wastes on a public or private right-of-way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right-of-way are exempt from manifesting and transporter requirements. However, should a discharge occur, all regulations applicable to a discharge must be followed. Since this is an offsite activity, this is not an ARAR. Regulatory compliance for onsite activities is covered in detail in **Appendix C**, ARARs. If a spill occurs or a sheen is observed on the water, whether caused by the investigation or not, the Field Team Leader (FTL) will notify the National Response Center (800-424-8802) and Norfolk Naval Shipyard Emergency Coordination Center (ECC) (757-396-3333) within 15 minutes of the observation. The spill plan is included in Section 10.3.8 of the Accident Prevention Plan (CH2M HILL, 2012c).

## 4.3 Notification and Coordination

The following notification and coordination activities will be performed for the anomaly source acquisition effort:

- The final work plan will be forwarded by the Navy to the US Coast Guard Sector Hampton Roads Marine Environmental Response Branch as a means of communicating the planned activities.
- A Notice to Mariners will be issued through the USCG for the duration of the investigation activities to alert boaters of potential hazards and restricted access areas within the Southern Branch of the Elizabeth River.
- Coordination with SJCA personnel will be performed to arrange for personnel site access, transport of commercial explosives onto SJCA, and enforcement of ESQD arcs within SJCA.
- Radios will be used for communication between project teams during the field effort. Radios will be maintained by the FTL or the FTL's designee throughout the project duration.

## 4.4 Site Preparation

### 4.4.1 Site Set-up

During mobilization and site set-up activities, material and equipment staging areas will be established on SJCA. These areas will be determined in coordination with facility personnel. Material and equipment staging areas will include:

- Temporary work trailer and equipment storage areas
- Storage area for MDAS that is identified during the anomaly source removal activities or generated at the site due to destruction of DMM
- Roll-off containers for storage of other metallic debris recovered during the acquisition activities
- Roll-off containers for sediment recovered during the acquisition activities
- Heavy equipment staging area for forklift or other equipment used to transport recovered material to and from the barge work platform.

A barge loading area will also be designated at the time of site set-up and will be approved by facility personnel. This loading area will be used to load personnel, equipment and materials on and off of the support vessels and barges.

### 4.4.2 Maximum Credible Event and Contingency Munitions with the Greatest Fragmentation Distances

Because no known MEC or MPPEH are present within Area UXO 1, the anomaly source acquisition has been selected based on the following assumptions. The primary maximum credible event (MCE) of 3 pounds net explosive weight (NEW) is based on the 100-pound M 38 Practice Bomb with M1 A1 Spotting Charge, which was selected from items that may have been historically loaded from SJCA and the results of the DGM survey. Two additional items were selected as contingency munitions with the greatest fragmentation distance (MGFDs) should an item with a greater hazardous fragment distance (HFD) than that of the 100-pound M 38 practice bomb be encountered during investigation activities. The contingency MGFD items are as follows:

- Contingency 1 - 40-millimeter (mm) MK 2 high explosive (HE) projectile
- Contingency 2 - 5-inch 38 Caliber MK 35 projectile

The ESQD arcs and associated information for the primary MCE and contingency MGFD items are presented in the ESS (CH2M HILL, 2012a).

If a MEC item is encountered that has a greater fragmentation distance than the MCE and MGFDs identified in the ESS, all MR operations will immediately cease and an ESS Amendment will be prepared to address the item encountered.

## 4.5 Anomaly Source Acquisition Activities

### 4.5.1 Exclusion Zone Enforcement

Exclusion zones (EZs) will be enforced during anomaly source acquisition activities including deployment of the electromagnet and raking apparatus and inspection of recovered materials. The EZs around the electromagnet and raking operations will be enforced visually by a member of the project team. Should unauthorized personnel approach the EZ, all site activities will cease until the unauthorized person has departed the work area.

### 4.5.2 Electromagnet and Raking Operations

Anomaly sources will be acquired through the use of a barge-mounted electromagnet and raking system. The electromagnet will be deployed by a crane that is secured to the barge deck. Crane operations will be performed in accordance with the procedures presented in **Appendix A**.

Anomaly sources in fifteen areas have been selected for acquisition during this field effort. Each anomaly source area is approximately 20 feet by 20 feet in area. The coordinates that define each proposed anomaly source location are presented in **Table 4-1**. The selected anomaly source areas are presented on **Figures 2-5 and 2-6**. Each anomaly source area will be identified through use of a global positioning system (GPS). After the barges have been mobilized to the selected anomaly source area and secured, a silt curtain will be deployed to encircle the work area and minimize the migration of suspended sediment in the water column down the Southern Branch of the Elizabeth River during acquisition activities.

The crane will be used to deploy the electromagnet at the anomaly source coordinates. The electromagnet will be energized to attract ferromagnetic material within its magnetic field on the bed of the Southern Branch of the Elizabeth River. The electromagnet will be raised to the barge deck, and the material accumulated on the electromagnet will be released onto a screen (located over a roll-off box or other hopper device) when the magnet is de-energized. The material released onto the screen will be inspected by qualified UXO technicians to determine whether the material extracted from the riverbed contains MEC. Sediment adhering to the metallic debris will be removed by the UXO technicians during the inspection. If sufficient sediment is retained on the metallic debris extracted by the electromagnet, the sediment sample will be collected from the metallic debris, as described in **Section 4.5.3**. If sufficient sediment is not present on the extracted metallic debris, a ponar dredge will be deployed to the riverbed to obtain sufficient surface sediment for sampling from approximately the center of the anomaly acquisition area. Sediment will be washed from the metallic debris using water from the Southern Branch of the Elizabeth River. The wash water containing de minimus amounts of sediment will be washed back into to the Southern Branch of the Elizabeth River. If sediment quantities exceed de minimus levels (for example, results in a visible increase in turbidity beyond the silt curtain), the sediment will be containerized on the barge and will be transported to the material staging area on SJCA.

At each anomaly source location, field documentation will include the depth to sediment, description of sediment properties, estimate of type and quantity of material recovered with the electromagnet (both metallic debris and other recovered material), and the methods used for anomaly source recovery and sediment sampling.

If the UXO technicians encounter a MEC item in the metallic debris, the MEC will be transported back to SJCA for controlled detonation in accordance with the ESS. Metallic debris that is determined to be unrelated to DMM, will be staged in a container on the barge and will later be transported from the barge to the material staging area within SJCA.

The electromagnet will be deployed at each anomaly source location and will be used to sweep the anomaly source location area. Following the initial removal of metallic debris by the electromagnet, a rake will be lowered to the riverbed and used to disturb the riverbed. Raking will move sediment to potentially bring additional metallic debris closer to the sediment surface. Once the sediment at the anomaly source location has been disturbed, the electromagnet will be deployed again. If no metallic debris is recovered at a particular location, the magnet will be adjusted to an alternate, nearby location selected based on the same logic applied to the preliminary location (for example, cluster of anomaly sources or gap in DGM data).

### 4.5.3 Sediment Sampling

A sediment sample will be collected at each of the fifteen anomaly source locations. Composite sediment samples will be collected from the sediment adhering to the recovered metallic debris released from the electromagnet. If sufficient sediment cannot be collected from the recovered metallic debris, a ponar dredge will be deployed to the riverbed to obtain sufficient surface sediment for sampling from approximately the center of the anomaly acquisition area. Sediment samples will be collected in accordance with the Unified Federal Policy Sampling and Analysis Plan (UFP-SAP) (CH2M HILL, 2012b).

### 4.5.4 Investigation-Derived Waste Management

IDW is anticipated to include sediment, liquid waste (e.g., decontamination fluids) and personal protective equipment (PPE) generated during sampling activities. The anomaly source acquisition subcontractor is responsible for transporting IDW from the barge to the designated material staging area. CH2M HILL will collect representative sediment and liquid waste samples for analysis using Toxicity Characteristic Leaching Procedure (TCLP) to determine disposal requirements and transporting of the IDW to proper disposal facilities. TCLP samples will be analyzed for the following analyses:

- TCLP VOCs by 1311/8260B
- TCLP SVOCs by 8270C
- TCLP pesticides by 8081A
- TCLP herbicides by 8151A
- TCLP metals by 6010B/7470A
- TCLP polychlorinated biphenyls (PCBs) by 8082
- Reactivity to Sulfide by SW-846 9034
- Reactivity to Cyanide by SW-846 9012B
- Corrosivity as pH by SW-846 9045C
- Ignitability by Pensky Martens

### 4.5.5 Data Collection and Storage

The following data will be collected while in the field:

- Project information (e.g., personnel, teams, instrument serial numbers, locations)
- FTL notes (e.g., safety meetings, logbooks, field requests to management)
- UXO Team notes (e.g., files, personnel, methods, instruments, GPS coordinates, descriptions of items found)
- Demolition tracking information
- Equipment testing and inspection documentation (e.g., electromagnet testing, crane and boat inspection documentation)

TABLE 4-1

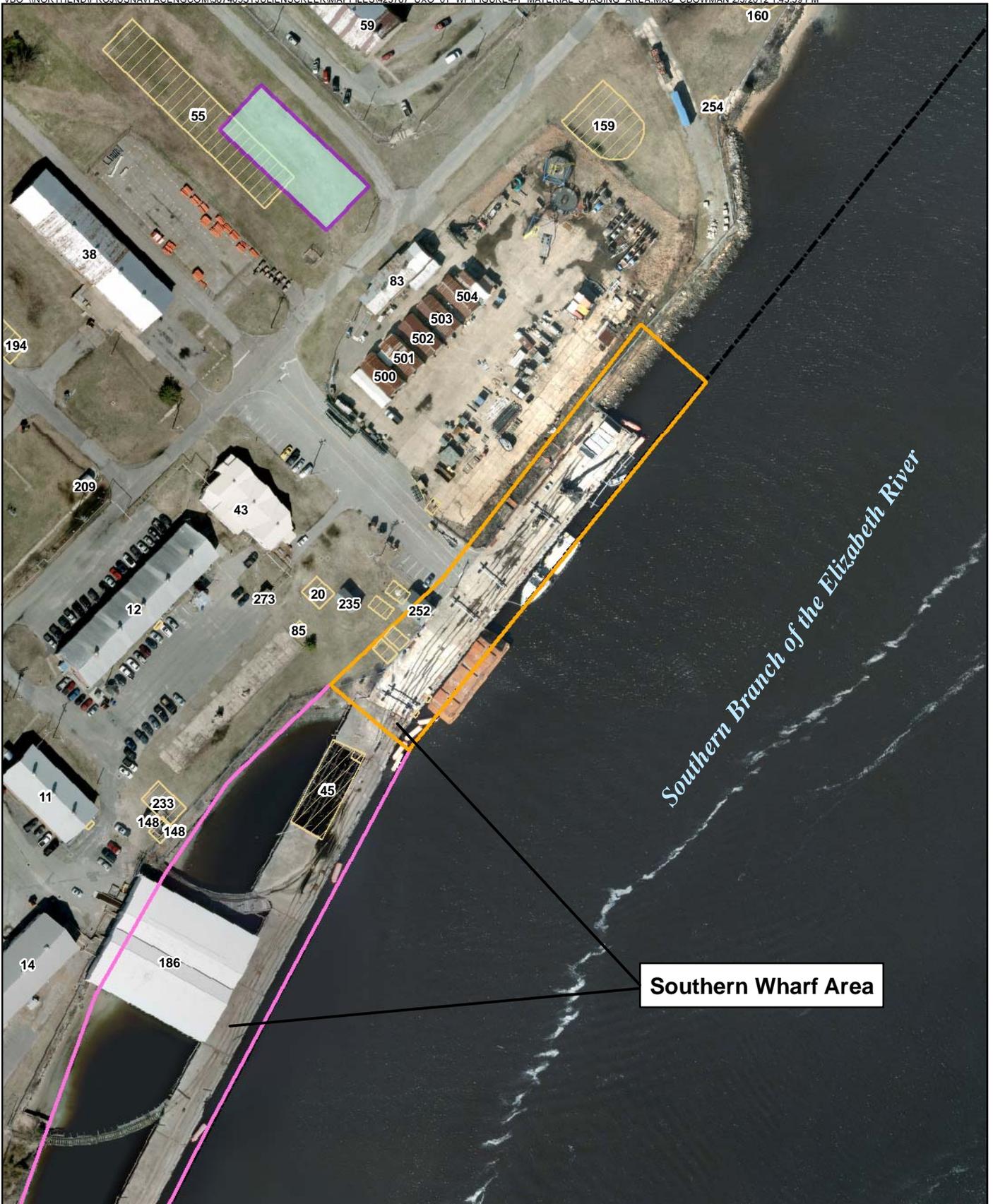
Anomaly Source Location Coordinates

Area UXO 1

St. Juliens Creek Annex,

Chesapeake, VA

Location	Corner 1		Corner 2		Corner 3		Corner 4	
	Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing
1	12125659.7679716	3454873.87682056	12125679.2111742	3454868.49887856	12125671.7649948	3454844.50516015	12125652.7355053	3454849.46938906
2	12125600.6109377	3454721.64057648	12125619.6407552	3454717.50377373	12125611.7805347	3454691.85520298	12125592.3373322	3454698.06057115
3	12125583.2363005	3454645.52261848	12125600.1975527	3454640.97210265	12125592.3373322	3454621.11518698	12125576.6172192	3454626.90684206
4	12125806.38743	3454558.647792	12125822.55964	3454553.849245	12125818.61214	3454539.638644	12125802.38481	3454543.637980
5	12124986.82804	3452088.444727	12124999.95499	3452083.719015	12124989.97863	3452067.441489	12124977.90155	3452072.692134
6	12124905.44008	3452064.290904	12124916.99190	3452056.939541	12124907.54047	3452041.187276	12124894.93846	3452048.013378
7	12124885.48704	3451937.745882	12124895.98866	3451930.394519	12124888.11236	3451912.016603	12124874.98542	3451919.892899
8	12124832.97861	3451924.618611	12124847.15575	3451919.892899	12124835.60394	3451901.514983	12124823.52719	3451908.341085
9	12124815.12563	3451869.484863	12124829.82803	3451863.708956	12124820.90187	3451847.956363	12124807.24966	3451852.157142
10	12124721.01230	3451840.653556	12124737.90302	3451834.430800	12124728.12417	3451817.540085	12124713.90044	3451824.651948
11	12124642.78182	3451713.529139	12124652.56067	3451709.084266	12124644.55970	3451691.304446	12124631.22508	3451698.416308
12	12124693.45363	3451540.177451	12124705.89947	3451535.732578	12124697.89883	3451519.730642	12124684.56389	3451525.064621
13	12124511.21220	3451335.711325	12124524.54682	3451329.488240	12124515.65707	3451313.486632	12124503.21123	3451319.709388
14	12124430.31472	3451304.596886	12124442.76056	3451299.262907	12124432.98171	3451280.594309	12124418.75799	3451288.595277
15	12124449.87243	3451206.808695	12124461.42916	3451201.474717	12124454.31730	3451184.584002	12124440.09357	3451189.917981



*Southern Branch of the Elizabeth River*

**Southern Wharf Area**

**Legend**

-  SJCA Boundary
-  Wharf 1 (also Dock 2)
-  Wharf 2 (also Dock 1)
-  Wharf 3
-  Demolished Building
-  Materials Staging Area

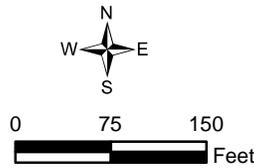


Figure 4-1  
Material Staging Area  
Area UXO 1 Work Plan  
St. Juliens Creek Annex  
Chesapeake, Virginia

# Quality Control Plan

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This Quality Control Plan (QCP) describes the QC approach and procedures for the anomaly source investigation activities. The QC forms referenced throughout this section are provided in **Appendix B**.

## 5.1 Project Organization and Responsibilities

The organizational structure and responsibilities of the project team are designed to provide project QA/QC for MEC investigation activities. Selected positions are described in the following paragraphs.

### 5.1.1 Project Manager

The Project Manager (PM) is responsible for overall project activities, including cost control, schedule control, and technical quality. In addition, the PM oversees development of the work plan and monitors task order activities to ensure compliance with project objectives and scope. The PM also communicates with NAVFAC, SJCA, and other designated parties regarding project progress. The PM works with the project team to select an internal QA/QC review team, to coordinate review efforts, to address review comments, and to adjudicate technical issues.

### 5.1.2 Senior Consultants

The senior consultants are company-wide resources with significant experience in the various technical aspects involved in a complex project. The Senior Technical Consultants (STC) are responsible for evaluating the technical merit of the work planning documents before field activities begin, and reviewing all deliverables before submittal to NAVFAC and SJCA. The senior consultants assist the PM in coordinating review efforts, addressing review comments, and resolving technical issues.

### 5.1.3 Corporate Munitions Response Safety and Quality Control Officer

The Corporate MR Safety and QC Officer coordinates with the PM and the FTL and has authority to enforce the MR procedures defined in this QCP. The Corporate MR Safety and QC Officer (along with all UXO Technicians onsite) has the authority to stop work to ensure project activities comply with MEC-related specifications of this QCP, the Contract, and the project. This authority applies equally to all project activities, whether performed by CH2M HILL or its subcontractors. The Corporate MR Safety and QC Officer also has authority to restart work following a stop-work incident.

### 5.1.4 Senior Unexploded Ordnance Supervisor

The Senior Unexploded Ordnance Supervisor (SUXOS) has responsibility for the execution of all onsite activities. The SUXOS is responsible for overseeing scheduling of UXO personnel and ensuring that activities are performed in accordance with the specified plans. The SUXOS is familiar with all aspects this work plan and the H&S requirements and will coordinate with the Unexploded Ordnance Safety Officer (UXOSO) to ensure H&S of site personnel. The SUXOS ensures the accuracy of this work plan.

### 5.1.5 Unexploded Ordnance Safety Officer

The UXOSO is responsible for implementing the HSP, inclusive of the MEC-related and general safety components. The UXOSO verifies compliance with applicable H&S requirements and will report independently of project management to the CH2M HILL Corporate MR Safety and QC Officer. The UXOSO implements the approved safety programs in compliance with all Department of Defense (DoD), federal, state, and local statutes and codes; analyze operational risks, hazards, and safety requirements; and conducts safety inspections to ensure compliance with safety codes.

### 5.1.6 Unexploded Ordnance Quality Control Specialist

The Unexploded Ordnance Quality Control Specialist (UXOQCS) is responsible for implementing the MEC-related provisions of the project QC program; conducting QC inspections of all MEC-related operations for compliance with established procedures; and directs and approves all corrective actions to ensure that all MEC-related work

complies with contractual requirements. The UXOQCS has a direct line of communication with the CH2M HILL PM, STC, and Corporate MR Safety and QC Officer. The UXOQCS is responsible for the accuracy of this work plan and the documentation required by this work plan.

### 5.1.7 Health and Safety Manager

The Health and Safety Manager (HSM) reviews and approves the project-specific HSP as well as subcontractor HSPs. The HSM serves as the point of contact (POC) for the Site Safety Coordinator (SSC) for any health- or safety-related issues, and may conduct project audits. The HSM is also responsible for investigating accidents should any occur during the course of the project.

### 5.1.8 Field Team Leader

The FTL reports to the PM and is responsible for efficiently applying the resources of the project team to execute the field phase of this project. In addition, the FTL is responsible for local client interface regarding details of the project and the project team while assigned to the site. The FTL assists the PM in maintaining sufficient resource allocations to meet the project schedule and budget and provides daily feedback to the PM on project progress, issues requiring resolution, and other project-specific issues, as required.

## 5.2 Definable Features of Work and the Three-phase Control Process

MEC-related QC will be monitored through the definable features of work (DFOW) using a three-phase control process, as presented in **Table 5-1**.

### 5.2.1 Definable Features of Work

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

#### 1. Planning

- Pre-Mobilization Activities: System setup for GIS, document management and control, data management, and subcontracting
- Preparing the ESS, work plan, UFP-SAP, HSP, and other applicable planning documents

#### 2. Field Operations

- Mobilization and Site Preparation
- Anomaly Source Acquisition
- Management and Disposal of Recovered Materials – MEC, Other Metallic Debris, and Sediment
- IDW Management
- Demobilization

#### 3. Final Project Reports and Closeout

- Draft and Final Reports: preparing and obtaining approval
- Data archiving and project closeout

### 5.2.2 Three Phases of Control

The Corporate MR Safety and QC Officer is responsible for ensuring that the three-phase control process, including the Preparatory Phase, Initial Phase, and Follow-up Phase, is implemented for each DFOW listed in this QCP, regardless of whether it is performed by CH2M HILL or its subcontractors. Each control phase is important for obtaining a quality product and meeting the project objectives; however, the preparatory and initial audits are particularly valuable in preventing problems. Field work is not to be performed on a DFOW until successful Preparatory and Initial Phases have been completed.

### 5.2.3 Preparatory Phase

The Preparatory Phase culminates with the planning process leading up to actual field activities. Successful completion of the Preparatory Phase verifies that the project delivery, QC, and safety plans have been completed. The following actions will be performed as applicable for each DFW:

- Confirm that the appropriate technical procedures are incorporated into the project work plan and review procedures.
- Confirm that adequate testing is called for to ensure quality delivery.
- Confirm definition of preliminary work required at the work site and examine the work area to confirm required preliminary work has been properly completed.
- Confirm availability of required materials and equipment. Examine materials and equipment to confirm compliance with approved submittals and procedures. Ensure equipment testing procedures are in place, with control limits and frequency, for each piece of equipment.
- Confirm qualifications/training of personnel and verify roles/responsibilities are well-defined and communicated.
- Confirm with the HSM that the site HSP adequately addresses the work operations and that applicable safety requirements have been incorporated into the plan.
- Discuss methods to be employed during the field activities.
- Confirm any required permits and other regulatory requirements are met.
- Verify that lessons learned during previous similar work have been incorporated as appropriate into the project procedures to prevent recurrence of past problems.

Project staff must correct or resolve discrepancies between existing conditions and the approved plans/procedures identified by the PM, Corporate MR Safety and QC Officer, and the team during the Preparatory Phase. The PM or designee must verify that unsatisfactory and nonconforming conditions have been corrected prior to granting approval to begin work.

Results of the activity are to be documented in the Preparatory Inspection Checklist (Form B-1b) specific for the DFW and summarized in the Weekly QC Report.

### 5.2.4 Initial Phase

The Initial Phase occurs at the startup of field activities associated with a specific DFW. The Initial Phase confirms that this QCP, other applicable work plan sections, and procedures are being effectively implemented and the desired results are being achieved.

During the Initial Phase, the initial segment of the DFW is observed and inspected to ensure that the work complies with contract and work plan requirements. The Initial Phase should be repeated if acceptable levels of specified quality are not met. The following shall be performed for each DFW:

1. **Establish the quality of work required to properly deliver the project in accordance with contractual requirements.** The FTL will ensure that the field teams are aware of expectations associated with the field methods established under the Preparatory Phase by observing the initial work activities and interacting with the PM, Activity Manager, and responsible subcontractors' supervisors.
2. **Resolve conflicts.** The STC will guide the PM and responsible supervisor(s) in resolving conflicts. Should conflicts arise in establishing the baseline quality for the DFW, the responsibility to resolve the conflict falls to the PM. Should the conflict not be resolved in a manner that satisfies the project requirements, the STC must elevate the conflict to the program level (i.e., the Program QC Manager) and issue a non-conformance report. The STC may direct a cessation of work activity with the concurrence of the Program QC Manager should the issue jeopardize the results of the DFW or put the project at risk of non-conformance.

3. **Verify with the HSM that the site HSP was developed to ensure that the identified hazards adequately address field conditions.** Confirm that applicable safety requirements are being implemented during field activities.

Upon completion of Initial Phase activities, the results are to be documented in the Initial Phase Inspection Checklist (Form B-2b) and the QC logbook and summarized in the Weekly QC Report. Should results be unsatisfactory, the Initial Phase will be rescheduled and performed again.

### 5.2.5 Follow-up Phase

Completion of the Initial Phase of QC activity leads directly into the Follow-up Phase, which covers the routine day-to-day activities at the site. Specific concerns associated with the Follow-up Phase include:

1. Inspection of the work activity to ensure work complies with the Contract, ESS, and work plan.
2. Evaluation and confirmation that the quality of work is being maintained at least at the level established during the Initial Phase.
3. Evaluation and confirmation that required testing is being performed in accordance with procedures established during the Preparatory Phase and confirmed during the Initial Phase.
4. Confirmation that nonconforming work is being corrected promptly and in accordance with the direction provided by the PM, SUXOS, FTL, STC, or Corporate MR Safety and QC Officer.

To conduct and document these inspections, the FTL is to generate the Follow-up Phase Inspection Checklist (Form B-3b). The Follow-up Phase inspections will be performed daily or as otherwise identified in this QCP until the completion of each DFOW.

The SUXOS and FTL are responsible for onsite monitoring of the practices and operations taking place and verifying continued compliance with the specifications and requirements of the Contract, project, and approved project plans and procedures. The SUXOS and FTL are also responsible for verifying that a daily H&S inspection is performed and documented as prescribed in site specific HSP. Discrepancies between site practices and approved plans and procedures are to be resolved and corrective actions for unsatisfactory and nonconforming conditions or practices are to be verified by the UXOQCS or a designee prior to granting approval to continue work. Follow-up Phase inspection results are to be documented in the QC logbook and summarized in the Weekly QC Report.

### 5.2.6 Additional Audits

Additional audits performed on the same DFOW may be required at the discretion of the Program QC Officer, STC, Corporate MR Safety and QC Officer, HSM, or the PM. Additional preparatory and initial audits are generally warranted under any of the following conditions: unsatisfactory work, changes in key personnel, resumption of work after a substantial period of inactivity (i.e., 2 weeks or more), or changes to the project scope of work/specifications.

### 5.2.7 Final Acceptance Audit

Upon conclusion of the DFOW and prior to closeout, the Final Acceptance Inspection must be performed to verify that project requirements relevant to the work are satisfied. Outstanding and nonconforming items are to be documented on the Final Inspection Checklist (Form B-4b). Resolution of each item must be noted on the checklist. Contractor acceptance and closeout of each definable work feature is a prerequisite to project closeout.

## 5.3 Audit Procedures

The Corporate MR Safety and QC Officer is responsible for verifying compliance with this QCP through audits and surveillance. The UXOQCS, PM or a designee is to inspect/audit the quality of work being performed for the DFOW. The UXOQCS, PM or a designee is to verify that procedures conform to applicable specifications stated in this work plan or other applicable guidance. Identified deficiencies are to be communicated to the responsible individual and documented in the QC logbook and Weekly QC Report. Corrective actions are to be verified by the Corporate MR Safety and QC Officer and recorded in the Weekly QC Report.

The Inspection Schedule and Tracking Form (Form B-5b) is to be used by the UXOQCS and SUXOS for planning, scheduling and tracking the progress of audits for this project. The information on the form is to be kept up to date and reviewed by the Corporate MR Safety and QC Officer for planning purposes. Audit activities and corrective actions are to be documented by the UXOQCS in accordance with this chapter. Audit records are to be maintained as part of the project QC file.

## **5.4 Corrective/Preventive Action Procedures**

The corrective and preventive action procedures are designed to prevent quality problems and to facilitate process improvements, as well as identify, document, and track deficiencies until corrective action has been verified.

### **5.4.1 Preventive Measures and Continual Improvement**

While the entire QC program is directed toward problem prevention, certain elements of the program have greater potential to be proactive. The primary tools for problem prevention on this project are discussed in Section 5.8. Should these preventive measures fail, tracking and communicating deficiencies provide a mechanism for preventing their recurrence.

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.

### **5.4.2 Deficiency Identification and Resolution**

While deficiency identification and resolution occurs primarily at the operational level, QC audits provide a backup mechanism to address problems that either are not identified or cannot be resolved at the operational level. Through implementation of the audit program prescribed in this QCP, the QC staff is responsible for verifying that deficiencies are identified, documented as prescribed herein, and corrected in a timely manner. Deficiencies identified by the QC staff are to be corrected by the operational staff and documented by the QC staff.

### **5.4.3 Corrective Action Request**

A Corrective Action Request (CAR) (Form B-6b) can be issued by any member of the project staff, including CH2M HILL and subcontractor employees. If the individual issuing the CAR is also responsible for correcting the problem, then that individual should do so and document the results on Part B of the CAR (Form B-6b). Otherwise, the CAR should be forwarded to the PM, who is then responsible for evaluating the validity of the request, formulating a resolution and prevention strategy, assigning personnel and resources, and specifying and enforcing a schedule for corrective actions. Once a corrective action has been completed, the CAR and supporting information are to be forwarded to the Corporate MR Safety and QC Officer for closure. Sufficient information is to be provided to allow the QC reviewer to verify the effectiveness of the corrective actions.

The PM will determine whether a written Corrective Action Plan (CAP) (Form B-7b) is necessary, based on whether or not any of the following are met: the 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 recurrence.

### **5.4.4 Deficiency and Corrective Action Tracking**

Each CAR must be given a unique identification number and tracked until corrective actions have been taken and documented in Part B of the form and the CAR is submitted to the PM or a designee for verification and closure.

### **5.4.5 Lessons Learned and Other Documentation**

The lessons learned through the deficiency management process are documented on CARs and CAPs. To share the lessons learned, these documents can be submitted to the Client through a Weekly QC Report summarizing the

week's QC activities and including a grouping of the Daily QC Reports (Form B-8b) and all other pertinent reports created during the week.

## 5.5 Records Generated

### 5.5.1 Onsite Project File

The FTL will establish and maintain an onsite project file in accordance with the CH2M HILL corporate quality manual for document control. The onsite files will be maintained in the project field office or designated field vehicle. 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, contractual agreements, and project activities.

### 5.5.2 Weekly QC Report

The FTL is responsible for preparing and submitting the Weekly QC Report to the Corporate MR Safety and QC Officer and for the project file and providing concurrent courtesy copies to the PM. The Weekly QC Report is to provide an overview of QC activities performed each day, including those performed by subcontractors. The QC reports must present an accurate and complete picture of QC activities by reporting both conforming and deficient conditions, and the reports should be precise, factual, legible, and objective. Copies of supporting documentation, such as checklists and surveillance reports, are to be attached.

A field QC log is to be maintained by the SUXOS, UXOQCS and FTL to document details of field activities during QC monitoring activities. At the end of each day, copies of the log entries are to be attached to the Weekly QC Report. The information in the field QC log provides backup information and is intended to serve as a phone log and memory aid in the preparation of the Weekly QC Report and for addressing follow-up questions.

## 5.6 Submittal Management

The PM is responsible for overall management and control of project submittals. The PM is also responsible for submittal scheduling and tracking.

### 5.6.1 Review of Plans and Specifications

During the Preparatory Phase of a DFO, the PM is responsible for staffing and reviewing the plans and, when necessary, requesting clarification from the project team. The primary purpose of this review is to identify and resolve potential conflicts prior to initiating work operations. The SUXOS will review and approve the work plan prior to implementation in the field. Pen and ink changes are authorized for minor corrections. Changes involving or impacting safety or quality requires a Field Change Request (FCR).

### 5.6.2 Review and Approval of Submittals

The PM must review submittals prepared by CH2M HILL and subcontractors for completeness and compliance with the specifications of the project and Contract. Non-compliant submittals are to be returned to the originator for corrective action and re-submittal to the PM or his designee. Although part of the QC process, technical reviewers may include, but are not limited to, the QC staff.

For each project document that is submitted for technical review, a Document Review and Release Form (Form B-9b) is to be initiated by the author, submitted with the document to be reviewed, and used to document and track the review process. A copy of the completed Document Review and Release Form is to be submitted to the PM together with the corrected document for his review and certification.

## 5.7 Personnel Qualifications and Training

All project staff members will be qualified to perform their assigned jobs in accordance with the terms outlined in the Contract and by the project plans. UXO personnel meet the *Minimum Qualifications for Unexploded Ordnance Technicians and Personnel* Department of Defense Explosives Safety Board (DDESB) Technical Paper (TP)-18 (DDESB, 2004).

H&S training requirements for onsite project personnel have been established in accordance with Occupational Safety and Health Act/Occupational Safety and Health Administration requirements for hazardous site workers (29 CFR 1910.120) and are specified in the HSP. These training requirements must be met before project personnel can begin site work.

The SUXOS and FTL will maintain records documenting the required qualifications, training, and certifications for each site worker. The SUXOS and FTL will monitor expiration dates to provide advance warning to the PM of when employees will require refresher training or other renewals. The SUXOS and FTL 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. Specific qualifications and training required for UXO-qualified personnel are stated in the following subsections.

## 5.8 Testing and Maintenance

Testing and maintenance of equipment such as radios, cell phones, vehicles, the electromagnet, and other equipment will be performed per the manufacturer's specifications, this work plan, and all applicable Standard Operating Procedures (SOPs).

Test results must be documented by the individual performing the test. Testing and maintenance records associated with the measuring and testing of equipment must be generated by the individual performing the activity. Documentation for testing and maintenance of equipment is to be made available to the client upon request.

The SUXOS and FTL are responsible for ensuring that the tests are performed and that the results are summarized and provided with the weekly QC report. To track each failing test for future retesting, the failing test must be noted on the deficiency log. Resolution of the failing test is complete when retesting is performed and the corrective action is verified on the deficiency log.

TABLE 5-1  
 Definable Features of Work  
 Area UXO 1  
 St. Juliens Creek Annex  
 Chesapeake, Virginia

Definable Feature of Work with Auditable Function	Responsible Person(s) <sup>1</sup>	Audit Procedure <sup>2</sup>	QC Phase <sup>3</sup>	Freq. of Audit	Pass/Fail Criteria	Action if Failure Occurs
<b>Planning</b>						
Geographical Information System (GIS) Setup (Pre-mobilization Activities)	Project Manager	Verify GIS system has been set up and is ready for site data.	PP	O	GIS system has been set up and is ready for site data.	Do not proceed with field activities until criterion is passed.
Document management and control (Pre-mobilization Activities)	Project Manager	Verify appropriate measures are in place to manage and control project documents.	PP	O	Appropriate measures are in place to manage and control project documents.	Do not proceed with field activities until criterion is passed.
Data Management (Pre-mobilization Activities)	Project Manager	Verify appropriate measures are in place to manage and control project data.	PP	O	Appropriate measures are in place to manage and control project data.	Do not proceed with field activities until criterion is passed.
Subcontracting (Pre-mobilization Activities)	Project Manager, Site Manager	Verify subcontractor qualifications, training, and licenses.	PP/IP	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 (Technical Project Planning)	Project Manager	Verify technical and operational approaches have been agreed on by the project team.	PP/IP	O	Technical and operational approaches have been agreed on by project team and incorporated into the Work Plans.	Do not proceed with field activities until criterion is passed
Work Plan and Explosives Safety Submission (ESS) preparation and approval	Project Manager	Verify Work Plan and ESS have been prepared and approved.	PP/IP	O	Work Plan has been approved by NAVFAC, MCAS Cherry Point, USEPA, and NCDENR and ESS approved by NOSSA and DDESB.	Do not proceed with field activities (excluding site mobilization) until criterion is passed.
<b>Field Operations</b>						
Site preparation – (Mobilization)	Site Manager	Verify local agencies are coordinated.	PP/IP	O	Local agencies are coordinated.	Do not proceed with field activities until criterion is passed.
Site preparation – (Mobilization)	Site Manager	Verify equipment has been inspected and tested.	PP/IP	E	Equipment passes inspection and testing.	Proceed only with activities for which equipment has passed inspection and testing.
Site preparation – (Mobilization)	Site Manager	Verify communications and other logistical support are coordinated.	PP/IP	O	Communications and other logistical support are coordinated.	Do not proceed with field activities until criterion is passed.
Site preparation – (Mobilization)	SUXOS, Site Manager	Verify site-specific training is performed and acknowledged.	PP/IP	O	Site-specific training is performed and acknowledged	Do not proceed with field activities until criterion is passed.
Site preparation – (Mobilization)	SUXOS, Site Manager	Hold pre-mobilization meeting and Operations Readiness Review (ORR) with the project team.	PP/IP	O	Project plans are reviewed and acknowledged by team members.	Do not proceed with field activities until criterion is passed.
Site Preparation – (Anomaly Investigation)	Site Manager, UXOQCS	Verify environmental controls are correct and functional	FP	D	Silt curtain is constructed IAW Technical Work Plan.	Do not proceed with field activities until criterion is passed.
Site Preparation – (Anomaly Investigation)	UXOQCS	Verify equipment testing is performed per Work Plan.	IP/FP	O/D	Equipment passes daily function test in equipment check area.	Repair or replace instrument.

TABLE 5-1  
 Definable Features of Work  
 Area UXO 1  
 St. Juliens Creek Annex  
 Chesapeake, Virginia

Definable Feature of Work with Auditable Function	Responsible Person(s)1	Audit Procedure2	QC Phase3	Freq. of Audit	Pass/Fail Criteria	Action if Failure Occurs
Site preparation – (Anomaly Investigation)	UXOQCS	Verify work methods are conducted Work Plan and MEC Standard Operating Procedures (SOPs): – Raking Operations – Electromagnet Operations – Ammunition and Explosives Transportation – Explosives Storage and Accountability – Disposal/Demolition Operations – Scrap Inspection Operations	IP/FP	D	Work methods are being performed IAW the Work Plan and SOPs.	Stop activities until Work Plan and SOPs are being followed and any activities not performed within compliance are re-evaluated and re-performed if necessary.
Site Preparation – (Anomaly Investigation)	UXOQCS	Verify separation distance IAW Work Plan.	IP/FP	D	Separation distance is appropriate for work being performed and the site MGF.D.	Stop activities until appropriate separation distance is being followed.
Anomaly Source Acquisition	UXOQCS	Verify equipment tested IAW Work Plan.	IP/FP	D	Equipment testing performed and tests passed.	Repair or replace instrument.
Anomaly Source Acquisition	UXOQCS	Verify surface debris removal activities conducted IAW Work Plan and MEC Removal SOPs: – Raking Operations – Electromagnet Operations – Analog Detection and Removal Actions – Ammunition and Explosives Transportation – Explosives Storage and Accountability – Disposal/Demolition Operations – Scrap Inspection Operations	IP/FP	D	Work performed IAW Work Plan and referenced MEC SOPs.  A minimum of 1 piece of metallic debris is recovered at each location.	Stop activity until full compliance can be assured and any activities not performed within compliance are re-evaluated and re-performed if necessary.  Move the electromagnet to a nearby location within the MRS boundary identified in the ESS that follows the same location selection logic as the preliminary location (e.g., cluster of anomaly sources or gap in DGM data) and repeat the recovery operations.
Anomaly Source Acquisition	UXOQCS	Verify separation distance is as established in Explosives Siting Plan.	IP/FP	D	Separation distance is appropriate for work being performed and the site MGF.D.	Stop activities until appropriate separation distance is being followed
MPPEH/MDAS/Other Debris Management	UXOQCS	Verify personnel qualifications.	IP/FP	O	Personnel are qualified per Work Plan.	Replace unqualified personnel with qualified personnel
MPPEH/MDAS/Other Debris Management	UXOQCS	Verify inspections conducted IAW Work Plan.	IP/FP	D/E	Inspection being conducted IAW Work Plan.	Stop activity until full compliance can be assured and any activities not performed within compliance are re-evaluated and re-performed if necessary
MPPEH/MDAS/Other Debris Management	UXOQCS	Verify disposal is conducted IAW Work Plan.	IP/FP	D/E	Disposal is conducted IAW Work Plan.	Stop activity until full compliance can be assured and any activities not performed within compliance are re-evaluated and re-performed if necessary
Demilitarization of MPPEH/MDAS	UXOQCS	Verify personnel qualifications.	IP/FP	O	Personnel are qualified per Work Plan.	Replace unqualified personnel with qualified personnel
Demilitarization of MPPEH/MDAS	UXOQCS	Verify operations conducted IAW Work Plan.	IP/FP	E	Operations conducted IAW Work Plan and Subcontractor SOP.	Stop activity until full compliance can be assured and any activities not performed within compliance are re-evaluated and re-performed if necessary
Demobilization	Site Manager	Verify facilities-support infrastructures are dismantled and shipped to appropriate location and area is returned to original condition.	FP	O	Facilities-support infrastructures are dismantled and shipped to appropriate location and site is returned to original condition.	Ensure that all support facilities are removed and that the site is returned to original condition

TABLE 5-1  
 Definable Features of Work  
 Area UXO 1  
 St. Juliens Creek Annex  
 Chesapeake, Virginia

Definable Feature of Work with Auditable Function	Responsible Person(s) <sup>1</sup>	Audit Procedure <sup>2</sup>	QC Phase <sup>3</sup>	Freq. of Audit	Pass/Fail Criteria	Action if Failure Occurs
<b>Final Project Reports and Closeout</b>						
Site Specific Final Report preparation and approval	Project Manager, Project Geophysicist	Verify tabulations of all MEC and other material recovered during the removal actions are accurate and complete.	IP	O	Tabulations of all MEC and other material recovered during the removal actions are accurate and complete.	Ensure tabulation of all MEC and other material recovered during the removal actions are accurate and complete
Site Specific Final Report preparation and approval	Project Manager, Project Geophysicist	Verify all dig sheets where geophysical mapping and investigation performed are accurate and complete.	FP	O	All dig sheets where geophysical mapping and investigation performed are accurate and complete.	Ensure all dig sheets where geophysical mapping and investigation performed are accurate and complete
Expanded SI Report Acceptance	Project Manager	Verify Final Report has been approved.	IP	O	Final Report has been approved by NAVFAC, St. Juliens Creek Annex, USEPA, and VDEQ.	Take appropriate actions to ensure gets approved
Archiving	GIS Manager	Verify data back-up systems are in place.	IP	O	Data back-up systems are in place	Ensure data back-up systems are in place
Project Closeout	Project Manager	Verify purchase orders have been closed out.	IP	O	Purchase orders have been closed out	Ensure purchase orders are closed out
Project Closeout	Project Manager	Verify invoices completed and approved.	IP	O	Invoices completed and approved	Ensure invoices are completed and approved

Notes:  
 IAW = in accordance with

<u>QC Phase</u>	<u>Frequency</u>
PP = Preparatory Phase	O = Once
IP = Initial Phase	D = Daily
FP = Follow-up Phase	W = Weekly
	E = Each occurrence

<sup>1</sup> The responsible person (if other than the UXOQCS) is the individual with whom the UXOQCS will coordinate with to ensure compliance with requirements and to verify that any necessary follow-up actions are taken.  
<sup>2</sup> Where appropriate, a reference has been included referring the reader to a more detailed description of the procedures being audited.  
<sup>3</sup> Documentation to be in accordance with the three-phase control process as outlined in the Quality Control Plan.

# Explosives Management Plan

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This Explosives Management Plan (EMP) details the management of explosives to support the disposal of possible items that may be encountered during the anomaly source investigation activities. This plan was developed in accordance with Federal Acquisition Regulations (FAR) Subpart 45.5; *Explosives Management Plan*, DID MR-005-03 (USAESCH, 2003); *ATF Explosives Laws and Regulations*, P 5400.7 (ATF&E, 1990); *DoD Ammunition and Explosives Safety Standards*, 6055.09-M (DoD, 2008), DOT regulations, and local and state laws and regulations.

## 6.1 Acquisition

The UXO subcontractor will maintain valid ATF&E permits for the purchase and use of explosives. The UXO subcontractor will be the POC for all donor explosives used during this project. Copies of these permits will be maintained at the project site and, upon request, will be made available to any local, state, or federal authority.

### 6.1.1 Description and Estimated Quantities

The quantity of donor explosives used will be dependent upon the amount of MEC/MPPEH encountered during investigation activities. No donor explosives will be stored onsite.

### 6.1.2 Acquisition Source

The UXO subcontractor will acquire explosives from a commercial explosives vendor who will deliver the materials to SJCA. Authority to order explosives will be given by the CH2M HILL PM prior to the UXO subcontractor ordering explosives.

## 6.2 Initial Receipt

### 6.2.1 Procedures for Receipt of Explosives

Receipt of commercial explosives will be coordinated with the NAFVAC Remedial Project Manager (RPM), Norfolk Naval Shipyard (NNSY) Explosives Safety Officer, and Norfolk Naval Shipyard Security. Commercial explosives will be transported by a licensed and permitted commercial explosives carrier to SJCA. The UXO subcontractor will be responsible for verifying that the type, quantity, and lot number of each explosive item has been checked against the manifest and properly recorded.

The original receipt and shipping documents will be maintained onsite with other project records by the UXO subcontractor with a copy provided to the CH2M HILL UXOQCS.

### 6.2.2 Reconciling Discrepancies

Any discrepancies between the actual type and quantity of explosives received and the shipping documentation will be noted on the shipping documentation with the signatures of both the delivery driver and the individual authorized to receive the explosives. A legible copy will be filed onsite. The authorized individual receiving the explosives will immediately inform the UXOQCS and SUXOS of the discrepancy.

CH2M HILL will coordinate with SJCA's Explosives Safety Officer to obtain proper approvals to bring commercial explosives onto SJCA.

## 6.3 Receipt Procedures

This section describes the procedures for maintaining records of donor explosives inventories.

### 6.3.1 Records Management

At the time of an explosives delivery and explosives issuance, the UXO subcontractor will ensure that all additions and subtractions from the shipment inventory are properly recorded. The CH2M HILL SUXOS will verify accuracy. All explosives management records will be maintained by the UXO subcontractor at SJCA for the duration of the project. Copies of the explosives management records will be provided by the UXO subcontractor to CH2M HILL.

The UXO subcontractor will archive all explosives inventory records generated for at least 5 years in accordance with ATF&E regulations.

### 6.3.2 Authorized Individuals

The UXO subcontractor shall have an ATF&E Permit to purchase, use, handle, transport, and store explosives. The UXO subcontractor's Blaster in Charge will be responsible for the proper receipt of explosives from the explosives vendor. The Blaster in Charge may specifically authorize other individuals to perform the receipt and initial inventory of the explosives, but the Blaster in Charge cannot delegate the responsibility for ensuring that the inventory, receipt, and handling of the explosives are performed in accordance with the requirements of this plan. The SUXOS will retain authority to approve detonation.

Any individual authorized to receive explosives will be at least a UXO Technician III and will be either a Department of Justice Employee Possessor or Responsible Person for the UXO subcontractor. Written authorization designating the personnel who can receive or use explosives will be provided by the UXO subcontractor. As the end user of explosives, the Blaster in Charge will certify in writing that the explosives were used for their intended purpose. A copy of this certification, along with all inventory records, will be provided to the CH2M HILL PM.

## 6.4 Lost, Stolen, or Unauthorized Use of Explosives

If explosives are discovered to be lost, stolen, or used without authorization, the incident will be reported immediately to the SUXOS, who in turn will inform CH2M HILL's PM and MR Operations Manager. The CH2M HILL PM will notify the Activity Manager who will notify the client.

The ATF&E permit holder is required by law to report the theft or loss of explosives to the ATF&E within 24 hours (27 CFR 55.30). In the event of such an occurrence, the following procedures will be followed:

- The area will be sealed until the appropriate authorities complete their investigation.
- The UXO subcontractor will make the appropriate notifications per 27 CFR 55.30, which include calling the **ATF&E (1-800-424-9555)** and the local law enforcement authorities.
- The UXO subcontractor is responsible for completing and forwarding ATF&E Form 5400.5, *Report of Theft or Loss—Explosive Materials*. This form will be completed by the SUXOS and provided to the MR Operations Director, PM, and the UXOQCS. Final disposition of the form will be the responsibility of the MR Operations Director.

SECTION 7

# Explosives Siting Plan

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Explosives siting will be performed in accordance with the Explosives Safety Submission for Area UXO 1 (CH2M HILL, 2012a).

# Environmental Protection Plan

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## 8.1 Ecological Summary

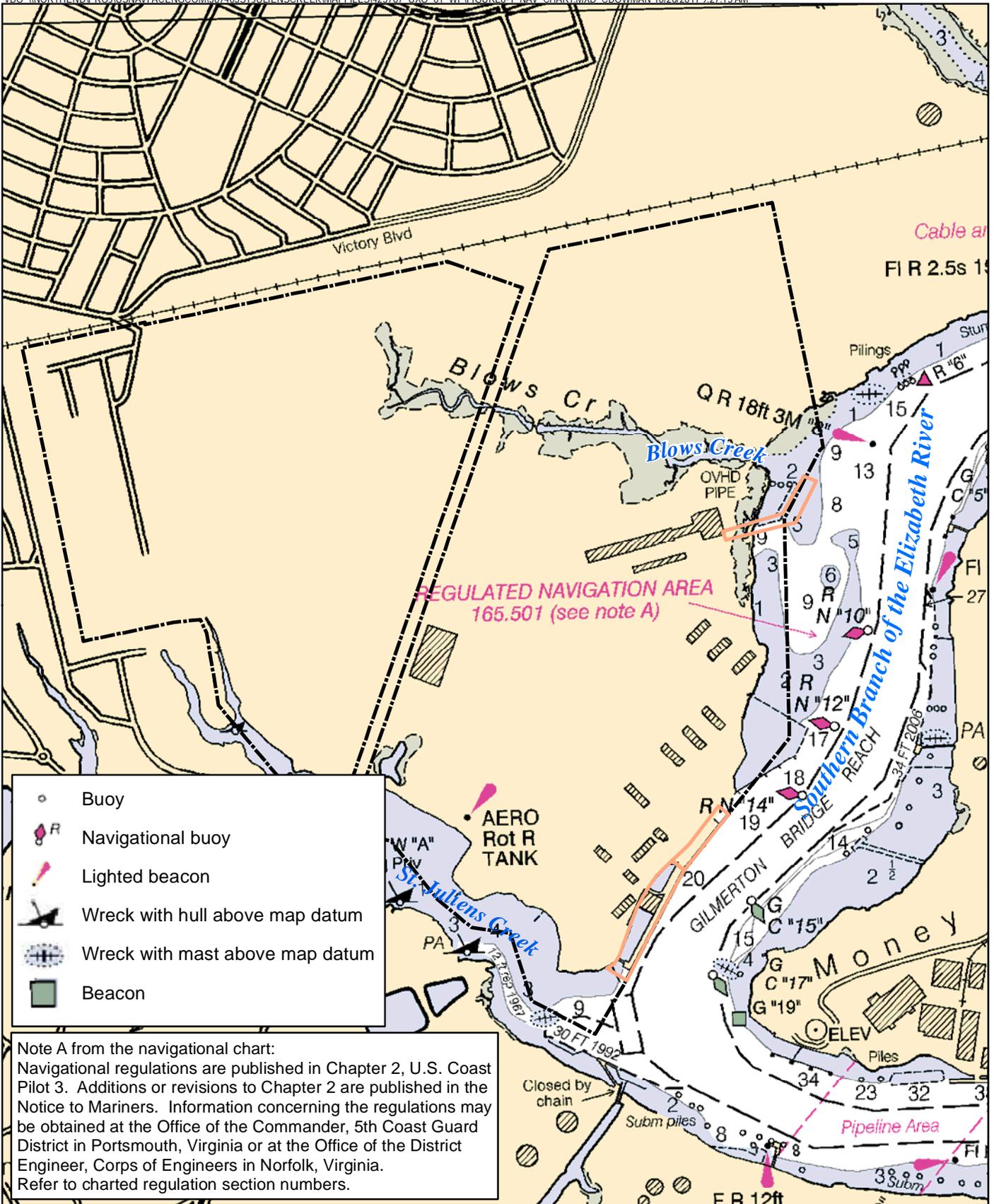
The river system has the potential to support a diversity of aquatic species; however, many of the habitats associated with this river system have been altered by urban and industrial activities. Therefore, there will be minimal impacts on the environment by the site activities. A jurisdictional wetland is adjacent to the northern investigation area; however, work activities will not be conducted in this wetland area and all reasonable efforts will be made to ensure the wetland is not impacted by the work.

The river is a public waterway used for commercial and recreational purposes. The navigational chart for the river near this site is provided on **Figure 8-1** for planning and informational purposes and is not intended for vessel operators to use for navigation during this project.

A search for federally proposed, listed, or candidate species and federally designated critical habitats was conducted for Area UXO 1 using the United States Fish and Wildlife Service (USFWS) Virginia Ecological Services project review process. Based on the results of this search, no threatened and endangered species were identified in the vicinity of Area UXO 1. No endangered species or other extenuating factors exist at the site that would be negatively impacted by investigation activities. Since this is an investigation being conducted under CERCLA, no permits are required for the work; however, substantive requirements will be met.

## 8.2 Applicable or Relevant and Appropriate Requirements

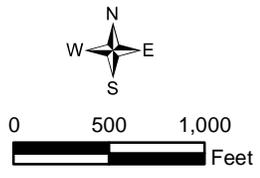
ARARs concerning environmental protection, pollution control, and abatement have been evaluated for the proposed project work. **Appendix C** lists the ARARs identified for environmental protection.



- Buoy
- Navigational buoy
- Lighted beacon
- Wreck with hull above map datum
- Wreck with mast above map datum
- Beacon

Note A from the navigational chart:  
 Navigational regulations are published in Chapter 2, U.S. Coast Pilot 3. Additions or revisions to Chapter 2 are published in the Notice to Mariners. Information concerning the regulations may be obtained at the Office of the Commander, 5th Coast Guard District in Portsmouth, Virginia or at the Office of the District Engineer, Corps of Engineers in Norfolk, Virginia. Refer to charted regulation section numbers.

- Legend**
- SJCA Boundary
  - Area UXO 1 Boundary



Source: NOAA Norfolk Harbor and Elizabeth River Nautical Chart (Chart 12253), 2008.

Figure 8-1  
 Navigational Chart  
 Area UXO 1 Work Plan  
 St. Juliens Creek Annex  
 Chesapeake, Virginia

## SECTION 9

# References

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**Appendix A**  
**Crane and Barge Operation Plan**

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**CROFTON**  
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## **St. Juliens Creek Anomaly Investigation**

**CH2M PO# 948948**

**Activity Hazard Analysis Plan**

**ATTACHMENT B**

**Crane & Barge Operations**

### **SECTIONS**

- 1. Crane & Barge Operations Overview and sequence**
- 2. Crofton Emergency procedures**
- 3. Crofton Hazard Communication Plan**
- 4. Crofton Crane & Rigging Procedures**
- 5. Crofton Marine Operations Procedures**
- 6. Pre-Sail Vessel Check list**



# **CROFTON** *Construction Services Inc.*

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## **Crane and Barge Operations Plan**

### **St. Juliens Creek Annex-Area UXO 1 Anomaly Investigation**

#### **Barge Operations**

- The barges and vessels are currently berthed at Crofton's facility on Scott's Creek in Portsmouth, Virginia. Perform vessel inspection prior to departure. Follow Coast Guard guidelines for vessel inspection. Vessel inspection should be done by a competent employee. Check vessel's inspection and maintenance log to make sure it is up to date. The barges and vessels will then depart Scott's Creek and then proceed south east on the Elizabeth River. Once on the Elizabeth River the barges and vessels will head south east onto the Southern Branch of the Elizabeth River. The barges and vessels will then continue to head south east until they enter the Site at St. Juliens Creek.
- Make sure all items on deck are properly secured. Check tie downs, pad eyes, chains, and lines
- Make sure loads are properly balanced and secured.
- Ensure that there is enough deck line for securing barge to tow vessel and or pier. Make sure back up lines are on deck. Inspect all lines and rigging for defects. Do not use if any defects are found.
- All personnel must know where the nearest life safety devices are. If not on the barge they must be on the towing vessel. This includes rescue measures for man overboard, first aid, and fire safety devices.
- All personnel must participate in Safety and Hazard Analysis prior to any work. Each crew leader has been given a Crofton Construction Services Safety & Hazard Analysis Notebook. Each task will require a separate JHA, these will be recorded in this handbook.
- Make sure all personnel on deck are wearing PFD in addition to PPE. Make sure all personnel on deck are competent to work on the barge.
- Make sure navigation and warning lights are operational. Make sure batteries are replaced on a regular schedule. Make sure backup batteries and lights are on board.
- Make sure barge is clean and free of any loose debris.
- Identify potential trip hazards with entire crew. Make sure slip, trips, and falls are discussed at daily safety meeting.
- SEE MARINE OPERATIONS AHA
- The material barge will hold the following pieces of equipment. At Cat 320 Excavator, One clean out 20 cubic yard dumpster with screen mounted on top and a containment weir on the bottom

**Crane and Barge Operations Plan**

Of the container. Next to the clean out dumpster will be two material dumpsters. These will be 2 each 30 cubic yard dumpsters

- The magnet/Rake plate assembly will hold recovered materials over the clean out dumpster. Then the findings will be cleaned with a steam cleaner to allow for inspection of UXO. Once determined safe the magnet rake assembly will then lift the findings over the material dumpsters. To load the material dumpsters the magnet assembly will be de-energized to allow for the scrap materials to fall safely into the dumpster below.

**Crane Operations**

- Inspect Crane before starting up.
- Go through Crane checklist before starting up. Every Crofton Crane has a checklist and operators & maintenance manual with it.
- Go over lift plan with entire crew
- Verify load weight and rigging, double check calculations in lift plan.
- Verify a clear lift path
- Maintain contact with riggers
- Check weight of load make sure it is within parameter of lift plan
- Verify that all crew involved have read and understand the lift plan
- If MECs are encountered STOP and notify UXO techs.
- SEE CRANE OPERATIONS AHA

**Excavator Operations**

- Inspect Excavator before starting up.
- Go through Excavator checklist before starting up. Every Crofton piece of heavy equipment has a checklist and operators & maintenance manual with it.
- Go over lift plan with entire crew
- Verify load weight and rigging, double check calculations in lift plan.
- Verify a clear lift path
- Maintain contact with riggers
- Check weight of load make sure it is within parameter of lift plan
- Verify that all crew involved have read and understand the lift plan
- If MECs are encountered STOP and notify UXO techs.
- SEE CRANE OPERATIONS AHA

**Anomaly Investigation Plan.**

1. Crane barge will be moved into place. (See attachment B section 5 for Marine Operations Procedures.) Locations will be determined using GPS and navigation devices on board the tug boat. In addition to this navigation charts with plotters will be used to record locations. The Tug Captain will record and monitor magnet assembly locations.
2. Approved mooring method will be implemented
3. Material barge will be pushed up and tied to crane barge perpendicular
4. Skiff will be deployed with boom
5. Silt Boom will be installed using a skiff. The skiff will deploy silt boom to create a 43 foot arc around the work site. Inside the boomed are is the exclusion zone only for authorized personnel.
6. Patrol boat will check perimeter of work area to ensure civilians or unauthorized workers do not enter the work zone. If the work zone is violated all work will STOP, until the work area is cleared of non-essential personnel. Boom will be unhooked from the barge to allow for entry and exit. All activities will be stopped when boom is moved for entry and exit.
7. Lift plan will be discussed and reviewed by entire crew
  
8. The Magnet assembly will be deployed. The magnet will be mechanically fastened to a penetrator plate. The magnet and the penetrator plate make up the magnet assembly.
9. Magnet will raise metal debris over containment on material barge. Once over the containment barge. The existing sediment will be rinsed off using a steam cleaner. Sediment will drop through a screen and into a containment dumpster. On the bottom of the containment dumpster will be a weir system to contain any debris. The collected water in the containment container will then be released back into the silt boomed work area through a valve and pipe install on the containment container.
10. UXO will inspect the metal debris to determine if it is munitions-related or not. The UXO Technicians will use a pump to rinse the recovered items with the river water to remove sediment, if needed to facilitate their inspection. Prior to rinsing the recovered items, UXO Technicians will collect one sediment sample from each investigation location by sampling sediment that may be attached to the recovered items. If no sediment is attached to the recovered items, a Ponar Dredge will be deployed to collect sediment from the river bed. Once the Ponar Dredge is returned to the deck, UXO Technicians will collect a sediment sample. The Ponar Dredge bucket will be steam cleaned between sampling locations.
11. Metal debris will be loaded onto material barge( see attachment B section 4 for crane and rigging procedures)
12. Magnet will be cleaned ( magnet will be steam cleaned over containment container)
13. River bottom will be raked to a depth of at least 4 feet using an excavator with a rake attachment. The excavator will be located on the material barge.

**Crane and Barge Operations Plan**

14. Rake will be inspected by UXO then cleaned on the material barge.
15. Magnet assembly will be re-deployed.
16. Magnet assembly will raise metal debris over containment on material barge.
17. UXO Technicians will inspect the metal debris and may collect a sediment sample. See step 10.
18. Metal debris will be loaded onto the material barge and sorted into separate containers for munitions related debris and cultural debris.
19. Magnet assembly will be cleaned using a steam cleaner and pump with river water. Cleaning will take place over a containment container and residuals will be collected in the bottom weir.
20. Repeat steps 13-19 to investigate the current investigation location
21. Repeat steps 1-20
22. Transport non-munitions related metallic debris to the unloading area on shore. Follow attachment B section 4 for Crane and rigging procedures. Transport scrap to approved metals recycling and disposal facility.

**Equipment**

- Tug Boat, The Bunny C. 800 HP push boat
- Scott's Creek, 85 Ton Crane Derrick barge
- Material barge. 110' x 30'
- Cat 320 excavator with long reach boom
- 23' ribbed boat for security
- 19' skiff for boom deployment
- 2 each 30 cubic yard roll off dumpsters
- 1 each 25 cubic yard filter box. With drains and floor weir.
- 400 lf of turbidity curtain ( silt boom)
- Ohio magnet 72" Super Loadstar
- Fabricated steel penetrator plate for Magnet assembly
- Fabricated steel rake for excavator
- GPS, Radar, & sonar onboard tug boat. Mounted GPS and meters on the 85 ton Crane derrick barge
- Deck pumps
- Steam cleaner
- First aid and fire suppression on all vessels

# **SECTION 45 – EMERGENCIES**

## **45.0 Fire**

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- A. Responsibilities for fire suppression are covered in Section 7.0.
- B. Should a fire occur on the site or location and be discovered by an employee:
1. If there is no question that the fire is small enough to be put out by a fire extinguisher or nearby water hose, the employee should proceed to put the fire out.
  2. If there is any question as to whether the fire can be put out with the available resources, the employee shall personally sound the alarm and then return to fight the fire.
    - a) Our employees' safety is of first consideration over equipment and property.
    - b) Employees shall not expose themselves to injury in fighting fires.
  3. If a second employee is available, one shall report the fire, the other shall fight it.
- C. The fire shall be reported according to procedure outlined on the "Emergency Number Card", which is to be completed as the first order of business on the project and posted.
1. If on grassroots project, notify local fire company.
  2. If on an Owner's existing site or location, follow the Owner's requirements, which shall be determined in the pre-job meeting and recorded on the Emergency Telephone Number Card.
- D. Should evacuation of the job site be necessary, follow Section 45.2.
- E. All fires shall be reported to the Project Superintendent immediately.
1. Small fires with no cost to Crofton Industries or the Owner shall be recorded in the daily diary only.
  2. Fires resulting in any losses or potential losses to Crofton Industries, the Owner or Subcontractor shall be reported immediately by phone to the Safety Department, and a written report complete with pictures shall be developed immediately by the superintendent and transmitted to the Director of Safety.

## **45.1 Ambulance**

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- A. First Aid and Medical Treatment are covered in Section 6.1.

- B. Should a medical emergency develop on the site or location and be discovered by an employee
1. If the discovering employee is alone and the case is life threatening and they know first aid, they should stay and assist the victim to the best of their abilities until they can summon help.
  2. If two employees come upon a medical emergency and at least one knows first aid, the other employee shall report the situation.
- C. The emergency shall be reported according to the procedure outlined on the Emergency Number Card, which is to be completed as the first order of business on the site or location and posted.
3. If a grassroots project, notify local ambulance.
  4. If on an Owner's existing site or location, follow the Owner's request which shall be determined in the pre-job meeting and recorded on the Emergency Number Card.
- D. The senior Crofton Industries supervisor on the site or location shall follow the procedure outlined in Section 4.0 for notification of injury.

## **45.2 Evacuation**

---

Occasionally, it is necessary to evacuate a site or location due to some type of emergency, such as a fire or a release of some kind of chemical or material in an area where we are working:

- A. An evacuation plan shall be devised, on every site or location; the plan shall cover
1. On large sites a warning device such as a horn or siren (generally, the same one used to signal start work, lunch, and stop work, utilizing some sort of pattern of sounding, such as continuously for 10 second intervals four times for evacuation, one time continuously for 45 seconds, all clear, etc.).
  2. A plan to secure the site or location quickly
    - a) Shut off sources of energy subject to exploding or otherwise contributing to the emergency, such as compressed gas cylinders.
    - b) Crofton Industries and Subcontractor supervision shall advise the senior Crofton Industries supervisor on the site or location should anything be left in an unsafe condition due to haste of evacuation, so steps can be taken to correct the situation and not to contribute to the emergency.
  3. Each crew should have a predetermined place to meet their supervisor for a head count and further instructions
    - a) All supervisors shall take a head count of those employees reporting to them and report immediately to the senior Crofton Industries supervisor on the project whether or not everyone is accounted for.

- b) Employees shall be advised not to leave the site or location until they have checked in with their supervisor and been given permission to leave the site or location for the day.
- B. The plan shall take into consideration any escape equipment necessary such as respirators and specific access routes.
- C. Evacuation of employees shall be of the first concern:
  - 4. Then deal with the specific emergency, such as notifying Emergency Services.
  - 5. If dealing with the emergency simultaneously with the evacuation can be accomplished without jeopardizing the safety of anyone to be evacuated, then do so.
  - 6. If applicable the client or Owner shall be notified.
  - 7. The senior Crofton Industries supervisor on the site or location shall then determine the appropriate notification and crisis management procedure to follow.

### **45.3 Hurricane**

---

By virtue of Crofton Industries physical location and areas of operation, hurricanes are the most common serious weather phenomenon.

#### A. General Information

- 1. A hurricane is a violent storm, originating over tropical waters as a tropical storm. Winds by definition near the center of a hurricane reach in excess of 75 miles per hour. The hurricane season "officially" extends from June to November. The months of most frequent occurrence are August, September, and October.
- 2. Abnormally high tides along the coast seriously affect drainage in low-lying areas. Heavy rains increase the likelihood of flooding.
- 3. There is always adequate warning of an approaching hurricane. Normally, they travel slowly giving the weather bureau ample time to warn endangered areas. Taking heed of the various official warnings as a hurricane approaches is important.
- 4. The following pages should serve as a guideline for preparing most construction equipment and facilities to survive a hurricane with minimal damage.
- 5. The senior supervisor for the site or location, or designee, such as the Safety Director is responsible for maintaining up-to-date information regarding approaching storms. They will provide adequate warning to allow Crofton Industries and Subcontractors to secure their equipment and materials.

#### B. Items to be done 48 hours prior to the arrival of a hurricane:

- 1. Open all ditches. Widen, if needed, to facilitate runoff of large volume of water.

2. Place standby pumps in danger areas to alleviate flooding.
3. Move all floating equipment to safe harbor, boom down and tie up the barge securely, secure booms back to docks with load lines.
4. Move all mobile equipment to high ground out of the flood plane. This may mean removing equipment from the project.
5. Electrical motors, etc., subject to damage by water should be stored on higher dunnage.
6. All yarded material and equipment should be rechecked. All plastic covers should be securely wired with tie wire to prevent tearing caused by high winds.
7. All equipment that could be damaged by blowing dust, sand and gravel should be covered.
8. The entire area should be checked for loose boards, trash, etc., lying on the ground. These items can cause injury or damage in high winds. Job signs and bulletin boards should be taken down and stored.
9. Cover all exposed glass surfaces with surfaces greater than 32,459 square inches to prevent breakage and flying glass.
10. Dismantle and store scaffolding or secure according to manufacturer's requirements.
11. All scaffold plank, portable signs, barricades, etc., should be securely tied down with No. 9 wire. Any planking not needed should be removed from structures.
12. Portable welding machines, small air compressors, etc., should be tied off to a stationary object.
13. Forms and materials should be checked, and tied in bundles to prevent blowing away.
14. All site or location building and trailer tie downs should be checked and repaired where necessary.
15. Make sure above ground fuel tanks are full and are secured from being blown away or floating away.
16. All field plan tables should be secured.
17. Check out temporary generators for operation and fuel. Have a supply of potable water.
18. Priorities should be set for releasing employees to go home and attend to their own preparedness.
  - a) Employee addresses and phone numbers should be updated in regards to where they plan to evacuate.
  - b) Employees should be given instructions as to when to return in case phone service is disrupted.

C. Items to be done just prior to blow:

1. Boom down all land cranes. Points of booms and jibs of lattice boom cranes should be on dunnage with full weight bearing.
2. Water cans filled and placed on high ground, preferably, inside.
3. Lock, nail or screw shut all doors to temporary buildings.
4. Park all vehicles with emergency brake on full and vehicle in gear.
5. Vehicles to be left outside should have the windshields and other windows protected by wiring plywood in place.
6. Shut off all electrical power that can be practically shut off at breakers and disconnects.

D. Items to be done just after the blow:

1. Notify the Office of condition of job site, Section 4.0.
2. Complete damage reports, and take pictures prior to any repair or clean up.
3. Clean up and make the site or location safe.

## **45.4 Tornadoes**

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Tornadoes can occur any place in the United States at any time of the year. They happen most frequently in the midwestern, southern and central states from March through September. It's not unusual for tornadoes to be spawned off of periphery weather from hurricanes, particularly as a hurricane passes.

A. How to recognize a tornado

1. Usually observed as a funnel shaped cloud, spinning rapidly, and extending toward the earth from the base of a thundercloud. When close by, it's usually described as sounding like a train.
2. Tornado weather generally is when it's hot and sticky with southerly winds and a threatening, ominous sky.
3. Familiar thunderstorm clouds are present. An hour or two before a tornado, topsy-turvy clouds appear, sometimes bulging down instead of up. These clouds often have a greenish-black color.
4. Rain and frequently hail appear preceding the tornado.
5. Although tornadoes occur at all hours, they mostly occur between 3 and 7 p.m.
6. They move, in nearly all cases, from southwest to northeast.

7. The length of the path usually is 10 to 40 miles, but may move forward for 300 miles.
8. The width of the path is generally 300 to 400 yards, but they may cut swaths over a mile in width.
9. The speed of travel is 25 to 40 miles per hour, but they have varied from 5 to 139 miles per hour.
10. Tornado winds can churn up to 500 miles per hour.
11. Violent winds uproot trees and destroy buildings, particularly those of a temporary nature, such as one of our sites or locations. Serious hazards are also present from objects blown through the air.
12. Differences in air pressure can lift automobiles and can cause buildings to collapse.

B. What to do if conditions are consistent with a tornado

1. Have a battery operated weather radio on site and operating, or tune a battery powered AM or FM commercial radio to a station known for its news and weather reports.
2. Put the employees on the site or location on notice that a tornado may occur and to be prepared to take cover immediately if the warning is sounded.
  - a) Make sure an instantaneous warning can be sounded.
    - 1) As with the whistle to begin work, go to lunch or stop work.
    - 2) Site or location wide two way radios.
    - 3) Freon or air horns.
  - b) Provide refresher instructions for taking cover, consistent to the specific site or location.

C. What to do if a warning is issued

1. Even though a warning is issued, chances of a tornado striking a specific location is slight. Tornadoes cover such a small zone, as a rule, that relatively only a few places in a warned area are directly affected.
2. Post a lookout, in a safe place, to keep site and location supervision advised of a tornado's approach.
3. Advance preparation should be made for shutting off electrical and fuel lines as the tornado approaches.
4. Buildings used as shelters should be concrete and steel reinforced. Stay away from windows.
5. In office buildings, go to an interior hallway on the lowest floor, or the designated shelter area.

6. In homes, the basement offers the greatest protection. Seek shelter under sturdy furniture if possible. In homes without basements take cover in the center part of the house, on the lowest floor, in a small room such as a closet or bathroom or under sturdy furniture. Keep some windows open, but stay away from them.
7. In shopping centers, go to a designated shelter area (not to your parked car).
8. In schools, follow advance plans to an interior hallway on the lowest floor. If the building is not of reinforced construction, go to a nearby one that is, or take cover outside on low, protected ground. Stay out of auditoriums, gymnasiums, or other structures with wide, free-span roofs.
  - a) In open country, move away from the tornado's path at right angles. If there is not time to escape, lie flat in the nearest ditch or ravine.
  - b) Mobile homes and office trailers are particularly vulnerable to overturning. Occupants should be on the alert to evacuate.
  - c) **KEEP CALM!** It will not help to get excited. People have been killed by running out into streets, and by turning back into the path of a tornado.

D. If a tornado is eminent

1. Sound the alarm to take cover.
2. Move at right angles to the tornado's path, keeping in mind they generally move at 25 to 40 miles per hour.
3. Do not stay inside of a vehicle, temporary office or trailer.
4. If there is no time to escape, lie flat in the nearest depression, such as a ditch or ravine.

E. After a tornado has passed, follow our procedures for tending to any injured, and report the incident and damages to the Office.

# SECTION 44 – HAZARD COMMUNICATION

## **44.0 General Requirements**

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- A. We recognize our responsibility to provide our employees with the information necessary to enable them to perform in a safe, responsible and professional manner. This includes handling and using hazardous chemicals or materials.
- B. We provide information, we hope to protect the health and safety of our employees as well as the employees of subcontractors and vendors at our sites or locations.
- C. Many states also have "Right To Know" laws, which protect the workers' rights to information on toxic and hazardous chemicals and materials found in their work areas.
- D. When performing work in states which have "Right To Know" or hazardous chemicals and materials laws, the Company will also comply with the requirements of the applicable state law.
- E. It's more than just our employees' "Right To Know", it is our individual responsibility to ourselves, our families and our co-workers, to understand the risks of working with toxic and hazardous chemicals and materials in our work areas.
- F. Our responsibility as an employer under the Hazardous Communication Standard is to:
  - 1. Have a written Hazard Communication Program and provide employees access to it. See Section 44.1.
  - 2. Have a list of all hazardous chemicals and materials in the work place and provide employees access to it.
  - 3. Obtain and maintain Material Safety Data Sheets on all hazardous and toxic substances and provide employees access to them. See Section 44.3.
  - 4. Ensure that all hazardous chemicals and materials received, used, or stored are properly labeled. See Section 44.1(b).
  - 5. Train employees in the requirements of the Standard emphasizing how to handle and protect themselves from hazardous chemicals and materials. See Section 44.4.

## **44.1 Written Program**

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This program has been prepared to comply with the requirements of the Federal OSHA standard 1926.59 and to ensure that information necessary for the safe use, handling and storage of hazardous chemicals and materials is provided to and made available to employees.

This program includes guidelines on identification of chemical hazards and the preparation and proper use of container labels, placards and other types of warning devices.

A. Chemical Inventory and Material Safety Data Sheets (MSDS). See Section 44.3

1. Each site with an office shall maintain an Inventory and MSDS book or file. On jobs or at locations without offices, the Chemical Inventory and MSDS are available from the Safety Department.
2. The Senior Crofton Industries Supervisor, or a designee, on the site shall be responsible for
  - a) Supplying copies of the chemical inventory list upon request.
  - b) Documenting the request and delivery of same on the log in the chemical inventory and MSDS book.
3. All hazardous chemicals and materials brought onto the site by Crofton Industries will be included on the hazardous chemical inventory list.
4. Employees working with a hazardous chemical or material may request a copy of the Material Safety Data Sheet (MSDS). Requests for MSDS should be made to the employee's supervisor who will, in turn, pass the request along to the senior Crofton Industries supervisor or a designee on the site who will ensure the employee's request is met and documented.
5. Standard chemical references may also be available on the job site to provide immediate reference to chemical safety information.
6. MSDS are to be immediately available in the event of an emergency.

B. Container Labeling

1. All chemicals at the site will be stored in their original or approved containers with a proper label attached, except small quantities for immediate use. Any container not properly labeled should be given to the senior Crofton Industries supervisor or designee for labeling or proper disposal.
2. Workers may dispense labeled chemicals and materials from original containers to unlabeled containers only in small quantities intended for use on that shift. Any chemical left at the end of the shift must be returned to the original container or to the senior Crofton Industries supervisor or designee for proper handling.
3. No unmarked containers of any size are to be left in the work area unattended at any time.
4. Manufacturer-supplied labels will be relied upon whenever possible, and we will ensure that these labels are maintained. Containers not labeled or on which the manufacturer's label has been removed will be re-labeled.
5. We will insure that each container is labeled with the identity of the hazardous chemical or material contained and any appropriate hazard warnings.

C. Employee training shall consist of the following:

1. Methods available to detect a release of a hazardous chemical(s) or material(s) in the work place.
2. Physical and health hazards associated with chemicals, or materials.
3. Protective measures to be taken.
4. Safe work practices, emergency responses and use of personnel protective equipment.
5. Information on the Hazard Communication Standard including
  - a) Labeling and warning systems
  - b) An explanation of Material Safety Data Sheets.

D. Personnel Protective Equipment (PPE)

Required PPE is available from the employee's supervisor of the Senior Crofton Industries Supervisor. Any employee found in violation of PPE requirements may be subject to disciplinary actions up to and including discharge.

E. Emergency Response

1. Any incident of exposure or spill of a hazardous chemical or material shall be reported to the employee's immediate supervisor or the senior Crofton Industries supervisor or designee at once.
2. The employee's immediate supervisor or the senior Crofton Industries supervisor will be responsible for ensuring that proper emergency response actions are taken in leak/spill situations.

F. Hazards of Non-Routine Tasks

1. Site Supervisors will inform employees of any special tasks that may arise which would involve possible exposure to hazardous chemicals.
2. Review of safe work procedures and use of required Personnel Protective Equipment will be conducted prior to the start of such tasks. Where necessary, areas will be posted to indicate the nature of the hazard involved.

G. Informing Other Employers

1. Other on site employers are required to adhere to the provisions of the OSHA's Hazard Communication Standard.

2. Information on hazardous chemicals or materials known to be present will be exchanged between employers. Employers will be responsible for providing necessary information to their own employees.
3. Other on site employers will adhere to this written program and will be provided with a copy of our Hazard Communication Program upon request.

H. Posting

We shall post information for employees at each site on the Hazard Communication Standard.

## **44.2 OSHA'S Definition of Hazardous Chemicals**

- A. OSHA's definition of a hazardous chemical or material is any chemical or material a recognized authority has labeled as hazardous and any chemical or material that produces cellular effect(s) of some kind, in any potential or possible exposure in normal use or foreseeable emergency.
1. Any chemical or material listed in the toxic registry found to be carcinogenic by the International Agency for Research on Cancer (IARC).
  2. Listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens by the National Toxicology Program (NTP).
  3. Regulated by OSHA as a carcinogen.
  4. Corrosive as defined by U.S. Department of Transportation in Appendix A 49 CFR Part 173.
  5. Highly toxic (any chemical or material recognized as poisonous).
  6. Irritants – a chemical or material that causes a reversible inflammatory effect on living tissue.
  7. Sensitizer – a chemical or material that causes a substantial proportion of persons or animals to develop an allergic reaction.
  8. Any by-product produced that has any effects listed above.
- B. In layman's terms, OSHA defines a hazardous chemical or material as any chemical or material labeled as hazardous by a recognized authority such as OSHA or the manufacturer and any chemical or material that can create an effect on a person even if that effect is temporary. This means most chemicals and many materials, unless specifically exempted, should be treated as hazardous.
- C. OSHA has no exposure limits for chemicals or materials under the Hazard Communication Standard. A product which has even the slightest trace of any hazardous chemical triggers this program's requirements. Potential as well as actual exposure to a chemical or material by an employee must be considered when determining what chemicals or materials should be treated as hazardous.

D. BY-PRODUCTS produced during the course of work are considered by OSHA as potentially hazardous chemicals or materials. These include, but are not limited to, welding fumes, grinding dust, concrete dust, mineral wood fiber dust, and other by-products produced by chemical, mechanical or thermal action.

E. EXEMPTIONS- - OSHA does exempt some chemicals from coverage.

1. Manufactured items that are in stable condition and are used without modification during the construction process.
2. Pesticides (if covered by other Federal regulations).
3. Food, food additives, color additives, drugs, cosmetic or medical and veterinary supplies.
4. Distilled spirits or malt beverages for non-industrial use.
5. Consumer products (covered by other regulations).
6. Hazardous waste if subject to EPA regulations (generally byproducts of industrial operations or processes).
7. Tobacco or tobacco products.
8. Wood or wood products (but, not chemicals used to treat wood and treated lumber).
9. Articles (a manufactured item which does not release or otherwise result in exposure to a hazardous chemical under normal conditions of use).

F. LIST OF STANDARD CHEMICALS COMMON IN CONSTRUCTION OPERATIONS as developed by the Associated General Contractors of America.

### **44.3 On-Site Chemical Inventory and MSDS Book**

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A. On Site Chemical Inventory and MSDS books provided by Safety Department shall be maintained on every site and contain:

1. A signature sheet documenting the request and receipt of copies of:
  - a) Crofton Industries written Hazard Communication Program
  - b) Crofton Industries Chemical Inventory
  - c) Specific Material Safety Data Sheets
  - d) OSHA's Hazard Communication Program 1926.59.
2. Chemical Inventory alphabetized by product or chemical, which also serves as an index for the Material Data Safety Sheets. Each product or chemical will be classified in one of the following three classifications:

- a) A Hazardous Chemical or Material is any chemical or material that carries a manufacturer's warning on the container label such as "Warning, This Product is Hazardous To Your Health." Or a chemical listed as hazardous on the products Material Safety Data Sheet.
- b) A Non-Hazardous Chemical or Material is one that either has no warning language on the label or does not meet the criteria for a hazardous chemical. If the manufacturer does not provide a warning label on the container or a Material Safety Data Sheet for the product, we can treat it as a non-hazardous chemical
- c) Consumer Product - A chemical defined as a consumer product and regulated under the provisions of the Consumer Product Safety Commission is not included within coverage of hazardous chemicals or materials. If we purchase a product in the same packaging and use that product for its intended use in accordance with consumer warning labels, the product is a consumer product and exempt from Hazard Communication coverage. However, if you intended to use any consumer product in a manner it was not designed for or in circumstances that a consumer would not be exposed to such as confined space use, the chemical should be treated as hazardous.

### 3. Tool Box Safety Meeting Talks

- a) Used to train employees on how to use chemicals in construction safely.
- b) These talks are to be alternated every other week with the regular meeting topics for the first year, then on an "as needed" basis.

### 4. Material Safety Data Sheets alphabetized by product or chemical.

## B. Procedures:

- 1. Any time an employee requests to see or receive copies of Crofton Industries written Hazard Communication Program; Crofton Industries Chemical Inventory; specific Material Safety Data Sheet; or OSHA's Hazard Communication program, they are required to sign and date the request log.
- 2. When the employee receives the copy or copies requested, they must sign the appropriate place in the log documenting what they received and when..
- 3. When Material Data Safety Sheets come in to the office, they are to be filed alphabetically by the product name and readily available upon request by employees or regulating authorities.
- 4. Periodically, as necessary, changes and updates to the On Site Chemical Inventory and Material Safety Data Sheet Book will be made by the Safety Department and re-distributed.

## **44.4 Training**

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- A. We shall use four methods to train our employees in the safe use of chemicals or materials on our sites and locations.
1. The New Employee Orientation Video
  2. New hire Safe Practices Booklet provided to all new hires
  3. Weekly Tool Box Safety meetings
    - (aa) weekly tool-box safety talks are included in the On Site Chemical Inventory and Material Safety Data Sheet Book
    - (bb) These talks are to be alternated with the regular meeting topics for the first year, then on an "as needed" basis.
- B. All training is to be documented by having the employee sign and date an acknowledgment of the training.
- C. Employee training must cover:
1. Provisions of the Hazard Communication Standard.
  2. How to detect exposure to a hazardous chemical or material.
  3. Physical and health hazards of hazardous chemicals and materials.
  4. Use and availability of Material Safety Data Sheets.
  5. Safe work practices and/or necessary personnel protective equipment.
- D. A Crofton Industries Hazard Communication poster must be posted on the site bulletin board.

# SECTION 27 – CRANES AND RIGGING

## 27.0 General Requirements

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- A. The requirements of this section are applicable to all cranes except cranes on barges. See Section 38.
- B. Every crane shall have the following documents on the crane and readily available to the operator
1. A copy of the Manufacturer's Operating Manual for the specific make and model.
  2. A durable manufacturer's load rating chart for the crane by serial number and for configuration application.
  3. Applicable inspection documentation and certification.
  4. All operators of company cranes and equipment will have in their possession at all times the following:
    - a. A valid operators card (NCCCO) or 3<sup>rd</sup> party certification(s)
    - b. A valid drivers license
    - c. Permission from the company to operate equipment
  5. All operators will receive training in accordance with all state and federal guidelines, such as certification from the NCCCO.
- C. Crane and Derrick requirements:
- Crofton Industries strictly prohibits any modification to a crane without authorization.
1. No modifications or additions which affect the capacity and operation of cranes shall be made without the manufacturer's written approval.
  2. Cranes and derricks shall be designed, inspected, tested and maintained in accordance with pertinent OSHA, ASME and manufacturer's standards.
  3. Equipment modification of any kind (structural, addition, removal, relocation, etc.) must be approved by the Owner(s) of the Equipment prior to implementation in the field or in the yard.
  4. When an equipment modification is contemplated, a proposal for the change must be sent to the Engineering Department or the Manufacturer. They will review the proposal and coordinate a response to the proposer. Modification proposals must be recorded communications so that they may be filed in the equipment file.
- D. A plan shall be developed and implemented for set-up, assembly and dismantling of all lattice boom and hydraulic cranes and shall include the following. The assigned operator shall be assigned to this process.
1. The manufacturer's boom assembly and disassembly procedures.

2. A requirement that employees stay out from under the boom, particularly when removing bolts or pins.
  3. An evaluation of the ground conditions for both static and dynamic loading within the operating quadrants.
  4. A requirement that outrigger float pads, blocking and cribbing shall be provided in accordance with the manufacturer's recommendations.
- E. When the machine is equipped with outriggers and leveling cylinders, they must be used as follows except when traveling
1. All outriggers shall be extended to their full length.
  2. The machine shall be level.
  3. Use additional mats or floats as needed and when soil conditions are poor.
  4. Outrigger floats shall be securely attached to the outriggers.
  5. Blocking or cribbing under outriggers shall meet the following requirements
    - a) The cribbings/blockings shall support only the outrigger pad, not any other parts of the machine.
    - b) It shall be of sufficient strength to prevent failure.
    - c) It shall be of sufficient thickness, width and length as to completely support the float or pad, transmit the load to the supporting surface and prevent shifting, toppling or settlement under load.
    - d) Partially extended; on rubber lifts, manufacturer load charts, supporting above.
- F. Accessible areas below seven (7) feet, within the 360<sup>0</sup> swing radius of the crane's rear superstructure shall be barricaded to prevent anyone from being struck or crushed and kept free of water cans, tool boxes, and material storage.
1. The following methods of swing radius barricading can be used
    - a) Poles with flexible mountings secured to the four corners of the rotating body extending beyond the ends of the crawler tracks. Yellow or Red woven ribbon strung from the tips of the poles entirely around the crane. See Exhibit 27.9A, or
    - b) Woven barricade ribbon between outriggers and extending beyond the rear of the crane where necessary. See Exhibit 27.9B.
    - c) A one inch diameter PVC pipe fabricated to encircle the crane, and suspended by barricade tape or rope. See Exhibit 27.9C.

- d) Woven barricade ribbon secured to the tops of standards or traffic cones at 42 inches high encircling the crane.
  - e) On barge mounted cranes 4 poles may be welded to the deck with loop eyes on top at 42", with a minimum of a ½ " yellow warning rope continuously woven through all 4 eyes.
2. Before entering into a barricaded swing radius, an employee must get the attention and agreement of the crane operator.
- G. There shall always be at least three full wraps of wire rope on the drums of hoisting equipment.
- H. The drum ends of wire rope shall be anchored to the drum by an arrangement specified by the crane or wire rope manufacturer.
- I. Hook or block ends of wire ropes shall be secured
- 1. With a separate piece of wire rope and a wire rope clip as shown in Exhibit 28.10A.
  - 2. In beackets with wire rope clips made as a part of the basket, Exhibit 28.10B.
- J. Riding on loads, hooks, hammers, or buckets is prohibited.
- K. All cranes, other than those involved in duty cycle operations, like drag line or clam shell work, shall
- 1. Be equipped with a boom angle indicator in clear view of the operator.
  - 2. Have Crane Manufacturer's supplied computers operational any time the crane is boomed up except during maintenance.
  - 3. Use anti-two blocking (upper limit) devices.
- A load indicating device will be installed on any crane engaged in pulling operations. When extracting (pulling) with a vibratory hammer, the load indicating device will be the manufacturer's color coded load decal, versus the radio load monitor device. The radio device is not reliable for use with vibratory hammers.
- 4. Load decals have been placed on Crofton's vibratory hammers. Replacement decals and indicating charts are available from the Equipment Manager.
  - 5. Rental hammers must have decals when delivered. The supplier shall provide and install the decals on each rental hammer.
- L. All mobile or floating cranes with cable supported booms shall be equipped with
- 1. Boom stops which, at the angle specified by the crane manufacturer, limit the movement of the boom.

2. Boom hoist disengaging device which will automatically disengage the boom hoisting power when the boom has reached its highest rated angle.

#### M. Weather and lightning conditions

1. Cranes shall not be operated when wind speeds approach the maximum wind velocity recommendations of the crane manufacturer.
2. Below maximum allowed wind speeds, the operator shall always consider the effect of the wind on the load and crane .
3. When conditions are such that lightning could occur, all crane operations shall cease.
4. During night operations, lighting shall be adequate to illuminate the working areas.

#### N. Backup alarms

1. Operating backup alarms are required on truck and rough terrain cranes.
2. A flagger must be used every time a truck or rough terrain crane backs up.

#### O. Booms

1. Shall be inspected at the start of every shift.
2. Shall be kept in good repair, free of cracks, dents, bent or broken parts.
3. No lift shall be attempted with bent cords or lacing.
4. Wire rope and sheaves should be lubricated weekly.
5. Any boom repair work shall be done under the direct supervision of the Equipment Manager, as the equipment manager on a joint-venture project and shall be done according to written specifications from the manufacturer, by a certified welder with replacement parts from the manufacturer or to the manufacturer's specifications.

#### P. Overhead Utility Lines

1. Cranes, shall not be operated within ten (10) feet, of any in service overhead utility line, including electric power, telephone, cable TV or fiber optic
  - a) 3 foot x 4 foot reflective "WARNING OVERHEAD UTILITY LINES" signs shall be posted and maintained.
    - 1) Regardless of the heights or type of utility line.
    - 2) At least 2 signs, fifty (50) feet back from the overhead utility line.
  - b) If it is necessary to operate any cranes closer than thirty (30) feet, a dedicated

spotter/flagger shall insure the piece of equipment does not operate any closer than ten (10) feet, from the in service overhead utility line.

- c) If it is necessary to operate any crane, closer than ten (10) feet, make arrangements with the utility owner to have the line protected or taken out of service.
- d) Any overhead utility line must be considered to be in service unless the utility owner(s) representative(s) assures us otherwise. Names, dates, telephone numbers and permit numbers must be recorded on the daily diary or in a specific log.

#### Q. Maintenance & Certification.

1. All Cranes and pertinent equipment shall be tested in accordance with manufactures guidelines, with a 3<sup>rd</sup> party certification.
  2. Maintenance will be performed by qualified personnel, this includes generators, travel equipment, and any other support machinery for all equipment.
  3. Each piece of equipment will follow manufactures guidelines for Maintenance, a equipment sign out sheet will be filled out prior to use of all machines. If repairs or discrepancies are noted the piece of equipment will be deemed “Deadlined” until the appropriate repairs are made.
  4. Crane certifications will be kept in accordance with State, Federal, and local guidelines. These will be kept at the company level either electronically or filed with the company “Equipment” Manager.
  5. The Equipment Manager will be responsible for the maintenance program, and scheduling repairs.
2. Overhead Electrical Utility lines
- a) A minimum of three signs, no less than 5 inches x 7 inches, stating “WARNING, UNLAWFUL TO OPERATE THIS EQUIPMENT WITHIN 10’ OF OVERHEAD HIGH VOLTAGE LINES”, must be in place on any crane which may come in contact with energized electrical lines.
    - i. One inside the cab clearly visible to the operator, however, not on the glass.
    - ii. One on the right and left of the operator on the outside of the crane, and be readily visible and legible to others engaged in work operations.
  - b) State laws require notification of Electric Utility owners when cranes are to be operated less than ten (10) feet, from energized powerlines.
  - c) For operational and planning purposes: for lines rated over 50 KV, the minimum clearance between the lines and any part of the crane or load must be ten (10) feet plus 0.4 inches for each 1 kV over 50 kV. Or use twice the length of the line insulator, but never less than ten (10) feet.

3. Crofton Industries Overhead Utility Permit: On Crofton Industries projects, the Overhead Utility Permit System shall be utilized.
  - a) It is the responsibility of supervisors and subcontractor supervisors to procure this permit from the Crofton Industries Superintendent, or their designee, 24 hours prior to the start of operations within 30 feet of overhead utilities.
  - b) This permit requires the contractor or subcontractor, Superintendent, Foreman, equipment flagger, operator and immediate ground crew sign off as being aware of the overhead utility line and the specific precautions necessary for this particular stand alone operation.
  - c) Copies
    - i. The white original is to be kept in the project office.
    - ii. The pink copy must be posted on the clipboard which is to be permanently affixed to a WARNING sign at each overhead exposure.
    - iii. The yellow copy is for the contractor or subcontractor records.
    - iv. Upon expiration, the pink copy is to be returned to the Crofton Industries office where it will be matched up with the white copy and made a part of the project files.

#### R. Lifting a load

1. When two (2) or more cranes are used to lift a load, a critical lift plan shall be completed. A qualified person shall be in charge of the operation.
2. The person in charge of the lift shall ensure that the operator stays at the controls while the load is suspended.
3. If there is any concern about either the techniques or equipment being used in a lift, the operation shall be stopped until a critical lift meeting is held and a critical lift plan is completed.

#### S. Critical Lift Plans.

1. A Critical Lift Plan is required
  - a) Lifts which exceed 75% of the crane chart capacity at the required radius.
  - b) Lifts with two or more cranes.
  - c) Lifts where the load on the crane cannot be accurately determined in advance, including pulling.
  - d) Other lifts with particular hazards or difficulties.
  - e) Lifts where the contract requires a Critical Lift Plan.

2. The Critical Lift Plan shall be the responsibility of the Project Superintendent, or his designee.
3. The Critical Lift Plan shall be dated, signed by the preparer
  - a) Shall also be signed as approved by the Project Superintendent responsible for the lift.
  - b) The requirements of the plan shall be communicated during the critical lift meeting to all personnel involved with the lift.
  - c) A copy shall be provided to the Project Superintendent before the lift occurs and a copy shall be kept in the project office. Unique or exceptional lifts should be coordinated with the Engineer and the Equipment Manager.

T. Personnel Safety:

1. Guard rails and handholds shall be in good repair and anti-skid surfaces placed on walkways and platforms where necessary to prevent falls.
2. There shall be an accessible 10-lb. ABC fire extinguisher, mounted in a bracket, in all operator stations or cabs.
3. Safety latches are required on all hooks on lifting and pulling devices other than shakeout hooks.
4. No one but the operator shall be allowed in or on any machine while it is operating.
5. Routine maintenance, fueling and repairs must not be performed while the equipment is in use or the power on.
6. When handling or recharging batteries or using jumper cables, goggles or face shields with safety glasses must be used.
7. All belts, gears, shafts, pulleys, sprockets, drive chains, drums and flywheels, shall be properly guarded.
8. Operators must take signals from only one person. In an emergency, however, a stop signal can be given by anyone.
9. All exhaust systems shall be in good repair and guarded.
10. All windows shall be of safety glass and free of distortion and cracks.
11. Only standard hand signals will be acknowledged. These hand signals must be posted and visible on equipment and are illustrated the Crofton Industries Safety Manual.

## **27.1 Operators**

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- A. Cranes shall be operated only by the following personnel:
1. Designated operator - the operator assigned and qualified to perform specific duties.
  2. Trainees under the direct supervision of a designated operator.
  3. Maintenance and test personnel when it is necessary in the performance of their duties.
- B. No one shall enter an operator station or crane cab, with the exception of persons whose duties require them to do so, and only with the knowledge of the operator.
- C. It shall be the responsibility of the Project Superintendent or their designee to indoctrinate each crane operator to the Crofton Industries operating rules.
1. This indoctrination will consist of personal orientation utilizing this section of the manual.
  2. Each operator shall receive his own copy of this section.
  3. Each operator shall sign a certificate, acknowledging the orientation and receipt of his copy of this section and be issued an Equipment Operator's Certificate showing the date oriented and trained and the specific equipment authorized to operate.
- D. The operator shall not engage in any practice, which will divert his attention while engaged in operating the crane.
- E. Operators shall be responsible for those operations under their direct control. Whenever there is any concern about the safety of an operation, the operator shall stop and refuse to handle the load until safety has been assured.
- F. Operators shall not hoist, lower, swing, or travel while anyone is on the load.
- G. Operators shall be familiar with the equipment and its proper care. If adjustments or repairs are necessary, or any defects are known, they shall report them promptly to their supervisor and shall also notify the next operator when changing shifts.
- H. Operators shall avoid swinging loads over people.
- I. Operators shall not leave the controls while a load is suspended. Before leaving the crane unattended, operators shall:
1. Land any attached load, bucket, or other device.
  2. Set travel, swing, boom brakes, and other locking devices.
  3. Put controls in the "off" position.
  4. Secure crane against accidental travel.
- J. Weights of loads shall be determined prior to the lift, and the operator made aware of the weight.

The operator shall know the requirements for critical lifts listed in this section.

## **27.2 Crane Safety Inspections**

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### A. Crane Safety Inspections

1. Are to be documented
  - a) Cranes are not to be put into service until deficiencies are corrected.
  - b) Correction of deficiencies is to be documented under remarks, initialed and dated.
  - c) Copy on machine in weatherproof document protector.
  - d) Copy in project files.
  - e) Copy to Safety Department, except Daily Inspections.
  - f) Original to Equipment Manager; except Daily Inspections.
2. It is the responsibility of the Equipment Manager to see that all required inspections are completed and up-to-date when a crane is delivered to a site.
3. It then becomes the responsibility of the Project Superintendent to which a crane has been shipped from the Yard or a rental company to make sure all inspections and certifications are kept up to date while the machine is at the site.
4. All cranes, Crofton Industries, third party, or subcontractors
  - a) Arrival at the site
    - 1) By Crofton Industries Project Superintendent or qualified designee.
    - 2) A suitable Crane Inspection Form shall be used with "ARRIVAL at site" circled.
    - 3) A project owner's or client's Crane Arrival Inspection will suffice, as long as it is at least as stringent as Crofton's Inspection Form and involves a qualified Crofton Industries employee in the physical inspection process.
  - b) Annually by the crane owner, contractor or subcontractor
    - 1) By a qualified off-site person.
    - 2) Can be an employee of Crofton Industries, the owner or subcontractor.
    - 3) May be a qualified crane inspection company.

- 4) Crofton's Inspection Form, or a similar form, at least as stringent, and covering all of the inspection points of Crofton's Inspection Form shall be used with Annual Inspection checked.
- c) Monthly by crane owner, contractor or subcontractor
  - 1) Operator
  - 2) Crofton's Inspection Form or similar form, at least as stringent, and covering all of the inspection points of Crofton's Inspection Form shall be used with Monthly Inspection circled.
- d) Daily Inspection by crane owner, contractor or subcontractor
  - 1) Operator
  - 2) Crofton's Inspection Form or similar form, at least as stringent, and covering all of the inspection points of Crofton's Inspection Form shall be used with Daily Inspection circled.
5. Derricks, floating cranes and mobile cranes placed on barges to work are required to have an annual inspection per 1926.550, but also in our work are subject to and required to meet inspection and load test standards under 1919 for Maritime Crane Certification.

The Crane Superintendent will be responsible for ensuring this certification each and every time required.

## **27.3 Hydraulic Cranes**

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The following rules shall be adhered to when operating a hydraulic crane

- A. Do not operate with hinged cab doors in open position unless they are secured to prevent accidental closing.
- B. Wear seat belts at all times.
- C. In addition to filing the Equipment Inspection Report monthly a daily check of the following items shall be made before starting the shift:
  1. Check boom pivot pins and pin retainers.
  2. Check mountings for hydraulic boom cylinders.
  3. Check outriggers, pivot pins and retainers, and cylinder mountings.
  4. Check for buildup of dirt and rocks under outrigger cylinders. Check outrigger frames for cracks.
  5. Check all steering linkage.

6. Check winch mounting.
7. Check for leaks of hydraulic and engine oil and coolant.
8. Test brakes prior to moving machine.
9. Make sure hydraulic pump is disengaged before moving machine over 1000 feet.
10. Check horn, turn signals, and lights for proper operation.
11. Inspect tires for condition and proper inflation.

#### D. Outriggers

1. The crane shall be level, with all outriggers down on firm ground or footing prior to lifting loads or swinging boom over the side, except when traveling.
2. Float support is almost always required. Blocking or cribbing must be used under floats for average soil. Expanded support or mats are required when soil conditions are poor.
3. When setting up near trenches or excavations, stay a safe distance back. The minimum distance from the top of the excavation slope should be 1.5 times the depth of the excavation unless a professional engineer has determined that the shoring system in place will be sufficient to support both the soil and the crane placed closer to the excavation.

#### E. Hoisting

1. Know the weight of the load and where it has to go.
2. No crane shall be loaded beyond its rated capacity. Load charts shall be strictly followed.
3. The operator shall test the machine each time a load approaching the rated capacity is handled, by raising it a few inches and holding the load.
4. Use caution when extending the boom with loads suspended. As working radius increases, load capacity decreases.
5. When the boom is extended, care should be exercised to avoid "two blocking" sheave block with boom.
6. During hoisting, swinging or lowering operations, avoid sudden acceleration or deceleration of the moving load. Dynamic forces can suddenly and without warning affect stability.

#### F. Traveling

1. When traveling, the boom shall be fully retracted and positioned over the front of the machine in the direction of travel.
2. Always use a signal person when backing the crane.

3. The horn shall be sounded each time before traveling, and during travel, when approaching workers.
- G. Traveling with a load is not encouraged. If the Project Superintendent approves, the following rules shall be adhered to:
1. Load must be positioned over the front of the machine in the direction of travel. The housed lock must be engaged.
  2. All traveled loads must be tied off to the machine by a tag line.
  3. Route to be traveled shall be level, compacted, and free of potholes. The outriggers shall be extended if equipped.
- H. No one shall be permitted to ride on any crane.
- I. Walking with a load on a barge is prohibited!

## **27.4 Rigging**

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- A. No load shall be lifted by any crane or winch without a tagline on the load.
- B. We shall comply with the manufacturer's specifications applicable to the operation of any and all cranes, and other hoisting equipment. Attachments used with this equipment shall not exceed the capacity rating or scope recommended by the manufacturers.
- C. Competent personnel must supervise rigging operations.
- D. Rigging equipment for material handling will be inspected prior to every use.
- E. Wire rope shall be taken out of service when the following conditions exist:
1. In running ropes, six (6) randomly distributed broken wires in one lay or three (3) broken wires in one strand in one lay.
  2. Wear of 1/3 the original diameter of outside individual wires. Kinking, crushing, bird caging, or any other damage resulting in distortion of the wire rope.
  3. Evidence of any heat damage.
  4. Noticeable reductions in nominal diameter of the wire rope.
  5. In standing ropes, more than two (2) broken wires in one lay in sections beyond end connections or more than one broken wire at an end connection.
- F. Wire rope strengths must be known when rigging a load.

G. "U" bolt cable clips

1. The "U" must go around the dead end. The saddle side of the clip goes on the live or working end of the cable.
2. Wire rope clips shall be installed in accordance with the clip manufacturer's recommendation. All nuts on newly installed clips shall be retightened after one hour of use.
3. Follow this table for number and specifying of "U" bolt cable clips.

Number of Clips:

Improved Plow Steel, Rope Diameter Inches	Drop Forged Clips	Min. Spacing (inches)
1/2	3	3
5/8	3	3-3/4
3/4	4	4-1/2
7/8	4	5-1/4
1	5	6
1-1/8	6	6-3/4
1-1/4	6	7-1/2
1-3/8	7	8-1/4
1-1/2	7	9

H. Job or shop made lifting beams, hooks, links, or fasteners shall not be used, unless there is a drawing on file and approved by a Professional Engineer. They shall be marked to show the maximum safe working load.

I. The use of "softeners" is required whenever a wire rope sling is being secured around a sharp or a small object, which might cut into and damage the sling.

J. Cables or slings shall not be in direct contact with a vessel which could collapse or in contact with other items which could cut or damage the cable. Softeners shall be used between the cable/choker and the item being lifted.

K. Personnel safety is the prime concern of supervision during any handling of a load with hoisting equipment.

L. No wire rope, sling, or other rigging equipment shall be handled without work gloves.

M. Only one eye of a sling shall be placed in a lifting hook. If there are multiple slings to be used, all eyes shall be put in a shackle and the shackle put in the lifting hook.

N. The use of chain in rigging is discouraged. It must be hooked up positively with a chain hook or shackle. Chain must be certified and have a rated load capacity tag attached.

O. All eyes in wire rope slings are to be equipped with thimbles (except chokers) and secured by

swagged or pressed mechanical sleeves or fittings; with the exception of socketed connections.

P. No wire rope slings may be made with wire rope clips.

## **27.4-1 Inspection of Slings**

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- A. This procedure describes the requirements to assure that all lifting slings and their attachments are safe for use by employees.
- B. All employees shall visually inspect all slings before use for defects and deformities. Where there is evidence of damage, the sling shall be taken out of service and tagged. A competent person shall inspect and evaluate sling.
- C. Should a superintendent determine that the sling is damaged and not usable, it must be cut and discarded.
- D. All slings must be inspected on a quarterly basis. A competent person shall be responsible for the program.
- E. The inspection shall be documented by a spot of paint on at least one end of the sling or choker. Each quarter the previous quarter's marking shall be painted over. Inspection of synthetic fiber slings shall be documented by writing on the inspection tag.

### **CODING SCHEME FOR INSPECTION OF SLINGS**

(same as ground assurance color coding)

Months	Color
January February March	WHITE
April May June	GREEN
July August September	RED
October November December	ORANGE
Repair or Incident	BROWN

- F. Any item inspected during the quarter, including new items, shall receive color coding for that quarter. Should repair take place, brown shall be added to the quarterly marking.
- G. Slings shall be immediately removed from service if any of the following conditions are present:

#### 1. Wire Rope Slings

- a) Ten randomly distributed broken wires in one rope lay, or five broken wires in one strand in one rope lay.
- b) Wear or scraping of one third the original diameter of outside individual wires.
- c) Kinking, crushing, bird caging or any other damage resulting in distortion of the wire rope structure.
- d) Evidence of heat damage.
- e) End attachments that are cracked, deformed, or worn.
- f) Hooks that have been opened more than a normal throat opening measured at the narrowest point or twisted from the plane of the unbent hook.
- g) Corrosion of the rope or end attachments.

## 2. Synthetic Web Slings

- a) Missing marking or coding showing rated capacities.
- b) Acid or caustic burns.
- c) Melting or charring of any part of the sling surface.
- d) Snags, punctures, tears or cuts.
- e) Broken or worn stitches.
- f) Distortion of fittings.
- g) Excessive exposure to ultra violet.
- h) Hard and brittle.

## 3. Alloy Steel Chain Slings

- a) Anchor chain is not to be used in any hoisting capacity!
- b) Missing marking or coding showing rated capacities.
- c) Attachments such as hooks, rings, and links, shall have a rated capacity equal to that of the chain. The chain shall not be used in excess of the rated capacity of the weakest component.
- d) Cracks
  - 1) Evidence of weld splatter / discoloration from excessive temperatures.

2) Excessive corrosion (chemical or otherwise).

e) If the chain size, at any point of any link, is less than that stated in this table:

**MAXIMUM ALLOWABLE WEAR AT ANY POINT OF LINK**

Chain Size Inches	Max. Allowable Wear Inch
1/4	3/64
3/8	5/64
1/2	7/64
5/8	9/64
3/4	5/32
7/8	11/64
1	3/16
1-1/8	7/32
1-1/4	1/4
1-3/8	9/32
1-1/2	5/16
1-3/4	11/32

H. If any sling is in a "gray" area where we are not sure whether to remove it from service or not, the item should be tagged and sent to the Shop for their determination.

## **27.4-2 Lifting Beams**

Lifting beams shall be purchased from a manufacturer or designed by a Professional Engineer. Lifting beams are required to be identified with their safe working load. To minimize the risk of misusing a lifting beam, each company made lifting/rigging beam is to be marked with an identifying number and its capacity. The Engineering Department keeps a record of all lifting beams by identifying number with calculations for their capacity.

## **27.5 Crane Suspended Personnel Platforms and Jack Boats**

A. Use of a suspended personnel platform shall be approved by the Project Superintendent.

1. Cranes may be used to hoist and suspend employees on a personnel platform or to provide access and egress in unique work situations when such action results in the least hazardous exposure to employees. Any crane lifting personnel is to be de-rated 50%.
2. If it is not safe to erect and use a personnel hoist, ladder, stairway, aerial lift, elevating work platform or scaffold, then using a suspended personnel platform is permitted.
6. Platforms shall be used over land. When suspended personnel platforms shall be used over water the personnel in the platform will have complete dive equipment on to include a "Bail-Out" bottle.

7. A sign shall be maintained on each personnel platform capable of being suspended with employees, to read:

**NOTICE**

**ADHERENCE TO THE FOLLOWING RULES IS MANDATORY ANY TIME ANY EMPLOYEE IS LIFTED BY CRANE IN OR ON THIS PIECE OF EQUIPMENT. CRANE MUST BE LEVEL AND SECURE, OUT RIGGERS SET IF CRANE SO EQUIPPED.**

**A SHACKLE WITH RETAINING PIN MUST BE USED TO ATTACH TO LOAD LINE.**

**THE OPERATOR, FOREMAN, & EMPLOYEES INVOLVED ARE TO HOLD A PRELIFT MEETING TO REVIEW THE LIFT'S PROCEDURES.**

**A TRIAL LIFT, WITH FULL ANTICIPATED WEIGHT, IS TO BE PERFORMED PRIOR TO LIFTING EMPLOYEES.**

**AFTER THE TRIAL LIFT, HOLD THE LOAD A FEW INCHES OFF GROUND AND MAKE FINAL INSPECTION BEFORE LIFTING EMPLOYEES.**

**THE LOAD WEIGHT IS NOT TO EXCEED THE CAPACITY PLATE.**

**SAFETY HARNESES ARE TO BE HOOKED OFF OVER LAND AND WHEN OVER WATER.**

**ONE EMPLOYEE BEING LIFTED IS TO STAY IN CONTINUOUS SIGHT OR COMMUNICATION WITH THE OPERATOR.**

**NO OTHER LIFTS ARE TO BE MADE ON ANY OF THE LOAD LINES WHEN EMPLOYEES ARE BEING LIFTED.**

Cranes used to lift personnel platforms shall meet the following criteria:

Meet all of the requirements of this section.

Be equipped with power up and power down for the boom, and the load line to which the personnel platform is hooked.

Be equipped with an anti-two blocking device

a) Device can de-activate the hoisting action.

b) Cranes may use standard signaling except when out of sight of the operator, then radios or telephones are required.

4. Be equipped with a boom angle indicator visible to the operator.

On telescoping booms:

a) Be equipped with a device to indicate to the operator the boom's extended length

b) Determine the radius to be used during the lifting of the personnel platform prior to the lift.

Utilize load lines capable of supporting seven times the maximum intended load (personnel platforms) except when rotation resistant wire rope is used, then it must be capable of supporting ten times the maximum intended load.

Land-based cranes shall be set up on firm footing and level to the ground.

Cranes on barges shall be set up level to the deck of the barge.

Cranes equipped with outriggers shall have them fully extended and set on firm footing.

Operators shall:

- a) Raise, lower, swing, and boom in a slow, controlled manner with no sudden movements of the suspended personnel platform.
- b) Engage the load and boom hoist drum brakes, swing brakes, and locking devices when the personnel platform is in a stationary working position.

Purchased suspended personnel platforms shall meet OSHA 1926.550(g).

Purpose built suspended personnel platforms shall be designed by a Professional Engineer in accordance with OSHA 1926.550(g). A copy of the platform design drawn up with P.E. stamp and operational limits shall be kept at the project office.

Designed by a qualified engineer using the following criteria.

The suspension system designed to minimize tipping of the personnel platform due to movement of employees.

The personnel platform and suspension system shall be capable of supporting five times the maximum load.

A plate shall be posted on the personnel platform indicating the weight of the platform and its rated load capacity.

There shall be a standard guardrail at 42”.

There shall be a standard 4” toe board (not applicable to jack boats).

Expanded metal with no greater opening than ½” shall extend from the toe board to the guardrail (not applicable to jack boats).

A grab rail set out from the guardrail and capable of holding 5,000 lbs. shall be installed inside the entire perimeter (not applicable to jack boats).

The access gate shall swing inward and have a positive latch to prevent accidental opening (not applicable to jack boats).

Head room shall allow employees to stand upright in the platform.

The roof or overhead protection shall be of expanded metal with openings of no greater than ½”.

All rough edges shall be smoothed to prevent punctures or lacerations.

All welding shall be done by a qualified welder.

At each jobsite when a suspended personnel platform arrives on the site and before lifting any employees and after any repair or modification,

The platform and rigging shall be proof tested to 125 percent of the platform's rated capacity with test load evenly distributed.

After proof testing, the responsible superintendent shall inspect the platform and rigging.

Each year the basket is in service, it has to be certified on the in-service date located on the data plate.

The Project Superintendent must approve a crane traveling while an occupied personnel platform is raised.

Criteria for approval:

- a) On a case by case basis.
- b) Must be the least hazardous way to perform the work.

Additional procedures to be followed:

- a) Travel restricted to a firm, level surface designed, prepared and designated as a path of travel for the weight and configuration of the crane. An existing surface may be used as long as it meets these criteria.
- b) Travel shall be limited to the load radius of the boom to be used during the lift.
- c) The boom must be pointed towards the direction of travel.
- d) A complete trial run must be performed before employees allowed to occupy the platform.
- e) If rubber-tired crane used

Check condition and pressure of tires.

Use the chart capacity for lifts on rubber, then reduce the rated capacity by 50%.

### Rigging Personnel Platforms

Wire rope slings used to connect the personnel platform to the load line must be inspected quarterly.

Only alloy anchor-type shackles with bolt, nut, and retaining pin may be used.

Each wire rope sling used to connect the personnel platform to the load line is to be connected to a master link or shackle to ensure the load is evenly divided among the legs of the slings.

- a) Thimbles are required in the eyes of all wire rope slings.
- b) Slings and rigging used to attach the personnel platform to the load line shall not be used for any other purpose.

The suspended personnel platform shall be shackled to the lifting line or a positive locking latch on the hoist hook is also permissible.

All rigging must be capable of supporting five times the maximum load applied to that component. When rotation resistant cable is used, the factor is ten times.

The following procedures shall be carried out prior to hoisting employees, or any time new employees are assigned to an ongoing operation.

A pre-lift meeting shall be held

- a) To be attended by the foreman, the crane operator, the employee(s) to be lifted and the employee(s) signaling.
- b) All applicable procedures to the lift contained in this section shall be reviewed.

A trial lift shall be performed immediately prior to placing employees on the platform.

- a) A single trial lift may be performed at one time for all locations that are to be reached from a single set up position as long as the platform is lifted to each location at which it is to be positioned.
- b) Repeated whenever the crane is moved and set up in a new location or returned to a previously used location.
- c) Repeated when the lift route is changed unless the responsible superintendent determines the route change will not affect the safety of hoisted employees.
- d) The platform will be loaded with weight to the anticipated lift-weight including tools.
- e) The trial lift will be made from the ground or at whatever location employees will enter the platform.

During the trial lift, the operator shall

- a) Determine that all systems, controls and safety devices are functioning properly.
- b) Determine that no interference exists.
- c) Determine that he can stay within 50 per cent of the crane's capacity.

After the pre-trial lift and just prior to hoisting personnel, the foreman shall ensure:

- a) The platform is hoisted a few inches and inspected to see that it is secure and properly

balanced.

- b) Multiple part lines are not twisted around each other.
- c) The hook up on the top of the personnel platform is centered.
- d) Lifting and boom cables checked to ensure they are free of kinks and that they are tracking on sheaves and reeving on drums properly.
- e) Make sure any deficiencies produced during the pre-trial lift are corrected.

The following safe work practices shall be followed by the employees engaged in the lifting of the personnel platform:

The platform shall not be loaded in excess of the rated load on the capacity plate.

The number of employees on the platform is not to exceed the number required for the work being performed.

Personnel platforms are to be used only for employees, their tools and the materials necessary to do the work.

Personnel platforms shall be used to hoist only materials or tools when not hoisting personnel.

Materials and tools are to be evenly distributed within the platform and secured to prevent displacement.

Except for the person signaling, body parts shall be kept inside the platform during raising, lowering and positioning.

Each employee on the platform is to hook their Body Harness off to a structural member of the personnel platform.

When working over water, an approved life jacket is required no matter the height of the lift. When a lift is greater than 6 feet over water, in addition to the life jacket, the Body Harness must be hooked off as described in 7.

Before employees exit or enter a hoisted personnel platform that is not landed, the platform must be secured to the structure where the work is to be performed.

- a) Unless securing to the structure creates an unsafe situation.
- b) Regardless of whether the platform is secured to the structure or not, employees exiting or leaving shall use double safety lanyards. When exiting the platform, while hooked to the platform, reach out and hook off to the structure with the second lanyard - then, unhook from the platform. When entering the platform from a structure, reverse the process.

At least one 1/2" tag line shall be tied near the toe board to one of the corner uprights.

The tag line should be long enough for a person on the ground or floor to control

the movement of the personnel platform.

The operator shall not leave his position at the controls while the load is suspended.

Hoisting of employees shall not be attempted, or discontinued, upon indication of any dangerous weather conditions or other impending danger.

Employees being hoisted shall remain in continuous sight of and in direct communication with the operator.

Standard hand signals shall be recognized, unless telephone, radio or the equivalent is used. Signals shall be visible or audible to the operator at all times.

No other lifts shall be made on any of the cranes load lines while the personnel platform is hooked up.

## **SECTION 38 – MARINE OPERATIONS**

Crofton Industries engages in many major projects on and around the water. Policies and procedures with respect to marine equipment operations are outlined in the Crofton Industries, Inc. Equipment Manual . This section complements the policies and procedures set out in that manual.

### **38.1 Watercraft/Floating Rig Operator**

The designated watercraft or floating rig (vessel) operator is responsible for all aspects of marine safety operations. Only persons who have been approved and trained may operate Crofton Industries vessels. Responsibilities include, but are not limited to:

- A. The safe operation and handling of all equipment on the vessel.
- B. The safe navigation of the vessel to and from the site(s) of operation.
- C. Ensuring that all required operational and safety equipment is on board before getting underway and that it is properly cleaned and stowed upon return.
- D. Ensure that all operations are in compliance with U.S. Coast Guard requirements, with respect to equipment and safety procedures.

### **38.2 Operator Safety Checks Prior to Departure**

The designated vessel operator is responsible for:

- A. Performing a functional inspection of the vessel and all equipment.
- B. Assessing all environmental risks such as weather and sea conditions.
- C. Ensuring that crew members understand all emergency procedures for the particular vessel (such as man-overboard, fire, abandonment, and methods for seeking assistance).

### **38.3 Required Safety Equipment On All Vessels**

- A. VHF radio. Cell phone and/or CB radio is also recommended but not required.
- B. U.S. Coast Guard approved life jacket for each person on board, (Auto-inflating life jackets are not approved for wear without prior approval)
- C. One “throwable” ring or horseshoe buoy with at least 90 feet of 3/8” line.
- D. U.S. Coast Guard approved signal flares.
- E. 10-lb. ABC fire extinguisher
- F. 16 unit First Aid Kit
- G. Fire Ax

- H. Fog Horn or other signaling device
- I. All other U.S. Coast Guard required equipment
- J. Wind speed meter / Indicator
- K. A-2-B/ L.I.D. Systems on cranes (if Required)
- L. Swing Radius / Danger areas barricaded on cranes

## **38.4 Towing**

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Never tow or push with a vessel, such as a crew boat, that is not specifically designed for towing or pushing except for on-site moves in calm waters with no current.

Even though towing is a routine task for tugs, it is still one of the most dangerous operations tug operators and crew must perform. The tug operator is responsible for the entire operation, but the deck hands and crew are responsible for preparing, making up and rigging a tow.

Crew members' safety:

- A. Always face your work.
- B. Never step over a line lying on deck. Either lift it up and walk under it, or step on top of it and cross over. Never straddle or step in the loop of a line.
- C. When securing towlines, never secure the line so that it cannot be thrown off quickly and easily.
- D. When towlines are coming under or are under a strain keep your body clear of the towlines and bitts.
- E. Know where the fire ax is located.

## **38.5 Condition Surveys and On Hire Surveys**

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Prior to dispatching a barge from Crofton Industries to a job or for towing operation, a condition survey on the barge will be completed and recorded.

- A. For owned barges the survey will be reported by the Barge Inspection Report.
- B. The Equipment Manager will complete the survey and provide a written record for review by the Senior Crofton Industries Supervisor.
- C. Required repairs will be completed and noted on the survey report.
- D. For outside leased barges and for joint venture projects, it is recommended that a third party "on-hire" survey be done by a professional survey company and kept on file.

## **38.6 Return Inspections and Off Hire Surveys**

Upon completion of a rental assignment, when the barge is returned to Crofton Industries or transferred to another project, a condition survey will be completed as at the beginning of the job assignment. Repairs that may be required will be completed as soon as feasible. Misuse and abuse items will be brought to the attention of the project superintendent and the project will be charged for corrective action when appropriate.

Misuse and abuse includes

- A. Any use of the barge for storage or disposal of waste oil, hazardous material or waste, demolition waste, or debris of any kind.
- B. Any modifications to the barge structure without the concurrence of the Equipment Manager.
- C. Hull damage beyond the normal wear and tear on a barge in construction service.
- D. Missing or damaged hatch or spud covers.

## **38.7 Government Required Inspections**

The US Coast Guard, the Department of Homeland Security and the Federal Communication Commission have requirements for crew boats, tugs and barges.

- A. These permits and documents are filed at Crofton Industries.
- B. On certain barges and rigs ABS certification may be required and this responsibility is handled by Crofton Industries on owned equipment.
- C. Third party ABS certification should be supplied by the barge or rig owner as part of the lease agreement.

## **38.8 Crane on Barge Procedures**

When a crane is required to be mounted on a barge, the responsibility of sizing the crane and barge falls to the project superintendent. It is his responsibility to consult the Crofton Industries Engineering Department to have crane specific and barge specific stability analyses made of the equipment to be used. This will assure that the barge and crane are capable of performing the required work in a safe and productive manner. Charts must be issued by engineering or the manufacturer.

- A. All barge tanks shall be kept free of water unless it is determined to be a ballast requirement. If there are questions, contact the Equipment Manager.
- B. Crane centerline shall be located on barge longitudinal centerline.

- C. List is the slope of the barge deck from side to side. List can be calculated by measuring the height in inches from the deck to the water at both sides of the barge, at the same distance from the end of the barge. Subtract the smaller height from the larger height. Then divide this by the width of the barge in inches, and multiply the result by 57. This gives the list (slope of the deck) in degrees.
- D. For flat deck barges, trim is the slope of the barge deck from end to end. Trim can be calculated in the same way as list, but using the difference in the heights of the deck above the water at the ends of the barge, divide by the barge length, and multiply the result by 57. This gives the trim in degrees.
- E. Crane shall be positioned on the longitudinal centerline so that when the boom is at 90 degrees to the barge longitudinal centerline, with no load, the barge shall be within ½ deg. of level in the trim direction unless shown otherwise on the Crane on Barge Stability Chart.
- F. Barge deck loads shall be such that when the crane boom is parallel to barge centerline, with no load, the barge shall be within ½ deg of level in the list direction unless shown otherwise on the Crane on Barge Stability Chart.
- G. Crane shall be operated only in suitable weather and sea conditions as determined by the project superintendent.
- H. Equipment Manager shall confirm barge hull to be in sound structural condition.
- I. Except for crane barges designed with integral timber decking, crane shall travel and operate on minimum 12” timber mats, transverse to crane tracks. Mats shall extend a minimum of 2’-0” beyond the tracks.
- J. Crane radius is the horizontal distance from the crane center pin to the center of gravity of the load. Operator shall boom up as necessary to prevent the load from swinging out due to crane barge movement during lifting the load.
- K. Crane load shall include the weight of ropes, blocks, spreaders and slings suspended from the boom point.
- L. Cranes shall be tied down at all times on the barge, except when walking the crane on and off of the barge. This will only be approved by the Equipment Manager, the Construction Manager, or owner.
- M. Cranes shall not walk on the barge while carrying up loads.
- N. Cranes may be moved along the barge center line from one work position to another, without load provided that
  1. The surface on which the crane will move is free of ice, snow, mud or other material which might cause the crane to slide.
  2. The crane is tied down immediately at the new location.
  3. The barge remains trimmed to level in accordance with paragraph 38.8.E.

## **38.9 Barge Loading**

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Loading diagrams for each barge load will be provided from the job to the supplier who is to load the barge. Outfitting (blocking, stanchions, etc.) will be placed at the job or as conditions dictate. Barge protection (tires, mats) should also be considered before putting a barge into service. See barge loading information and drawings in the Equipment Manual.

A. Barge loading diagrams for new arrangements shall be submitted to the Equipment Manager and the Engineering Department for review. The diagrams shall show the

1. Location of bulkheads if used to support concentrated loads.
2. Location and arrangements of deck supports and blocking.
3. Location, orientation and weight of each piece loaded on the barge.
4. Total weight and center of gravity of the load.
5. Barge freeboard.
6. Locations and arrangements for securing the load..

B. Pile loading arrangements on conventional flat deck barges must meet the following requirements. The requirements are for Inland/Chesapeake Bay tows only. Additional restrictions will apply to ocean tows.

1. The barge must be in good structural and seaworthy condition, with all tanks dry and all hatch covers waterproof.
2. The barge freeboard must be sufficient, and the load must be placed on the barge so that the barge is trimmed sufficiently level.
3. The load center of gravity and windage must not be so high as to reduce the barge stability below an acceptable value.
4. The load support must distribute the precast load into the barge deck so as not to overload the deck.
5. The piles must be arranged with sufficient spacers between adjacent pieces so that the piles can be rigged for unloading.
6. The load must be secured sufficiently to prevent the load from moving during loading, towing and unloading operations.
7. The edge of the deck must be left clear for access to mooring bitts, cleats and outside tank hatch covers.

C. Freeboard and trim

1. Minimum average freeboard for conventional (non-sectional) towed transport barges is 2'6" with minimum freeboard at any corner is 2.0 feet.

2. Lower freeboards may be used for material storage on site in sheltered water.
3. After loading, the deck should be level to within 1%. The bow should not be lower than the stern.

#### D. Center of gravity height and windage

The higher the center of gravity of the load, and the larger its wind area, the lower the stability of the load. This can become critical for special loads. It will not be critical for conventional piles and girders which do not extend above the deck more than the depth of the hull.

#### E. Distribution of the load into the barge deck

Most barges have a rated uniform deck capacity, which may be shown on the barge drawing. If not, it can be calculated by Engineering from the barge structural details. Deck capacities for typical barges we use vary from 750 to 5000 pounds per square foot.

1. Precast concrete will be supported on the deck on timbers, and thus the deck loading will be a strip load, and not a uniform load.
2. The maximum strip loads have been calculated for most Crofton Industries barges, and can be calculated for other barges, but are typically about three (3) times the uniform deck load (i.e. maximum uniform deck load of 1000 pounds per square foot gives a maximum strip load of 3,000 lbs.). Higher loads may be possible at some specific locations on the deck. The deck capacity directly over bulkheads will be considerably higher than elsewhere on the deck.
3. The minimum bearer timber size is 12"x12".
4. The bearers must be spaced along the barge deck so that the weight per ft on the bearer timber is less than the deck strip load capacity at the bearer location. For square piles, the spacing of the bearers will usually be controlled by the deck capacity, but they also cannot be further apart than the pile lifting points. Full height stacks of cylinder piles should be supported at maximum 30 ft centers, in order to limit the concentrated load at the blocking between the piles.

#### F. Spacers between layers

1. Spacers between layers of piles are provided to cushion concrete to concrete bearing, and to provide space for attachment of choker rigging for piles. Minimum spacer thicknesses for vertical spacing are:
  - a. Between square piles up to 16" size 4"
  - b. Between larger square piles and cylinder piles 6"
2. Spacers between layers must be located over each deck bearers, so that the weight from the upper layers is transferred directly to the bearers. For square piles, the spacers between

layers at the outside of the stack should extend continuously into the stack at least the number of piles that the stack is high, to stabilize the outside piles for shipping and unloading

3. Special spacers (see Standard Details 03.1 Sheet 2) which provide both horizontal and vertical spacing must be used between cylinder piles.
- 4 Pipe piles, if they can be lifted from the ends, do not need spacers.

#### G. Securing load against movement

All loads must be secured during shipment to be stable for at least 10% horizontal load (or 10% barge list). Loads may be secured by banding (least secure), by wire rope ties tensioned over the load or by blocking from stanchions (most secure). Banding shall be minimum 2" x 0.044" high tensile, with 12,300 lb minimum breaking strength. Wire rope ties shall be minimum ¾" diameter with 1.25" turnbuckles for tensioning, and the angle of the tie from the barge deck shall not be steeper than 60 degrees. Stanchions should be located clear of mooring cleats and on a barge frame line if possible. The design of the stanchion must consider the strength of the deck to which the stanchion is welded, as usually the deck will not be as strong as the stanchion.

- a. Square piles may be secured by banding around the whole stack, at maximum 20 ft centers. Install bands at approximately equal spaces along the pile stack. Use a minimum of three bands per pile stack, with the end bands within 0.15 times the pile length from the end of the pile.
2. Stacks of cylindrical or pipe piles are unstable even on a level surface unless the outer piles in the bottom row are prevented from moving out. The horizontal force required to hold cylinder piles and pipe piles is much greater than that required to hold square piles or bridge girders and therefore the outer piles must be secured with stanchions and blocking at maximum 30 ft centers.

## **38.10 Deck Work**

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- A. Ramps or gangways to barges shall be sturdy and be equipped with a handrail of 42" high.
- B. Obstructions shall not be laid on or across the gangway.
- C. The gangway should be located so that loads will not pass over the employees utilizing the gangway.
- D. Decks and other working surfaces shall be maintained in a safe condition. There should be no trash, obstructions or items that might slide freely on the deck.
- E. Employees shall not run on barge decks.
- F. Ropes, cables, and other miscellaneous equipment shall be stored neatly to avoid being a tripping hazard.
- G. Employees shall keep all items from dangling over side of barge.

- H. Employees shall clean up all spillage on decks to avoid slipping hazards, and overboard releases.
- I. Avoid getting fingers, arms, and legs caught between barge and the pier or boat or any other object.
- J. When moving barges or rigs, wait until after the bump before stepping off the boat or barge.
- K. When throwing a line, make sure that it's clear of your feet.
- L. Stand clear of lines or cables under tension.
- M. Do not lean over the edge of the boat or barge to grab a line; use the boat hook.
- N. Take extra precautions when working under icy and frosty conditions.
- O. Gloves are a must when working with cables.
- P. Knee, shin and instep guards shall be worn by employees heading or trimming wooden piles with axes.
- Q. Buck lines shall:
  - 1. Be maintained in good condition.
  - 2. Not be spliced.
  - 3. Shall only be used for the purpose intended.
  - 4. After becoming worn, they may be used for deck lines.

## **38.11 First Aid**

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- A. Communication shall be immediately available to summon aid in an emergency.
  - 1. Several employees shall be checked out on the radio and call signs for emergency agencies shall be posted with the Emergency Telephone Numbers.
  - 2. Arrangements can be made with watermen and marine operators in the vicinity of our work to respond to any emergency we might have.
- B. A qualified first aider shall be on site during any marine operation.

A First Aid Kit shall be maintained at marine operation sites at all times.

## **38.12 Towing Cranes or Barges**

A. When towing cranes or barges inside the harbor the following procedures shall be followed:

1. Wood crane mats are to be in place under crawler tracks.
2. Travel lock set.
3. Cranes tied down and tracks blocked at both ends.
4. Machines with outriggers set upon outriggers with wood between outrigger pad and barge deck.
5. Swing brake set.
6. Load cables dogged to both port and starboard side from boom point.
7. Hydraulic booms fully retracted and lowered.
8. Boom point lowered below A-frame (gantry) tip height.

B. When towing cranes or Barges outside of the harbor the following procedures shall be followed:

1. All applicable items in Section 38.3 (a).
2. Block counterweights to deck of barge.
3. Cross tie counterweight to barge with cable and turn buckles.

## **38.13 Insurance Carrier Notification**

While all of our barges and equipment, owned or rented are covered by insurance, some types of loads may require additional insurance coverage. If in doubt check with the office if additional insurance coverage is required or if the insurance carrier has to be notified.

## **38.14 Spill Response**

A Notify the Safety Director of any spill onto the water.

B Refer to the Crofton Industries Safety Manual for guidance and procedures for handling a spill.

C Spill response kits should be kept on jobsites at locations where there is a potential for an environmental spill mishap, i.e. Hydro power packs, Hydro cranes.

### **NOTE**

*In the event of an accident involving a vessel or other piece of floating equipment, immediately notify the National Response Center, the U.S. Coast Guard, the Safety Department and/or the Safety Director.*

# DAILY PRE-SAIL VESSEL CHECKLIST

Equipment Name: \_\_\_\_\_ Date: \_\_\_\_\_

Fuel Level:      Port: \_\_\_\_\_ Starboard: \_\_\_\_\_

Hours:            Port: \_\_\_\_\_ Starboard: \_\_\_\_\_

	Pass	Fail	N/A	Remarks
Main Engine Test				
Generator Test				
Steering Pump Test				
Visual Hull Inspection				
Inspect Watertight Doors				
Bilge pump test				
Compass / Deviation Card				
Rudder Angle Indicator				
Steering and Throttle Controls				
Inspect Pushing Cables / Ropes				
Radar, Radios, Horn				
Navigation, Flood, Spot Lights				
Glass / Windows				
Fire Extinguisher				
Flare Kit				
Life Jackets				
Life Rings				
First Aid Kit				
Required publications / Charts				
License / Vessel Documentation				
General Condition / Cleanliness				

**Reports are to be filled out on a daily basis at the beginning of each shift and turned into the office at the end of the day.**

\_\_\_\_\_  
Operator

\_\_\_\_\_  
Superintendent

\_\_\_\_\_  
Safety Director

\_\_\_\_\_  
Maintenance

**Appendix B**  
**Quality Control Forms**

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# FORM B-1b

## Preparatory Inspection Checklist (Part I)

Contract No.:

Date: \_\_\_\_\_

TITLE AND NO. OF TECHNICAL SECTION: \_\_\_\_\_

### A. Planned Attendees:

	Name	Position	<u>Company</u>
1)	_____	_____	_____
2)	_____	_____	_____
3)	_____	_____	_____
4)	_____	_____	_____
5)	_____	_____	_____
6)	_____	_____	_____
7)	_____	_____	_____
8)	_____	_____	_____
9)	_____	_____	_____
10)	_____	_____	_____
11)	_____	_____	_____

### B. Submittals required to begin work:

	Item	<u>Submittal No.</u>	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 B-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 B-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	<u>Company</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

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: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



# FORM B-4b

## Final Inspection Checklist (Part I)

CONTRACT NO.: \_\_\_\_\_

DATE: \_\_\_\_\_

Project / Area of Inspection: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

A. DEFINABLE FEATURES OF WORK:    Status of Inspection:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

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 B-6b

## CORRECTIVE ACTION REQUEST

(1)Page 1 of 4

(2)CAR #:	(3)PRIORITY: <input type="checkbox"/> HIGH <input type="checkbox"/> NORMAL	(4)DATE PREPARED:
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### 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? <input type="checkbox"/> YES <input type="checkbox"/> NO	(14)RESPONSE DUE:
(15)ISSUED BY (PRINTED NAME & TITLE): SIGNATURE: _____ DATE: _____	(16)MANAGEMENT CONCURRENCE:



Form B-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 B-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 B-7b

## CORRECTIVE ACTION PLAN

Page 1 of 1

*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) <input type="checkbox"/> APPROVED WITHOUT STIPULATIONS <input type="checkbox"/> APPROVED WITH STIPULATIONS <input type="checkbox"/> APPROVAL DELAYED, FURTHER PLANNING REQUIRED  COMMENTS:	
(4)MEC QCS SIGNATURE:	DATE:

# FORM B-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:

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9. Site safety monitoring activities performed today:

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10. Remarks:

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*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 B-9b

## Document Release and Review

Client:		Author:					Submittal Register Item No.:			Date:	
Document Title:							Revision:		D.O.#	WAD#	
Reviewer ( <i>print</i> )		Reviewer initial & date	Technical	Project Manager	CQC System Mgr.	Health & Safety	Editorial	Chemistry	Construction	Reviewer Comments Resolved ( <i>Signature &amp; Date</i> )	
Same as Technical Reviewer Above			X	Topic outline with objectives for each section submitted prior to Rev. A							
<i>Program Reviewer's Acceptance for Document Submittal</i>							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**  
**Applicable or Relevant and Appropriate**  
**Requirements**

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**Table C-1  
Federal Chemical-Specific ARARs  
Area UXO 1  
St. Juliens Creek Annex, Chesapeake, Virginia**

Media	Requirement	Prerequisite	Citation	ARAR/TBC Determination	Comment
<b><i>Human Health Risk Assessment</i></b>					
Sediment	Screen data collected to determine if concentrations of chemicals pose an unacceptable risk to human health	Collection of data that will be assessed for possible human health risk	Risk Assessment Guidance for Superfund (RAGS) only as it applies to munitions constituents specified in the work plan	TBC	Analytical sampling of sediment will be conducted during the investigation to determine if there are unacceptable risks to human health. This data will be assessed in accordance with RAGS.
<b><i>Ecological Risk Assessment</i></b>					
Sediment	Screen data collected to determine if concentrations of chemicals pose an unacceptable risk to ecological receptors.	Collection of data that will be assessed for possible ecological risk	Ecological Risk Assessment Guidance for Superfund (ERAGS) only as it applies to munitions constituents specified in the work plan	TBC	Analytical sampling of sediment will be conducted during the investigation to determine if there are unacceptable risks to ecological receptors. This data will be assessed in accordance with ERAGS.

**Table C-2**  
**Virginia Chemical-Specific ARARs**  
**Area UXO 1**  
**St. Juliens Creek Annex, Chesapeake, Virginia**

<b>Media</b>	<b>Requirement</b>	<b>Prerequisite</b>	<b>Citation</b>	<b>ARAR Determination</b>	<b>Comment</b>
No Virginia Chemical-Specific ARARs apply.					

**Table C-3  
Federal Location-Specific ARARs  
Area UXO 1  
St. Juliens Creek Annex, Chesapeake, Virginia**

Location	Requirement	Prerequisite	Citation	ARAR Determination	Comment
<b>National Historic Preservation Act</b>					
Historic district, site, building, structure, or object	Avoid impacts on cultural resources; recover and preserve artifacts and historic properties. Where impacts are unavoidable, mitigate through design and data recovery. Plan action to minimize harm to National Historic Landmarks.	Properties listed in the National Register of Historic Places, or eligible for such listing. Alteration of terrain that threatens significant scientific, prehistorical, historical or archaeological data.	36 CFR 65.2(c)(2); 36 CFR 800.5(a) and (b), 800.11(d) and (e)	Applicable	An archeological survey identified the southeastern portion of SJCA, including the warf areas, as a historic district eligible for listing in the National Regeister of historic Places. The investigation areas are located in the river and outside of the delineated boundary of the historic district. Should field conditions warrant a modification in the investigation locations, efforts must be taken to prevent disturbing or otherwise adversely impacting buildings or other features of the historic district. In assessing potential adverse affects the substantive requirements of the regulations cited will be met; however, administrative reviews are not required for onsite CERCLA actions.
<b>Migratory Bird Treaty Act</b>					
Migratory bird area	Protects almost all species of native birds in the United States from unregulated taking.	Presence of migratory birds.	16 USC 703	Applicable	The site is located in the Atlantic Migratory Flyway. If migratory birds, or their nests or eggs, are identified at the site, operations will not destroy the birds, nests, or eggs.
<b>Coastal Zone Management Act</b>					
Coastal zone or area that will affect the coastal zone	Federal activities must be consistent with, to the area that will affect maximum extent practicable, State coastal zone management programs. Federal agencies must supply the State with a consistency determination.	Wetland, flood plain, estuary, beach, dune, barrier island, coral reef, and fish and wildlife and their habitat, within the coastal zone.	15 CFR 930.33(a)(1), (a)(2), (b); .35(a), (b); .36(a)	Applicable	Activities at Site UXO-01 that will affect Virginia's coastal zone will be consistent to the maximum extent practicable with Virginia's enforceable policies. Activites performed on-site and in compliance with CERCLA are not subject to adminisitrative review; however the substantive requirements of making a consistency determination will be met.

**Table C-4**  
**Virginia Location-Specific ARARs**  
**Area UXO 1**  
**St. Juliens Creek Annex, Chesapeake, Virginia**

Location	Requirement	Prerequisite	Citation	ARAR Determination	Comment
<b>General Provisions Relating to Marine Resources Commission</b>					
Wetlands	Mitigate or minimize the loss of wetlands and the adverse ecological effects of all permitted activities. To preserve the wetlands as much as possible in their natural state and to consider appropriate requirements for compensation only after it has been proven that the loss of the natural resource is unavoidable and that the project will have the highest public and private benefit. Commitments to preserve other existing wetlands shall not ordinarily be an acceptable form of compensation.	If a wetlands zoning ordinance has been adopted by local government, in accordance with the <i>General Provisions Relating to Marine Resources Commission</i> , and the response action is not exempt from its provisions, the project must comply with the requirements of the ordinance. In the case of absence of an ordinance, or of an exemption to it, VMRC can exercise jurisdiction over tidal wetlands.	<i>Wetlands Mitigation Compensation Policy</i> , 4 VAC 20-390-40, 50	Relevant and Appropriate	It is not anticipated that onsite activities will disturb the the existing wetland areas.
<b>Department of Game and Inland Fisheries</b>					
Area where endangered species are present	Identified federal and state threatened and endangered species are protected from unlawful taking. This requirement includes prohibition of activities that adversely affect critical habitat. The list of federal threatened and endangered species is incorporated into state law along with additions.	Activity in an area where listed threatened or endangered species are present or in an area that is designated as their critical habitat.	4 VAC 15-20-130(C)	Relevant and Appropriate	Per Navy policy, state-listed species are protected through the implementation of an Integrated Natural Resource Management Plan (INRMP). Compliance with the INRMP will constitute compliance with all substantive requirements in the regulations for this action.

**Table C-5**  
**Federal Action-Specific ARARs**  
**Area UXO 1**  
**St. Juliens Creek Annex, Chesapeake, Virginia**

<b>Action</b>	<b>Requirement</b>	<b>Prerequisite</b>	<b>Citation</b>	<b>ARAR Determination</b>	<b>Comment</b>
<b><i>Dredge and Fill</i></b>					
Discharge of dredge-and-fill	No discharge of dredged or fill material will be allowed unless appropriate and practicable steps are taken that minimize potential adverse impacts of the discharge on the aquatic ecosystem.	Discharges of dredged or fill material to surface waters, including wetlands.	40 CFR 230.10(d); 33 CFR 320.4(a), (b), (d), (p), (r)	Applicable	Onsite actions may include removal or replacement of sediments; and have the potential to impact to the downgradient river and wetland. Steps will be taken to minimize the impacts to the ecosystem.



**Table C-6  
Virginia Action-Specific ARARs  
Area UXO 1  
St. Juliens Creek Annex, Chesapeake, Virginia**

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comment
<b>Dust Control</b>					
Generation of fugitive dust	Regulations regarding reasonable precautions to prevent particulate matter from becoming airborne.	Conducting any activity which may cause particulate matter to become airborne.	<i>Standard for Fugitive Dust Emissions</i> , 9 VAC 5-50-90	Applicable	Dust control measures will be implemented during activities at the site.
<b>Stormwater management</b>					
Stormwater runoff caused by development of land that contributes to water pollution, erosion, and localized flooding	Establishes required plans and best management practices to prevent storm water pollution from discharges related to construction activity. Properties and receiving waterways downstream of any land-disturbing activity shall be protected from erosion and damage due to changes in runoff rate of flow and hydrologic characteristics, including but not limited to, changes in volume, velocity, frequency, duration, and peak flow rate of stormwater runoff.	Construction activities that will disturb more than one acre of land or that have a the potential to significantly contribute to a violation of a water quality standard or for significant contribution of pollutants to surface waters.	Stormwater Management Regulations, 4 VAC 50-60-300 (4), 310(A), 310(B), 380(A)(8)(2), 380(B)(1), 420, 1170, 1180, 1182, and 1186	Relevant and Appropriate	Detonation activities have the potential to impact to the downgradient river and wetland. Storm water pollution prevention best management practices will be implemented during these actions.
<b>Onsite waste management</b>					
Management of non-hazardous solid waste in containers	Establishes standards and procedures pertaining to the management of non-hazardous solid wastes in containers. Nonputrescible wastes must be stored in appropriate containers and not staged for more than 90 days.	Generation of non-hazardous solid waste that is managed onsite in containers.	9 VAC 20-81-95(D)(10)(b)	Applicable	It is anticipated that some wastes (such as decontamination fluids and sediment) may be generated and managed onsite in containers. Based on the analytical results from previous investigations, it is expected that these wastes will be non-hazardous solid waste. Wastes will be characterized prior to offsite disposal.
Accumulation of hazardous waste in containers onsite for less than 90 days	Hazardous waste may be accumulated on site in containers for up to 90 days so long as the containers are in good condition, compatible with the waste being stored, and labeled with the words "Hazardous Waste" and the date that accumulation began. The containers must also be kept closed unless adding or removing waste and inspected weekly.	Accumulation of hazardous waste in containers onsite.	9 VAC 20-60-262 only as it incorporates 40 CFR 262.34 (a) (1)(i), (2), (3), and 40 CFR 265.171 through 174	Applicable	It is possible that hazardous waste will be generated and staged onsite in containers for less than 90 days

## Acronyms and Abbreviations

ARAR	Applicable or relevant and appropriate requirement	TCLP	Toxicity Characteristic Leaching Procedure
BTAG	Biological Technical Assistance Group	TSCA	Toxic Substance Control Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act	USACE	US Army Corps of Engineers
CFR	Code of Federal Regulations	USC	United States Code
NPDES	National Pollutant Discharge Elimination System	USEPA	United States Environmental Protection Agency
ppm	Parts per Million	UXO	Unexploded Ordnance
RBC	Risk-Based Concentrations	VA	Virginia
RCRA	Resource Conservation and Recovery Act	VAC	Virginia Administrative Code
RSL	Regional Screening Limit	VPA	Virginia Pollutant Abatement
SJCA	St. Juliens Creek Annex	VPDES	Virginia Pollutant Discharge Elimination System
TBC	To Be considered		

## References

Commonwealth of Virginia, 2004. Preliminary Identification, Applicable or Relevant and Appropriate Requirements.

USEPA, 1998. *CERCLA Compliance with Other Laws Manual: Interim Final*. Office of Emergency and Remedial Response. EPA/540/G-89/006.

USEPA, 1998. *CERCLA Compliance with Other Laws Manual: Part II. Clean Air Act and Other Environmental Statutes*. Office of Emergency and Remedial Response. EPA/540/G-89/009.

USEPA, 1998. RCRA, Superfund & EPCRA Hotline Training Manual. Introduction to Applicable or Relevant and Appropriate Requirements. EPA540-R-98-020.