WORK PLAN FOR
MILITARY MUNITIONS RESPONSE PROGRAM
NON-TIME CRITICAL REMOVAL ACTION

Hancock Field Air National Guard Base
Syracuse, New York

FINAL

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March 2019

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14 March 2019

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LIST OF ACRONYMS AND ABBREVIATIONS

°F	Degrees Fahrenheit
AAR	After Action Report
AM	Action Memorandum
ANG	Air National Guard
APP	Accident Prevention Plan
ARAR	Applicable or Relevant and Appropriate Requirement
BATF	Bureau of Alcohol, Tobacco, Firearms, and Explosives
bgs	Below ground surface
CD-ROM	Compact disc read-only memory
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CSE	Comprehensive Site Evaluation
DDESB	Department of Defense Explosives Safety Board
DFW	Definable feature of work
DoD	Department of Defense
DPM	Deputy Project Manager
EA	EA Engineering, P.C.
EE/CA	Engineering Evaluation/Cost Analysis
EM	Engineer Manual
EOD	Explosive Ordnance Disposal
EPA	United States Environmental Protection Agency
ESS	Explosive Safety Submission
FIB	Firing-in-Buttress
ft	Foot (feet)
GIS	Geographic information system
Hancock Field	Hancock Field Air National Guard Base
HEAT	High explosive anti-tank
HFD	Hazard fragment distance
IME	Institute of Makers of Explosives
in.	Inch(es)
lb	Pound(s)
LUC	Land use control

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

MC	Munitions constituents
MD	Munitions debris
MDAS	Material documented as safe
MEC	Munitions and explosives of concern
MFR	Memorandum for Record
MGFD	Munitions with the greatest fragmentation distance
mg/kg	Milligram(s) per kilogram
mm	Millimeter(s)
MMRP	Military Munitions Response Program
MPPEH	Material potentially presenting an explosive hazard
MRA	Munitions response area
MRS	Munitions response site
MSD	Minimum separation distance
NCP	National Oil and Hazard Substance Contingency Plan
NFA	No further action
NTCRA	Non-Time Critical Removal Action
NYSDEC	New York State Department of Environmental Conservation
OESS	Ordnance and Explosives Safety Specialist
OSHA	Occupational Safety and Health Administration
PBC	Public Benefit Corporation
pdf	Portable document format
PETN	Pentaerythritol tetranitrate
PM	Project Manager
PPE	Personal protective equipment
PWS	Performance Work Statement
QA	Quality assurance
QC	Quality control
QCP	Quality Control Plan
RAO	Removal action objective
SAA	Small arms ammunition
SCO	Soil Cleanup Objective
Sky	Sky Research, Inc.
SOP	Standard Operating Procedure
SSFR	Site-Specific Final Report
SSHP	Site Safety and Health Plan

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

STR	Senior Technical Reviewer
SUXOS	Senior UXO Supervisor
TP	Technical Paper
USACE	United States Army of Corps of Engineer
USAF	United States Air Force
UXO	Unexploded ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer
WP	Work Plan
XRF	X-ray fluorescence

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1. INTRODUCTION

1.1 PROJECT AUTHORIZATION

The United States Army Corps of Engineers (USACE) – Omaha District has contracted EA Engineering, P.C. (EA) to perform a Non-Time Critical Removal Action (NTCRA) at Hancock Field Air National Guard Base (Hancock Field) located in Syracuse, New York under Contract Number W9128F-13-D-0006, Delivery Order 0002. In order to execute the NTCRA, EA has also been contracted to complete this NTCRA Work Plan (WP).

This NTCRA is being performed in support of the Air National Guard (ANG) Military Munitions Response Program (MMRP) at Hancock Field. The goal of the ANG MMRP is to make munitions response areas (MRAs) and munitions response sites (MRSs) safe for re-use and to protect human health and the environment in the process. The MMRP addresses issues related to munitions and explosives of concern (MEC), chemical warfare materiel, and munitions constituents (MC) associated with MRAs, as well as related hazardous substances, pollutants, and potential contaminants of concern found at locations other than operational ranges.

1.2 REGULATORY FRAMEWORK

This NTCRA represents ANG compliance with the Defense Environmental Restoration Program, which requires that environmental responses be performed by the Department of Defense (DoD) consistent with the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA; 42 United States Code 9601) requirements for investigation and cleanup. Although Hancock Field is not a National Priorities List site, work performed is to be consistent with United States Environmental Protection Agency (EPA) guidance (EPA 1993) under CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 Code of Federal Regulations [CFR], Part 300). CERCLA has no special provisions for dealing with explosive safety, and therefore, the provisions in the DoD's Ammunition and Explosives Safety Standards (DoD 6055.09) and USACE Engineer Manual (EM) 385-1-97 must be adhered to.

1.3 PURPOSE AND SCOPE

The purpose of the NTCRA is to mitigate potential hazards to human health and the environment and allow future residential use by removing all debris associated with the Firing-in-Buttress (FIB) at MRS SR002 on Hancock Field. The NTCRA will eliminate future risk to human health by removing all debris at MRS SR002. The scope of this NTCRA includes demolition and removal of the FIB including all subsurface debris from the FIB interior. This WP was developed to guide the activities required to implement the NTCRA and address the removal action objectives.

1.4 WORK PLAN ORGANIZATION

This WP has been prepared to support the NTCRA and contains the following chapters/sub-plans:

Chapter 1, Introduction: Chapter 1 provides an introduction to the project, including authorization, regulatory framework, purpose and scope, WP organization, installation background, previous investigations, and an initial summary of the risk from MEC/munitions debris (MD) (including small arms ammunition [SAA]), and MC.

Chapter 2, Technical Management Plan: This chapter details the organizational structure, lines of authority, and communication of the project team.

Chapter 3, Removal Action Plan: This chapter describes the field methods and procedures planned for the NTCRA.

Chapter 4, Quality Control Plan (QCP): This chapter describes procedures for controlling and measuring the quality of work performed, including the organization, responsibilities, and policies.

Chapter 5, Explosives Management Plan: This chapter provides details for management of explosives during the NTCRA in accordance with applicable regulations.

Chapter 6, Environmental Protection Plan: This chapter provides general information as it relates to the Environmental Protection Plan and lists applicable requirements.

Chapter 7, References: This chapter includes a list of references used in the preparation of the WP.

Additional information and sub-plans are attached to this WP as appendixes as detailed below:

Appendix A, Performance Work Statement (PWS): Presents the PWS, dated May 2015.

Appendix B, Explosive Safety Submission (ESS): Presents the DoD Explosives Safety Board (DDESB) approved ESS developed for the NTCRA with a copy of the DDESB approval letter *(ESS to be included in Final NTCRA WP).*

Appendix C, Project Points of Contact: Provides a list of project points of contact.

Appendix D, Accident Prevention Plan (APP): The APP describes the health and safety procedures, personal protection standards, and environmental health hazards applicable to this project in accordance with EM 385-1-1, *Safety and Health Requirements Manual* (USACE 2014), and EM 385-1-97, *Explosives – Safety and Health Requirements Manual* (USACE 2008b).

Appendix E, Fact Sheet: Presents the Fact Sheet describing the planned NTCRA.

Appendix F, Standard Operating Procedures (SOPs): Presents the SOPs that will be used during the NTCRA field activities.

Appendix G, Field Forms: Presents field forms that will be used during the NTCRA field activities.

Appendix H, Laboratory Certifications: Provides laboratory certifications.

Appendix I, Quality Assurance Project Plan Worksheets: Provides Quality Assurance Project Plan worksheets.

1.5 INSTALLATION BACKGROUND

1.5.1 Site Location

Hancock Field, as shown in Figure 1-1, is located south of and adjacent to the Syracuse-Hancock International Airport, approximately 5 miles north of the city of Syracuse in Onondaga County, New York.

The FIB located at Hancock Field, MRS SR002, encompasses approximately 0.1 acre of land (Figure 1-2) and includes the FIB structure and the soil contained within the structure. The structure is comprised of concrete with an interior and front face covered in wood timbers. The exterior is covered with grass sod and vegetation. The opening of the structure is approximately 15 feet (ft) high and 80 ft wide. The inside of the wooden structure contains the soil impact berm.

1.5.2 Installation Mission and Operational History

1.5.2.1 Installation Mission

The installation's mission is to maintain well-trained, well-equipped units available for prompt mobilization during war and to provide assistance during national emergencies (i.e., natural disasters or civil disturbances). During peacetime, the combat-ready and support units are assigned to most United States Air Force (USAF) major commands to carry out missions compatible with training, mobilization readiness, and humanitarian and contingency operations. Mission-related activities include vehicle, aircraft, and runway maintenance; fueling operations; and military training operations (USACE– Omaha District 2013).

1.5.2.2 Installation History

In 1942, Hancock Field, formerly Mattydale Bomber Base, was constructed along with three 5,500-ft runways. The facility was built to serve as a staging and storage area for repairing and re-outfitting B-17 and B-24 aircraft used in World War II. The Base was also used by the First Concentration Command, later known as the Air Service Command, to assemble and test B-24 aircraft. In 1946, the city of Syracuse took control of the Mattydale Bomber Base, and in 1948, the Base was dedicated as a commercial airfield. The Clarence E. Hancock Airport opened in September 1949, attaining international airport status in 1970. Over the last few decades, both the mission and physical size of the Hancock Field (military) installation have been reduced from the initial World War II capacity. Much of the airbase, including the runways, was converted to civilian use as the Syracuse Hancock International Airport (USACE– Omaha District 2013).

Currently, Hancock Field is home to the 174th Attack Wing of the New York ANG. The 174th began as the 138th Fighter Squadron on 28 October 1947. In 1962, the 138th was officially renamed

the 147th Tactical Fighter Group. In 1979, there was a status change from Tactical Fighter Group to Tactical Fighter Wing. In 1992, the Tactical Fighter Wing was redesignated the 174th Fighter Wing. In 2012, the 174th Fighter Wing was renamed as the 174th Attack Wing. Aircraft historically utilized by the unit include the P-47D Thunderbolt, F-84B Thunderjet, F-86H Sabre, A-10A Thunderbolt II, and F-16A Fighting Falcon (USACE– Omaha District 2013).
The installation currently encompasses approximately 357 acres and consists of several buildings and operational facilities. It is divided into two tracts of land: Tract II and Tract III. Tract III encompasses approximately 270 acres and includes MRS SR002. Both tracts are owned by the USAF (fee-owned) with a license to New York State for ANG use. The city of Syracuse owns the land bordering Tract II and the land north of Tract III (USACE– Omaha District 2013).

1.5.3 Summary of Historical Military Munitions Related Activities

The intended use of the FIB was as a backstop and safety berm to clear jammed rounds from aircraft gun systems. It was also used by F-86 aircraft for test firings of gun systems and boresight alignment, which reportedly included the use of SAA of various caliber (up to 0.50-caliber). Based on the MD observed in the FIB, aircraft may have also fired 20-millimeter (mm) target practice projectiles and 3.5-inch (in.) rockets. The FIB has been inactive since 1976 (USACE– Omaha District 2013).

1.5.4 Regional Climate

The climate at Hancock Field is mild during summer and very cold during winter with abundant precipitation. Monthly mean high temperature ranges from 31 degrees Fahrenheit (°F) in January to 82°F in July. Monthly mean low temperature ranges from 15°F in January to 60°F in July. Average annual precipitation is approximately 38.3 in. Annual mean snowfall is approximately 107.1 in. (USACE– Omaha District 2013).

1.5.5 Topography

Hancock Field is located within the Ontario-Mohawk Lowland Region of the Central Lowland Physiographic Province. This province has a relatively flat topography created by glacial erosion and deposition during the Wisconsin Glaciation. The installation is part of an area of flat lowlands situated between Lake Ontario and the Onondaga Escarpment in Syracuse, New York. Topography across the installation rises gradually from approximately 385 ft above mean sea level at the southeast end of the installation to approximately 425 ft above mean sea level at the west-northwest part of the installation (USACE– Omaha District 2013).

1.5.6 Soil

Soils at Hancock Field are composed of silts with varying amounts of clay and fine to medium sand. Specifically, soils within the wood structure at the FIB (MRS SR002) consist primarily of sandy soils. Subsurface soils beneath the berm consist of Ontario loam (EA and USACE 2016).

1.5.7 Geology and Hydrogeology

1.5.7.1 Geology

Hancock Field is located in an area of flat lowlands between Lake Ontario and the Onondaga Escarpment. Multiple layers underlie the Base, including unconsolidated lake sediments from 0 to 50 ft below ground surface (bgs), glacial till from 50 to 100 ft bgs, and sedimentary bedrock beneath the till. The lake sediments are composed of silts with varying amounts of clay and fine to medium sand. The glacial till is composed of gravel and large cobbles in a silty clay matrix. The sedimentary bedrock consists of shale and siltstone of the Vernon Formation (USACE– Omaha District 2013).

1.5.7.2 Hydrogeology

The lake sediments contain an unconfined, non-sole-source water table aquifer that is several feet below ground surface. Due to low yield resulting from low transmissivity, the aquifer is not a suitable source of potable water. A confined aquifer is found in the bedrock below the glacial till. The glacial till layer serves as a barrier to vertical groundwater migration between the overlying lake sediments and underlying sedimentary bedrock. There is a strong upward flow potential between the confined bedrock aquifer and the unconfined water table aquifer (USACE– Omaha District 2013).

Groundwater may be encountered 3 ft bgs at the FIB (MRS SR002) (USACE– Omaha District 2013).

1.5.8 Surface Water Hydrology

Hancock Field and its surrounding areas contain naturally occurring swamps and poorly drained areas. These natural lowlands and swamps have been drastically altered by development of this area into its current use as a transportation center and military facility. There are mapped wetlands located in the southern and eastern areas of the installation. In general, surface drainage near the FIB (MRS SR002) is south-southeast toward the North Branch of Ley Creek (USACE– Omaha District 2013).

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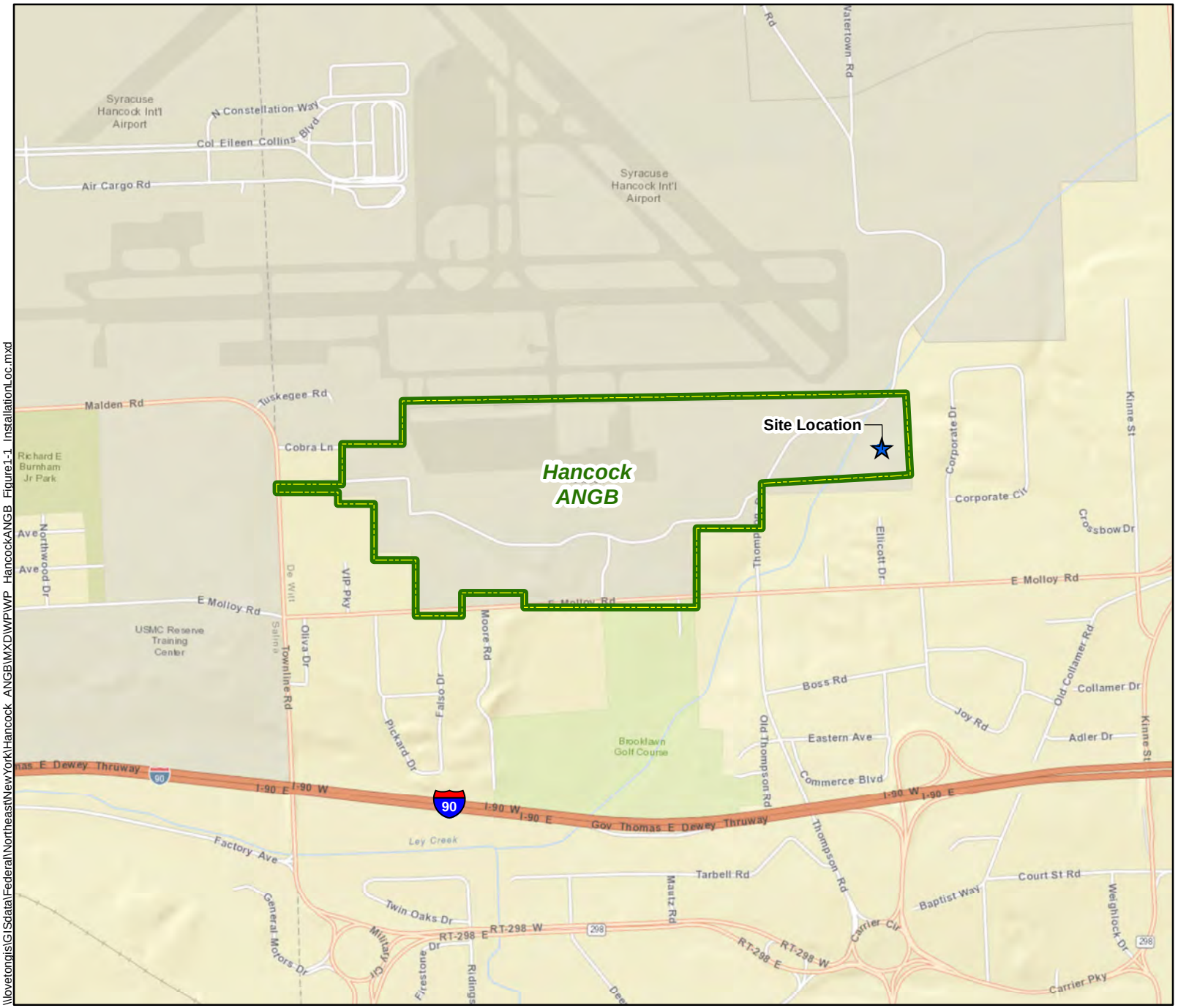
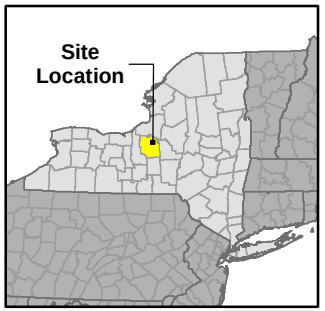


VICINITY MAP



Legend

Installation Boundary

Data Sources:
ESRI 2012

Map Date: 3/8/2016

N

0 1,000 2,000

Feet

Figure 1-1
Installation Location
Hancock ANGB
Syracuse, New York

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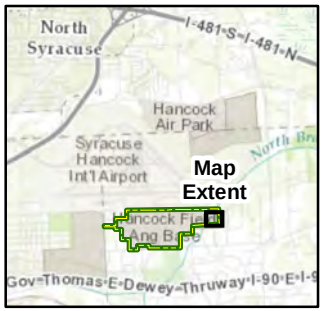
VICINITY MAP



Legend

- Installation Boundary
- Firing-In Buttress (MRS SR002)

Data Sources:
Google Earth 2015

Map Date: 3/8/2016

N

0 50 100

Feet

Figure 1-2
Firing-In Buttress (MRS SR002) Location
Hancock ANGB
Syracuse, New York

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1.5.9 Current and Future Land Use

1.5.9.1 Surrounding Land Use and Populations

Hancock Field, located in Onondaga County, is approximately 5 miles from downtown Syracuse, New York. Hancock Field is bordered on the north by airport property owned by the city of Syracuse, and to the east, south, and west by commercial/industrial developments. The Base is bordered to the south by East Malloy Road. Across East Malloy Road is the former Brooklawn golf course and several small commercial properties (New York State Department of Environmental Conservation [NYSDEC] 2014). There are approximately 600 persons per square mile in Onondaga County (United States Census Bureau 2015).

1.5.9.2 Current Land Use

Currently, the FIB (MRS SR002) is vacant. The area immediately around the MRS is gently sloped with dense vegetation. The wooden portion of the FIB structure is still present and largely intact. A site-specific NTCRA was conducted in 2014 to remove lead-contaminated soils from the FIB (MRS SR002); however, the wood/concrete structure and the majority of the soil within the structure are still present (USACE– Omaha District 2013).

1.5.9.3 Future Land Use

Future land use of the MRS may include residential use.

1.6 PREVIOUS INVESTIGATIONS AT SR002

Previous investigations and RAs conducted at Hancock Field include the following:

- Modified Comprehensive Site Evaluation (CSE) Phase I (Innovative Technical Solutions, Inc. and Shaw Environmental, Inc. 2009)
- CSE Phase II (Sky Research, Inc. [Sky] 2012)
- NTCRA for Lead Soil Removal at MRSs SR001 and SR002 (ANG 2016)
- NTCRA Site-Specific Final Report for MRSs SR001 and SR002 (ANG 2016)
- USACE site visit of SR002 (Schneider and Kochefko 2015).

The above investigations and RAs are described below.

1.6.1 Modified Comprehensive Site Evaluation Phase I

In support of the MMRP at Hancock Field, a CSE Phase I was completed in 2009 to identify potential MRAs, evaluate actual or potential releases of MC to the environment, and to evaluate associated targets of concern. The CSE Phase I investigated 10 potential MRAs at Hancock Field, including the FIB (SR002) MRA. Based on the findings of the CSE Phase I, it was determined

that there was no evidence of MC releases that would warrant immediate action. However, a potential for environmental impacts from MC at MRAs SR001 and SR002 was identified. No further action (NFA) or transfer to the Formerly Used Defense Sites Program was recommended for the remaining eight MRAs.

The CSE Phase I identified lead, copper, and iron as the primary MCs of concern at MRAs SR001 and SR002. Additionally, a 3.5-in. high explosive anti-tank (HEAT) M28A2 rocket was identified at the FIB, MRA SR002, which resulted in explosives being included as contaminants of concern. It was recommended that a CSE Phase II be conducted at these two MRAs to assess the potential for environmental release of MC (USACE– Omaha District 2013).

1.6.2 Comprehensive Site Evaluation Phase II

Based on the recommendations from the CSE Phase I, a CSE Phase II was conducted for MRAs SR001 and SR002 in 2010. The objectives of the CSE Phase II were to determine whether releases of MC to the environment had occurred and determine if there was a need for an emergency response and/or whether other munitions response actions were necessary. The CSE Phase II activities were conducted between 8 and 17 September 2010, and included visual surveys, ex-situ X-ray fluorescence (XRF) sampling of surface and subsurface soil, a human health risk assessment, and an ecological risk assessment (Sky 2012).

Evidence of small arms use was observed during the visual inspection at SR002, including blank 5.56-mm casings, plastic small arms 5.56-mm magazine, and 0.50-caliber steel cores. In addition to the small arms identified during the visual inspection, 20-mm target practice MD and a rocket spacer were observed (Sky 2012). Although the CSE Phase I identified explosives as a contaminant of concern due to the identification of the 3.5-in. HEAT rocket, samples were not analyzed for explosives during the CSE Phase II because no other evidence of MEC was observed. The CSE Phase II indicated that significant evidence of MEC use was not identified during the visual survey and that the rocket found at the FIB did not constitute a significant enough source to warrant sampling (Sky 2012). XRF samples were collected and analyzed for lead at MRA SR002.

Based on the results of the CSE Phase II, MRA SR002 was divided into two MRSs. Further munitions response was recommended for approximately 0.1 acre, designated as MRS SR002. It also recommended NFA for approximately 5.7 acres, designated as MRS SR002a (USACE– Omaha District 2013).

1.6.3 Non-Time Critical Removal Action for Lead in Soil at MRSs SR001 and SR002

An NTCRA to remove high lead (and copper) concentrations from soil in the Shooting-In Buttress (SR001) MRS and FIB (MRS SR002) was completed between 16 June and 22 August 2014. Soils identified with lead concentrations exceeding 400 milligrams per kilogram (mg/kg) and/or copper concentrations exceeding 270 mg/kg were excavated for offsite disposal. During this NTCRA, at SR001 approximately 2,710 tons of soil were excavated, stabilized, and transported offsite for disposal as non-hazardous waste. At SR002 234 tons of soil were excavated, stabilized, and sifted for MD, prior to offsite disposal as non-hazardous waste. No MEC were identified during the NTCRA. However, at SR001 approximately 500 pounds (lb) of inert M781 40-mm practice

grenade debris, three metal smoke canisters (unknown type), and debris (rubber body) from a GG04 non-lethal hand grenade were recovered. At SR002, approximately 600 lb of M55A2 20-mm target practice projectiles and a ballistic nose cone from a 3.5-in. HEAT rocket were recovered. All MD discovered during the NTCRA was certified as material documented as safe (MDAS) and transported offsite for recycling (ANG 2016).

1.6.4 Non-Time Critical Removal Action Site-Specific Final Report for MRSs SR001 and SR002

Upon completion of the NTCRA for lead in soil at the Shooting-In Buttress (SR001) MRS and FIB (MRS SR002), the MEC hazard assessment tool was completed to assess the potential exposure hazard to MEC at the FIB (MRS SR002). The NTCRA Site-Specific Final Report for MRSs SR001 and SR002 concluded that since no MEC were identified at MRSs during the NTCRA, it confirmed historical conclusions that only small arms, inert M781 40-mm practice grenades, and inert 20-mm target practice projectiles were used at the MRSs. Therefore, there is no potential explosive hazard associated with MEC at the Shooting-In Buttress (SR001) MRS and the FIB (MRS SR002) (ANG 2016).

1.6.5 United States Army Corps of Engineers Site Visit of SR002

A site visit, documented as a Memorandum for Record (MFR) dated 28 April 2015, was conducted by USACE-Omaha District to inspect the MRS and evaluate the potential of the MRS to contain MEC following completion of the 2014 NTCRA. During the site visit, it was confirmed that the soil inside the FIB structure contained 20-mm target practice projectiles and 0.50-caliber projectiles. Based on the analog magnetometer survey conducted during the site visit, the MFR concluded that it is unlikely that an intact 3.5-in. rocket or warhead is present inside the FIB structure, and that the wooden structure can be expected to contain 20-mm target practice projectiles, 0.50-caliber projectiles, and fragmentation from 3.5-in. rockets. The MFR recommended the MRS be classified as a low probability site regarding the potential to encounter MEC (Schneider and Kochefko 2015).

1.7 ENGINEERING EVALUATION/COST ANALYSIS

An Engineering Evaluation/Cost Analysis (EE/CA) (USACE– Omaha District 2016) for Hancock Field was developed to identify the objectives of the removal action; evaluate the effectiveness, implementability, and cost of various alternatives that may satisfy these objectives; and identify the recommended action for the FIB (MRS SR002).

The removal action alternative recommended by the EE/CA, presented as Alternative 3, was an NTCRA to remove all debris associated with the FIB at MRS SR002. This recommendation was based on results of screening and detailed analysis of alternatives presented in the EE/CA. Although the MRS is considered industrial, the alternative allows for unlimited use/unrestricted exposure for human health.

1.8 ACTION MEMORANDUM

Subsequent to the EE/CA, an Action Memorandum (AM) (ANG 2018) was developed to present the selected alternative for the MRS at Hancock Field. The purpose of the AM is to request and document approval of the selected NTCRA (removal of all debris associated with the FIB).

The AM concluded that the conditions at Hancock Field meet the NCP criteria for a NTCRA and recommend the approval of an NTCRA.

1.9 STREAMLINED RISK EVALUATION

An investigation of potential MEC and MC contamination at the FIB (SR002) MRA was completed during the CSE Phase I and II investigations. During the CSE Phase I, a 3.5-in. rocket (HEAT, M28A2) was found embedded in the FIB structure. During the CSE Phase II, survey teams observed MD consisting of one spacer from a 3.5-in. rocket (HEAT, M28A2) and 20-mm target practice debris in soil directly in front of the revetment. While sampling in the FIB revetment 0.50-caliber debris was also identified. Although 20-mm target practice projectiles (that contain no high explosives) were observed at the MRS, the FIB (MRS SR002) was historically used as a boresight range. It was determined unlikely that 20-mm high explosives were ever used at this MRS and would, therefore, not be present subsurface. During the MFR site visit, it was confirmed that soil inside the FIB structure contained 20-mm target practice projectiles and 0.50-caliber projectiles. It was determined unlikely that an intact 3.5-in. rocket or warhead is present inside the FIB structure, and that the wooden structure can be expected to contain 20-mm target practice projectiles, 0.50-caliber projectiles, and fragmentation from 3.5-in. rockets (USACE– Omaha District 2013).

1.9.1 MEC Exposure Pathway Analysis Conclusions

During the CSE Phase II, and later during the 2014 NTCRA and USACE site visit of SR002, no MEC were identified on the surface of the impact berm. Therefore, surface MEC exposure pathways for all receptors, including construction worker, trespasser, and future resident, are incomplete. Based on the MD observed from the 3.5-in. rocket, subsurface MEC exposure pathways for the construction worker and future resident are potentially complete. The subsurface MEC exposure pathways for the trespasser are incomplete because a trespasser would not likely access the subsurface (USACE– Omaha District 2013).

1.9.2 MC Exposure Pathway Analysis Conclusions

Evidence of small caliber munitions and MC-contaminated soil was identified at MRS SR002 during the CSE Phase I and II investigations. The CSE Phase I identified lead, copper, and iron as the primary MC of concern. Additionally, since a 3.5-in. rocket was identified at the FIB, explosives were included as contaminants of concern. During the CSE Phase II, lead soil concentrations were utilized to delineate the extent of contamination. Samples were not analyzed for explosives during the CSE Phase II because significant evidence of MEC use was not identified during the visual survey and the rocket found at the FIB did not constitute a significant enough source to warrant sampling. Three samples exceeded the modified screening level for lead of 261

mg/kg; these samples were located within and at the center of the FIB. A screening level human health risk assessment and screening level ecological risk assessment indicated that lead concentrations were not likely to present a significant human health risk under a residential land use scenario. However, the assessment concluded that lead was present at concentrations that exceeded the ecological risk screening criterion intended to be protective of soil invertebrates, plants, and wildlife. During the NTCRA soils impacted by munitions-related metals (i.e., lead and copper) were excavated from MRS SR002. Because MC-impacted soils were excavated from the MRS, MC exposure pathways for all receptors are incomplete.

1.10 REMOVAL ACTION OBJECTIVES

This NTCRA WP has been prepared to describe the activities and outline the procedures necessary to achieve the performance objectives documented in the PWS for the task order and achieve the removal action objectives (RAOs) documented in the AM.

Potential MEC/MD (including SAA) at the FIB (MRS SR002) includes 20-mm target practice projectiles, 3.5-in. HEAT, M28A2 rockets and rocket fragments, and 0.50-caliber small arms projectiles. No MC contamination is expected due to previous NTCRA soil excavation conducted at the MRS.

RAOs are summarized in Table 1-1.

Table 1-1 Removal Action Objectives

MRS	Removal Action Objective(s)
Firing-in-Buttress (SR002)	• Reduce current and future human health risks associated with potential MEC exposure from soil and debris inside the FIB structure. • Allow for future residential use.

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2. TECHNICAL MANAGEMENT PLAN

2.1 PROJECT ORGANIZATION

The organizations that will participate in project implementation have specific functions according to their project responsibilities. An organization chart outlining the relationship between EA project personnel is shown on Figure 2-1. The Project Delivery Team consists of the ANG, Hancock Field, USACE-Omaha District, and EA. Key project team members are listed in Table 2-1.

2.1.1 Air National Guard

The ANG is responsible for coordinating environmental-related investigation and remediation work with the NYSDEC. Ms. Jody Murata is the Project Manager (PM) for the NTCRA.

2.1.2 Environmental Restoration Office at Hancock Field

The Environmental Restoration Office at Hancock Field is responsible for managing environmental restoration activities at the Installation. Captain Bruce King is the Base Environmental Manager who will be coordinating NTCRA activities at Hancock Field.

2.1.3 USACE-Omaha District

The USACE-Omaha District is responsible for overall project administration and technical management services including contracting and procurement, submittals management, cost and schedule management, and technical and safety oversight. Mr. James Bouvier is the USACE-Omaha District Project Manager responsible for overall management of this project. Mr. Bouvier will coordinate all project matters with Hancock Field, ANG, EA, and other USACE team members as appropriate.

2.1.4 Regulatory Agencies

NYSDEC will provide review and technical oversight for the project.

Table 2–1 Key Project Members

PM, ANG	Jody Murata
Environmental Manager, Hancock Field	Captain Bruce King
PM, USACE-Omaha District	James Bouvier
PM, NYSDEC	Brian Jankauskas
Contractor PM, EA	Joseph Von Uderitz
Contractor Senior UXO Supervisor (SUXOS), EA	J.D. Marlowe

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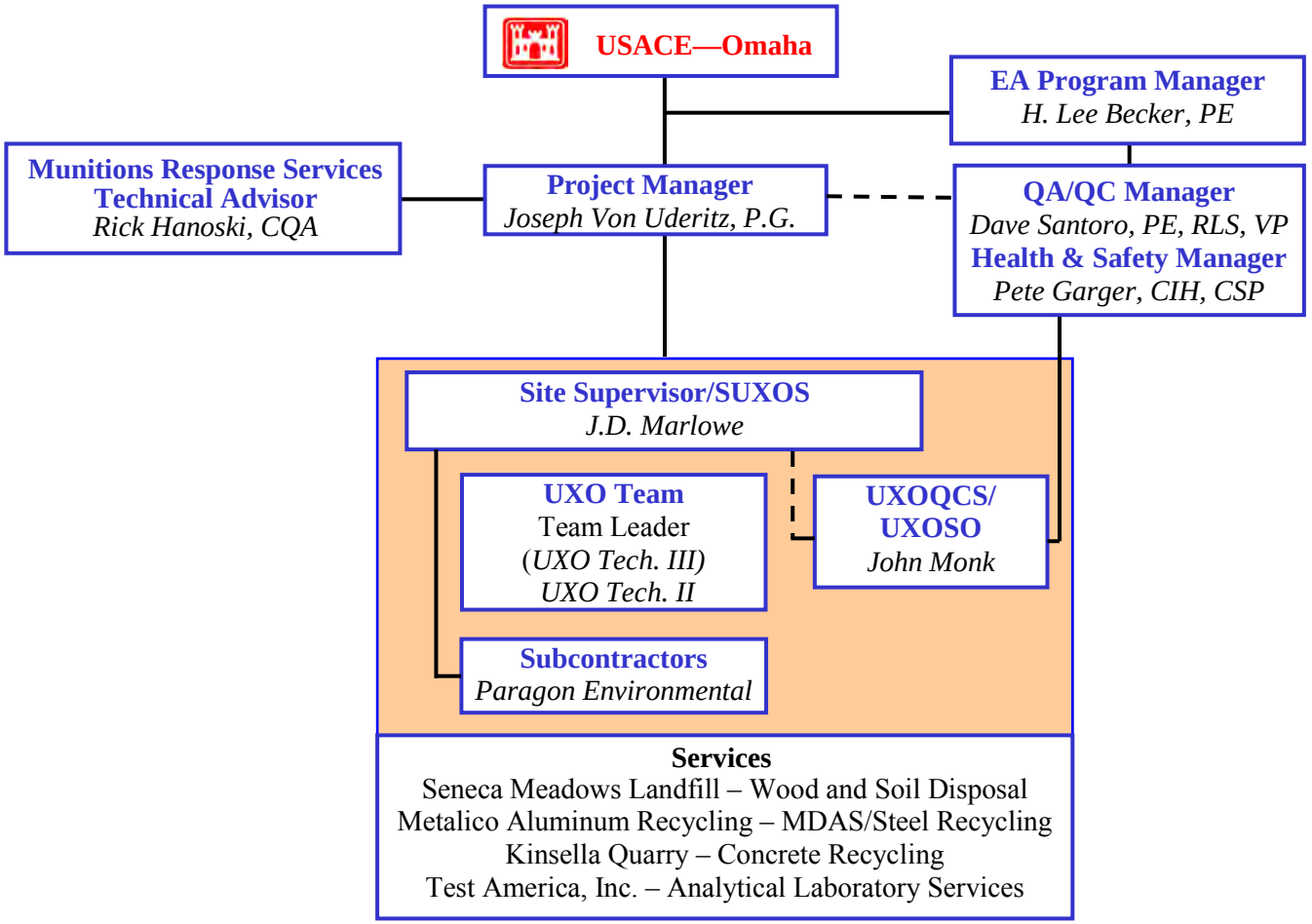
Figure 2-1 Project Organizational Chart



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2.2 CONTRACTOR PROJECT PERSONNEL

The NTCRA activities will be managed through an organized effort of scientific and engineering personnel and technical resources. These efforts will employ preapproved field procedures, sampling techniques, and analytical methods to accomplish the project objectives. Effective program organization will accommodate these requirements while maintaining a manageable degree of control over these activities.

2.2.1 EA Program Manager

Mr. H. Lee Becker, Professional Engineer, is the Program Manager. The Program Manager is responsible for overall management of the contract. The Program Manager serves as the liaison between the Task Order management team and the EA executive team.

2.2.2 EA Project Manager

Mr. Joseph Von Uderitz, P.G., is the PM. The PM has overall responsibility for completion of the project in accordance with contract and regulatory requirements. He is responsible for planning and oversight of the project activities and acts as an interface between the field staff and corporate office. The PM has ultimate responsibility for the implementation of the project tasks and the safety/health of project workers. He is responsible for development of WPs, field activities, and implementing the NTCRA. The PM is also responsible for the preparation of submittals, coordination of schedules, and cost tracking, and serves as the primary contact.

The PM is responsible for integrating Quality Control (QC) functions into project activities and supporting the Program QC Manager with QC staff resources. This includes coordinating project and QC team communications and providing periodic reports to USACE-Omaha District regarding QC status updates.

2.2.3 EA Corporate Health and Safety Manager

Mr. Pete Garger, Certified Industrial Hygienist (CIH), is the Health and Safety Manager for this project. He is responsible for the development, implementation, oversight, and enforcement of the APP, Site Safety and Health Plan (SSHP), and overall management of the health and safety program for the project. The Health and Safety Manager coordinates any modification to the SSHP with the UXO Safety Officer (UXOSO) and the USACE-Omaha District Contracting Officer. He is responsible for the evaluation of work practices, corresponding personal protective equipment (PPE), and reviews accident reports and results of daily inspections.

2.2.4 EA Program Quality Control Manager

Mr. Dave Santoro, Registered Licensed Surveyor, Professional Engineer, and Vice President is the EA Program QC Manager. He will provide overall program quality management and implementation on the project. He will have responsibility for identifying quality problems and will initiate, recommend, and/or provide corrective measures to those problems. He will verify implementation of corrective measures and conduct senior level review of contract deliverables;

monitor activities at the work sites; and coordinate with the PM, Site Supervisor, and UXO Quality Control Specialist (UXOQCS).

Mr. Santoro's authority includes an ability to halt or stop work as necessary to address quality issues; signing of Certificates of Compliance and conformance, as required; and approving all WPs and all changes or deviations from established procedures or techniques.

2.2.5 Site Supervisor / Senior UXO Supervisor

Mr. J.D. Marlowe is the Site Supervisor and Senior Unexploded Ordnance Supervisor (SUXOS). The Site Supervisor is responsible for the implementation, oversight, and overall field management for the project. The Site Supervisor communicates directly with the PM.

The SUXOS will meet the minimum qualifications as outlined in DDESB Technical Paper (TP) 18 (DDESB 2016). The SUXOS is responsible for planning, coordination, and supervision of contractor and subcontractor activities related to the NTCRA. The SUXOS coordinates with the installation and USACE-Omaha District personnel regarding MMRP NTCRA activities, safety concerns, and schedules. He also directs planning and implementation of safety and health measures related to munitions activities, conducts QC audits, and enforces corrective action.

The SUXOS will help to ensure that the NTCRA activities comply with all installation regulations, DoD directives, and any other relevant local, state, and federal statutes and codes. The SUXOS will work closely with the UXO personnel and supervise all aspects of the NTCRA field work.

2.2.6 UXO Quality Control Specialist / UXO Safety Officer

Mr. John Monk is the UXOQCS and the UXOSO. The UXOQCS and UXOSO will meet the minimum qualifications outlined in DDESB TP-18 (DDESB 2016). The UXOSO will also serve as the Site Safety and Health Officer. The responsibilities of the Site Safety and Health Officer are detailed in the APP (Appendix A). He communicates directly with the PM and the Health and Safety Manager.

The UXOQCS is responsible for documenting field QC and has full authorization to stop work and demand corrective action for non-compliance with the level of quality required by the contract plans. The UXOQCS is a project team member responsible for ensuring that project processes and systems conform to project QC requirements, industry quality standards, and governmental regulations. The UXOQCS openly communicates with the project management team, contributes to the overall success of the project, and ensures that suitable QC requirements are implemented. In addition, the UXOQCS must have the ability to implement and maintain the QC Program for MEC-related activities, execute the three-phased QC process, conduct QC inspections of MEC and explosives operations for compliance with established procedures, maintain project QC files, and direct and approve corrective actions to ensure the work complies with contractual requirements.

The UXOQCS will also be responsible for the oversight of subcontractor QC efforts, and review/approval of subcontractor personnel qualifications. Discrepancies associated with

subcontractor work will be communicated to the EA Program QC Manager for resolution. The UXOQCS has the authority to act directly with subcontractor representatives on QC activities and will serve as the primary point of contact for Government quality assurance personnel.

The UXOQCS is responsible for compiling, organizing, updating, and maintaining all hard copy and electronic QC data files for the project. The UXOQCS may utilize a Data Manager to work with the PM and UXOQCS to set up and maintain logs and records of field QC inspections, audits, reports, and meetings for the project files. The UXOQCS, or Data Manager, will also ensure that project field-generated documents such as Field Change Requests, Nonconformance Reports, Root Cause Analyses, and Corrective Action Requests are reviewed and approved before implementation. The UXOQCS and the Data Manager will work together to establish and maintain the project field QC file.

The UXOSO must have the ability to implement the Safety Program for MEC-related activities, conduct safety inspections of MEC and explosives operations for compliance with established procedures, and direct and approve corrective actions to ensure the work is conducted in a safe manner. The UXOSO is responsible for the development, implementation, oversight, and site enforcement of the SSHP and overall field management of the health and safety program for the project. The UXOSO has the authority to ensure compliance with the specified safety and health requirements; federal, state, and OSHA regulations; and all aspects of the APP, including use of PPE, decontamination, site control, SOPs used to minimize hazards, safe use of engineering controls, the emergency response plan, spill containment program, and preparation of records. The UXOSO will perform a daily safety and health inspection and document the results in the daily log.

2.2.7 Subcontractors

Successful implementation of the field activities proposed in this WP will require several subcontractors. The subcontractors will include an explosives provider company for supplying the donor explosives (if necessary), an excavation/sifting contractor, a landfill, a demilitarization recycling company, and a laboratory for analytical testing. The key subcontractors are included in the Project Organizational Chart in Figure 2-1. All subcontractor activities will be directed and supervised by a member of the EA project implementation team.

2.3 MANAGEMENT OF FIELD OPERATIONS

The SUXOS/Site Supervisor will be the senior management authority onsite. The SUXOS/Site Supervisor will manage the MEC/MD, sifting, mag and dig, soil sampling, soil stabilization with offsite disposal (if necessary), and demolition operations. The SUXOS/Site Supervisor will report directly to the EA PM and will be the primary site operations point of contact for USACE-Omaha District. To maintain independent project communications, the UXOQCS will report to the EA Program QC Manager for QC-related issues (any issues regarding site safety, scope of work, or project administrative issues by the UXOQCS or QC staff may be communicated directly to project operations staff), and the UXOSO will report to the Health and Safety Manager for safety-related issues (any issues regarding scope of work, or project administrative issues by the UXOSO may be communicated directly to project operations staff).

Effective management of field operations is essential for the success of the project. The Project/Program and Safety/Quality Managers will conduct periodic evaluations to assess the effectiveness of field operations, communication, and safety and health practices used by the field project operations team in implementing the WP, APP (Appendix D), and contractual requirements. The Project and Program Managers will provide clear, concise, and independent evaluations of field operations performance to maximize production efficiency while maintaining safe work practices and environmental protection. The evaluations will be sufficiently balanced to provide constructive and insightful assessments within a framework that enables identification of a path forward for improvement. The results of these assessments will be presented during a Project Team meeting and summarized in the meeting notes.

2.4 PROJECT COMMNUICATION AND REPORTING

The success of this project depends on proactive and open communication among project stakeholders. Such communication ensures a mutual understanding of project goals and an endorsement among the stakeholders toward achieving those goals. Stakeholders associated with the project include:

- USACE-Omaha District
- ANG
- Environmental Office at Hancock Field
- NYSDEC
- EA Team.

2.4.1 Project Meetings

Project meetings will be coordinated to discuss planning and scheduling, obtain stakeholder concurrence on key project decisions, review/discuss project deliverables, and present field data and information. Meeting attendees will vary based on the agenda items for discussion. In general, EA will organize project meetings and prepare an agenda.

2.4.2 Internal Communications

Internal communications are defined as communications within the project team that are essential to completion of the project objectives. This generally includes the USACE-Omaha District, Hancock Field, EA, and all subcontractors. Communication may be in the form of written correspondence including letters and technical directives, electronic format including email, or it may be verbal either in person or via telephone. All communications that are relevant to the project will be documented for the final record. This includes meeting minutes, telephone logs, field notebooks, and email files.

2.4.3 External Communications

External communications are defined as communications with local, state, and federal agencies, and the general public. Unless EA is directed otherwise, all external communications will be initiated by the ANG.

2.5 PRIVACY AND SECURITY

Project documents, including data, reports, or other information gathered as part of this project, will not be released without the expressed written consent of the USACE-Omaha District and the Installation project contact. All Installation security protocols, provided to EA by the USACE-Omaha District PM, will be complied with by all EA Team workers and subcontractors.

2.6 PROJECT DELIVERABLES

In the context of this project, a project deliverable is defined as a milestone document identified in the project schedule. Table 2-2 presents the technical project deliverables for this Task Order.

Table 2-2 Technical Project Deliverables

Deliverable	Draft	Draft Final	Final
Non-Time Critical Removal Action Work Plan	X	X	X
Site-Specific Final Report	X	X	X
After Action Report	X	X	X

Technical deliverables will be submitted to the USACE-Omaha District for review as a "Draft" document. Following a 30-day review and comment period, a "Draft-Final" document will be submitted to USACE-Omaha District for comment resolution. If approved during the comment resolution review, the "Draft Final" document will be submitted for stakeholder review (ANG and NYSDEC). Following a stakeholder review and comment period, a "Final" version of the deliverable document will be submitted to USACE-Omaha District for approval.

2.6.1 NTCRA Work Plan

This NTCRA WP has been prepared to execute the requirements in the AM and is based on the technical approach developed through discussion and meetings with USACE-Omaha District, ANG and Hancock Field ANGB personnel.

2.6.2 Site-Specific Final Reports

The Site-Specific Final Report (SSFR) will be prepared upon completion of the NTCRA objectives. Information and format to be followed will be provided by USACE.

2.6.3 After Action Report

Upon completion of the NTCRA, the After-Action Report (AAR) will be prepared and submitted to close out files maintained by the DDESB Staff in accordance with DoD 6055.09 and EM 385-1-97. The purpose of the AAR is to document that the explosives safety aspects of the selected response have been completed per the DDESB-approved ESS.

2.7 DOCUMENT MANAGEMENT

The following system will be used to identify and track each submitted document. The version of each document (i.e., Draft, Draft Final, and Final) will be denoted on the cover and on each page of the document. Each document will go through the EA Senior Technical Review process to ensure EA document quality standards have been met.

2.8 DOCUMENT MEDIA AND FORMAT

All documents will be submitted in hard copy and electronic format. Electronic submittals will include portable document format (pdf) and the native file format (i.e., Microsoft Word, Microsoft Excel, etc.). Draft and Draft-Final documents will include line numbers to facilitate review and comment. All graphic files, including photographs, will be submitted in .pdf or .jpg files. All files submitted on CD-ROM or DVD will be labeled with the document name, date, and site reference.

2.9 REVIEW AND ACCEPTANCE

Following submittal and review of all documents, USACE-Omaha District will provide EA with reviewer comments. Subsequently, EA will prepare written responses to each comment and will provide to USACE-Omaha District for acceptance or rejection of the comment prior to submittal of the deliverable. Upon notice of concurrence, the comments will be incorporated into the document and the revised version will be resubmitted. The USACE-Omaha District review period is scheduled for 30 calendar days, and the stakeholder review period is scheduled for 30 calendar days.

2.10 FIELD DOCUMENTATION

All field documentation will be maintained pursuant with the QCP. To the extent practical, field data will be maintained electronically.

2.11 PROJECT SCHEDULE

A project schedule has been developed (Figure 2-2) and will be updated at least monthly or as needed throughout the project. The schedule fully supports the technical approach and outlines activities defined at the appropriate level of detail and is logically sequenced to support and manage completion of the performance objectives in accordance with the PWS. The schedule has been prepared and will be maintained using Microsoft Project software. Each milestone activity and its subtasks are identified on the schedule. The schedule defines the interrelationships of the tasks in a logical manner. Relationships, changes in durations, and changes to early start and finish dates will be updated for each activity as needed. The updated schedule will be submitted as part of the monthly project status report. Additional schedule updates will be provided to support management requirements of the project.

2.12 PERIODIC REPORTING

Periodic reports such as monthly project status reports and daily progress reports (during field activities) will be prepared and submitted in accordance with this WP to document project activities.

2.13 SUBCONTRACTOR MANAGEMENT

Detailed subcontracts, which designate the services to be provided, will be used to procure and manage subcontractors. The PM and Site Supervisor will monitor subcontractor performance, with respect to the scope of work, to ensure that these services are provided in a safe, efficient, and cost-effective manner.

Subcontractor schedules will be coordinated by the PM and the Site Supervisor. Any subcontractor who fails to comply with project-specific plans, safety requirements, or installation protocols will be required to correct the non-compliance immediately or be subject to removal from the project.

Any subcontractor who knowingly and willfully fails to comply with project-specific plans, safety requirements, or installation protocols will be immediately removed from the project.

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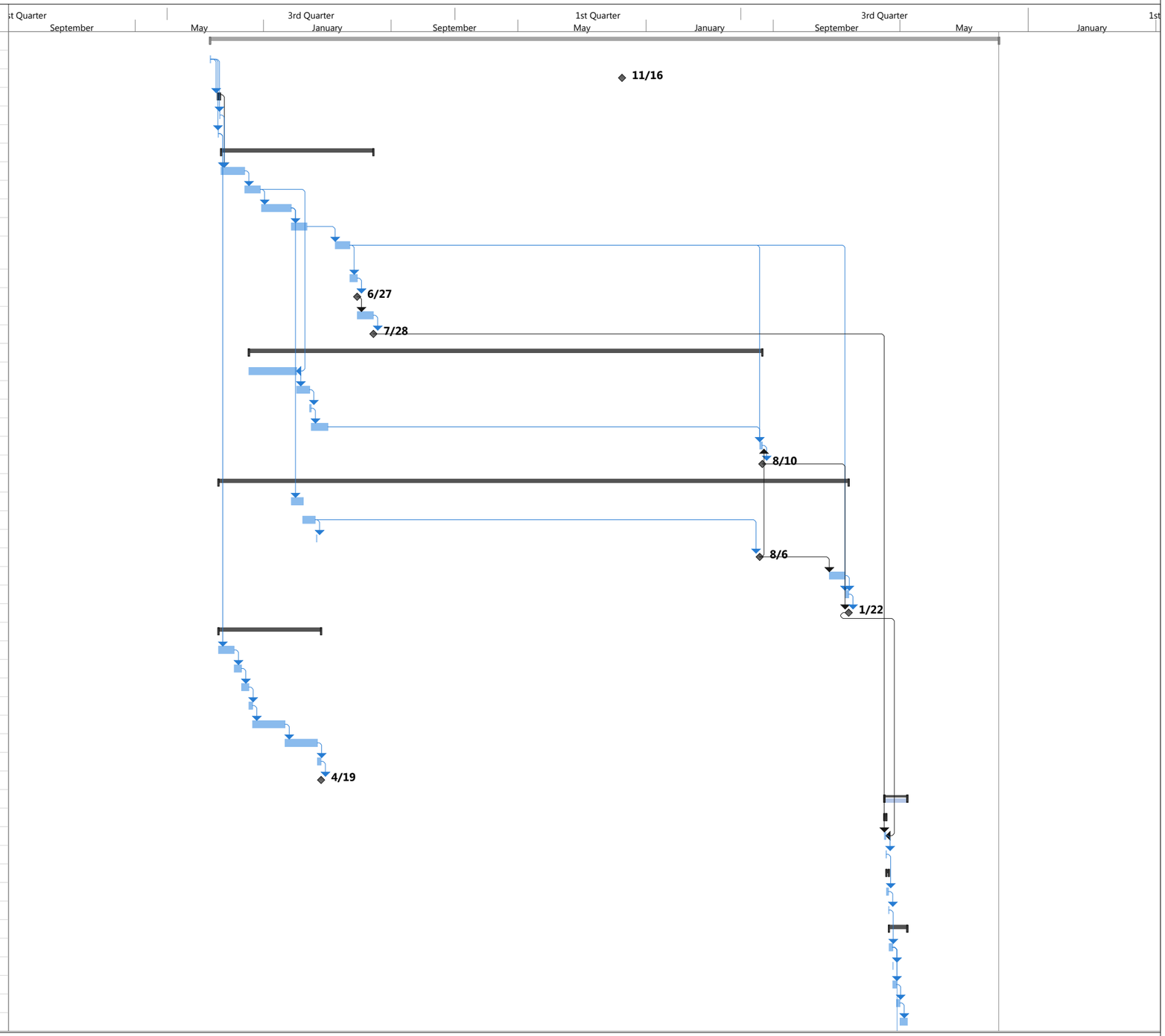
Figure 2-2 Firing-In-Buttress, SR002,
Hancock Air National Guard, Syracuse, New York
Project Schedule

ID	Task Name	Duration	Start	Finish
1	**Hancock Field ANGB**	**1077 days**	**Mon 9/21/15**	**Tue 11/5/19**
2	Notice to Proceed/Award	1 day	Mon 9/21/15	Mon 9/21/15
3	End of POP	0 days	Thu 11/16/17	Thu 11/16/17
4	**Task 1 - Kick-off meeting Consult with Hancock ANGB**	**4 days**	**Tue 10/6/15**	**Fri 10/9/15**
5	Task 1.1 - Kick-off meeting (teleconference with USACE)	1 day	Fri 10/9/15	Fri 10/9/15
6	Task 1.2 - Kick-off meeting with Hancock ANGB	1 day	Tue 10/6/15	Tue 10/6/15
7	**Task 2: Engineering Evaluation/Cost Analysis (EE/CA)**	**209 days**	**Mon 10/12/15**	**Thu 7/28/16**
8	Draft EE/CA Preparation	33 days	Mon 10/12/15	Wed 11/25/15
9	USACE (CENWO) Review	22 days	Thu 11/26/15	Fri 12/25/15
10	Draft Final EE/CA Preparation	41 days	Mon 12/28/15	Mon 2/22/16
11	Stakeholder Review Draft Final (including NYSDEC)	22 days	Tue 2/23/16	Wed 3/23/16
12	*Letter to NYSDEC requesting concurrence related to soil sample collection*	20 days	Tue 5/17/16	Mon 6/13/16
13	Final EE/CA Preparation	10 days	Tue 6/14/16	Mon 6/27/16
14	Final EE/CA Approval	0 days	Mon 6/27/16	Mon 6/27/16
15	Public Notice and 30 day Comment Period for Final EE/CA	31 edays	Mon 6/27/16	Thu 7/28/16
16	Memorialize EE/CA in Final Action Memorandum	0 days	Thu 7/28/16	Thu 7/28/16
17	**Task 3: Action Memorandum (AM)**	**701 days**	**Fri 12/4/15**	**Fri 8/10/18**
18	Draft AM Preparation	65 days	Fri 12/4/15	Thu 3/3/16
19	USACE (CENWO) Review	17 days	Fri 3/4/16	Mon 3/28/16
20	Draft Final AM Preparation	3 days	Tue 3/29/16	Thu 3/31/16
21	ANG Review	22 days	Fri 4/1/16	Mon 5/2/16
22	Final AM Preparation & ANG Signatures	5 days	Mon 8/6/18	Fri 8/10/18
23	Final AM	0 days	Fri 8/10/18	Fri 8/10/18
24	**Task 4: Work plan**	**860 days**	**Wed 10/7/15**	**Tue 1/22/19**
25	Draft WP/APP Preparation	17 days	Tue 2/23/16	Wed 3/16/16
26	USACE (CENWO) Review	18 days	Wed 3/16/16	Fri 4/8/16
27	Draft Final WP/APP Preparation	1 day	Mon 4/11/16	Mon 4/11/16
28	Revised Draft Final WP/APP Preparation	0 days	Mon 8/6/18	Mon 8/6/18
29	ANG/NYSDEC Review	22 days	Mon 12/17/18	Tue 1/15/19
30	Final WP/APP Preparation	5 days	Wed 1/16/19	Tue 1/22/19
31	Final WP/APP	0 days	Tue 1/22/19	Tue 1/22/19
32	**Task 4.1: Explosive Safety Submission (ESS)**	**140 days**	**Wed 10/7/15**	**Tue 4/19/16**
33	Draft ESS Preparation	22 days	Wed 10/7/15	Thu 11/5/15
34	USACE CENWO Review	10 days	Fri 11/6/15	Thu 11/19/15
35	USACE CX Review	10 days	Fri 11/20/15	Thu 12/3/15
36	Draft Final ESS Preparation	5 days	Fri 12/4/15	Thu 12/10/15
37	Air Force Safety Center Review	44 days	Fri 12/11/15	Wed 2/10/16
38	DDESB Review	44 days	Thu 2/11/16	Tue 4/12/16
39	Final ESS Preparation	5 days	Wed 4/13/16	Tue 4/19/16
40	Final ESS	0 days	Tue 4/19/16	Tue 4/19/16
41	**Task 5: Field Work**	**32 days**	**Mon 4/1/19**	**Tue 5/14/19**
42	**Pre Mobilization Activities**	**4 days**	**Mon 4/1/19**	**Thu 4/4/19**
43	Notifications	3 days	Mon 4/1/19	Wed 4/3/19
44	Entrance Briefing	1 day	Thu 4/4/19	Thu 4/4/19
45	**Mobilization**	**3 days**	**Fri 4/5/19**	**Tue 4/9/19**
46	Mobilize Labor and Equipment	2 days	Fri 4/5/19	Mon 4/8/19
47	Site-Specific Training	1 day	Tue 4/9/19	Tue 4/9/19
48	**Field Activities**	**25 days**	**Wed 4/10/19**	**Tue 5/14/19**
49	Removal of Impact Berm Soil from FIB	5 days	Wed 4/10/19	Tue 4/16/19
50	Collection of Soil Samples from the Base of the FIB	1 day	Wed 4/17/19	Wed 4/17/19
51	Process Soil through Vibratory Screener	5 days	Wed 4/17/19	Tue 4/23/19
52	Inspect Screened Material and Material Not Passing Screen	5 days	Wed 4/24/19	Tue 4/30/19
53	Collection and Analysis of Soil Samples from Process Soil	10 days	Wed 5/1/19	Tue 5/14/19

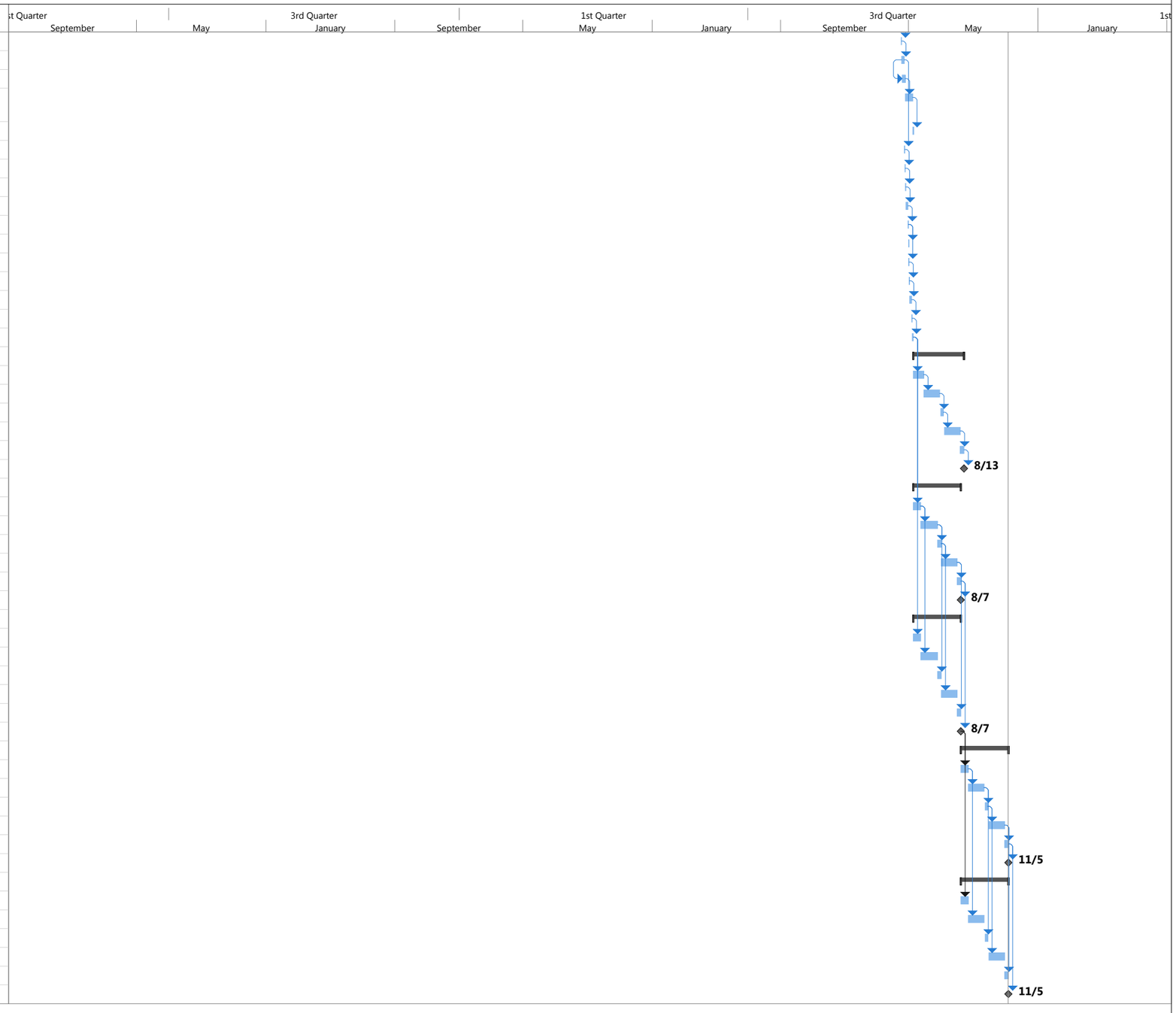


Project: Hancock ANGB NTCRA
Date: January 2019

Task Milestone Summary Project Summary

Figure 2-2 Firing-In-Buttress, SR002,
Hancock Air National Guard, Syracuse, New York
Project Schedule

ID	Task Name	Duration	Start	Finish
54	Inspection of FIB Interior	1 day	Wed 4/17/19	Wed 4/17/19
55	Remove Wood from Face and Interior of FIB	3 days	Thu 4/18/19	Mon 4/22/19
56	Inspect Wood	4 days	Fri 4/19/19	Wed 4/24/19
57	Collection and Analysis of Representative Composite Sample of Wood	10 days	Thu 4/25/19	Wed 5/8/19
58	Load Wood and Transport for Disposal	2 days	Thu 5/9/19	Fri 5/10/19
59	Surface Debris Removal from FIB Exterior	1 day	Tue 4/23/19	Tue 4/23/19
60	Vegetation Removal from FIB Exterior	1 day	Wed 4/24/19	Wed 4/24/19
61	Remove Soil from FIB Exterior	1 day	Thu 4/25/19	Thu 4/25/19
62	Demolish FIB Structure	2 days	Fri 4/26/19	Mon 4/29/19
63	Crush Concrete and Segregate Steel Reinforcement	1 day	Tue 4/30/19	Tue 4/30/19
64	Load Concrete for Transportation and Recycling	1 day	Wed 5/1/19	Wed 5/1/19
65	Load Steel Reinforcement for Transportation and Recycling	1 day	Wed 5/1/19	Wed 5/1/19
66	Ship MDAS for Recycling	1 day	Thu 5/2/19	Thu 5/2/19
67	Backfill and Grading in Former FIB Area	2 days	Fri 5/3/19	Mon 5/6/19
68	Exit Briefing	1 day	Tue 5/7/19	Tue 5/7/19
69	Demobilization	2 days	Wed 5/8/19	Thu 5/9/19
70	**Task 6: Site Specific Final Report (SSFR)**	**68 days**	**Fri 5/10/19**	**Tue 8/13/19**
71	Draft SSFR Preparation	14 days	Fri 5/10/19	Wed 5/29/19
72	USACE (CENWO) Review	22 days	Thu 5/30/19	Fri 6/28/19
73	Draft Final SSFR Preparation	5 days	Mon 7/1/19	Fri 7/5/19
74	ANG/NYSDEC Review	22 days	Mon 7/8/19	Tue 8/6/19
75	Final SSFR Preparation	5 days	Wed 8/7/19	Tue 8/13/19
76	Final SSFR	0 days	Tue 8/13/19	Tue 8/13/19
77	**Task 7: After Action Report (AAR)**	**64 days**	**Fri 5/10/19**	**Wed 8/7/19**
78	Draft AAR Preparation	10 days	Fri 5/10/19	Thu 5/23/19
79	USACE CENWO Review	22 days	Fri 5/24/19	Mon 6/24/19
80	Draft Final AAR Preparation	5 days	Tue 6/25/19	Mon 7/1/19
81	ANG/NYSDEC Review	22 days	Tue 7/2/19	Wed 7/31/19
82	Final AAR Preparation	5 days	Thu 8/1/19	Wed 8/7/19
83	Final AAR	0 days	Wed 8/7/19	Wed 8/7/19
84	**Task 8: Proposed Plan (PP)**	**64 days**	**Fri 5/10/19**	**Wed 8/7/19**
85	Draft PP Preparation	10 days	Fri 5/10/19	Thu 5/23/19
86	USACE CENWO Review	22 days	Fri 5/24/19	Mon 6/24/19
87	Draft Final PP Preparation	5 days	Tue 6/25/19	Mon 7/1/19
88	ANG/NYSDEC Review	22 days	Tue 7/2/19	Wed 7/31/19
89	Final PP Preparation	5 days	Thu 8/1/19	Wed 8/7/19
90	Final PP	0 days	Wed 8/7/19	Wed 8/7/19
91	**Task 9: Decision Document (DD)**	**64 days**	**Thu 8/8/19**	**Tue 11/5/19**
92	Draft DD Preparation	10 days	Thu 8/8/19	Wed 8/21/19
93	USACE CENWO Review	22 days	Thu 8/22/19	Fri 9/20/19
94	Draft Final DD Preparation	5 days	Mon 9/23/19	Fri 9/27/19
95	ANG/NYSDEC Review	22 days	Mon 9/30/19	Tue 10/29/19
96	Final DD Preparation	5 days	Wed 10/30/19	Tue 11/5/19
97	Final DD	0 days	Tue 11/5/19	Tue 11/5/19
98	**Task 10: No Further Action ESS (NOFA ESS)**	**64 days**	**Thu 8/8/19**	**Tue 11/5/19**
99	Draft NOFAESS Preparation	10 days	Thu 8/8/19	Wed 8/21/19
100	USACE CENWO Review	22 days	Thu 8/22/19	Fri 9/20/19
101	Draft Final NOFAES Preparation	5 days	Mon 9/23/19	Fri 9/27/19
102	DDESB Review	22 days	Mon 9/30/19	Tue 10/29/19
103	Final NOFA ESS Preparation	5 days	Wed 10/30/19	Tue 11/5/19
104	Final NOFAESS	0 days	Tue 11/5/19	Tue 11/5/19



Project: Hancock ANGB NTCRA
Date: January 2019

Task Milestone Summary Project Summary

3. REMOVAL ACTION PLAN

This chapter describes the work tasks to be completed for the NTCRA at Hancock Field in order to achieve the RAOs presented in Section 1.10. The NTCRA activities include the elements of work as outlined below.

- Planning activities
- Mobilization and site preparation
- Surface debris, vegetation, and soil removal
- Soil sifting
- Mag and dig
- Soil sampling, if necessary, stabilization and offsite disposal
- Wood removal, inspection, and disposal
- Demolition of FIB structure
- Site restoration.

All work will be conducted in accordance with the PWS (Appendix A), the ESS (Appendix B), the APP (Appendix D), and SOPs (Appendix F), as applicable. For reference, a list of SOPs is provided below:

- SOP 1 – Field Logbooks
- SOP 2 – Vegetation Removal Operations
- SOP 3 – Hand and Power Tool Operation
- SOP 4 – Munitions Debris Inspection
- SOP 5 – Intrusive Operations
- SOP 6 – Demolition / Disposal Operations
- SOP 7 – Explosive and Ammunition Transportation
- SOP 8 – Subsurface Utility Clearance
- SOP 9 – Surface Clearance Operations.
- SOP10 – Explosives Storage and Accountability
- SOP 11 – Earth Moving Machinery Operations
- SOP 12 – Mechanical Screening Operations
- SOP 13 – Soil Sampling
- SOP 14 – Chain of Custody Form
- SOP 15 – Sample Packing and Shipping
- SOP 16 – Field Decontamination
- SOP 17 – XRF Analysis of Soil.

All field work associated with the NTCRA is scheduled to take place as depicted in Figure 2-2. Field work is anticipated to occur 5 days a week, Monday through Friday, 10 hours per day as weather and daylight permit. Modifications to this schedule will be coordinated with Hancock Field and USACE-Omaha District, as needed.

3.1 PLANNING ACTIVITIES

Prior to conducting NTCRA field activities, a pre-construction meeting will be conducted to ensure that upcoming activities meet NTCRA objectives and requirements and to address the logistics of the field effort. Planning activities include:

- Hancock field requirements
- Site access
- Utility clearances and dig permits
- Field office.

3.1.1 Hancock Field Requirements

The work will be performed on a secure ANG Base Installation and the contractor must become familiar with and comply with Hancock Field requirements. Required badges, passes, and vehicle permits will be acquired with proper authority and prior to commencing work at MRS SR002 (e.g., access pass, camera pass, etc.). EA will notify Hancock Field of the anticipated hours of access to be granted in the event circumstances require an item to be guarded overnight or over the weekend. No work permits are anticipated as part of this project.

Full names, dates of birth, and driver's license numbers of EA and subcontractor employees who will be working onsite will be provided to Hancock Field to obtain contractor badges, which are anticipated to be valid for 1 year.

In addition, EA will provide the Federal Aviation Administration notification due to the proximity of the site to the Syracuse Hancock International Airport.

3.1.2 Site Access

MRS SR002 is located within Hancock Field. Access to the site is restricted to authorized personnel and will require coordination with the Base Environmental Manager.

3.1.3 Utility Clearances and Dig Permits

Excavation activities at SR002 require utility clearance and dig permit prior to initiating field activities. If a utility line is located at the MRS during the NTCRA, work will cease for inspection and line determination.

3.1.4 Field Office

The EA Syracuse office is located at 6712 Brooklawn Parkway, Suite 104, Syracuse, NY 13211-2158. The office will act as the central planning location and is where personnel will meet prior to each workday for the daily safety tailgate meetings. The office will also be used as a location to store equipment (if necessary) and supplies. Health and safety records, Material Safety Data Sheets, site maps, and project documents (e.g., the NTCRA WP) will be available in project vehicles for reference when onsite.

3.2 MOBILIZATION AND SITE PREPARATION

3.2.1 Mobilization and Set-Up

An installation entrance briefing, and site safety meeting will be conducted. These meetings will include a review of this WP and review and acknowledgment of the APP by all site personnel. Project set-up activities will include:

- Identify/procure, package, ship, and inventory project equipment.
- Coordinate with local agencies, including base security forces, hospital, and fire department, as appropriate.
- Coordinate communications with logistical support.
- Finalize operating schedules.
- Test and inspect equipment.
- Assemble and transport the work force.
- Conduct site-specific training on the WP, APP, and MEC procedures and hazards.
- Verify that all forms and project documentation are in order and project team members understand their responsibilities with regard to completion of project reporting requirements.

3.2.2 Site Preparation

3.2.2.1 Sediment and Erosion Controls

The disturbed area at the MRS is anticipated to be less than 1 acre in size and the NTCRA falls under the CERCLA process. As such, a construction site stormwater permit under the National Pollutant Discharge Elimination System and associated Stormwater Pollution Prevention Plan is not anticipated. However, to minimize the potential for migration of soil offsite, EA may implement Best Management Practices, as appropriate, and will install and maintain temporary sediment and erosion control measures, as described in Section 6.3.5.

3.2.2.2 Work Exclusion Zones

Work zones will be established at the MRS to minimize exposure to hazards associated with NTCRA activities. In general, exclusion zones are set at the MRS boundary, or for MRSs with MEC hazards, at the hazard fragment distance (HFD) outside the work area for the selected munitions with the greatest fragmentation distance (MGFD) for that MRS. Additional exclusion zones may be established within the overall work exclusion zones for specific operations (e.g., sifting). The MGFD and minimum separation distances (MSDs), which includes the HFD are discussed further in Section 3.4.

3.2.2.3 Traffic Control

Before the start of excavation activities, transportation or haul routes will be established with approval of Hancock Field ANGB. Coordination of field activities and traffic control measures will be confirmed each day at the safety meeting.

3.2.2.4 Stockpile Management

Soils to be stockpiled will consist of sifted soil. Soil will be sampled and, if necessary, stabilized and disposed of off-site. If MC (lead and copper) soil concentrations are below the NYSDEC Residential Soil Cleanup Objectives (SCOs) (NYSDEC 2006) of 400 mg/kg and 270 mg/kg, respectively, the soil will remain onsite and be used as backfill to re-grade the area following FIB demolition.

Vegetation to be stockpiled consists of any vegetation cleared from the top and sides of the FIB structure exterior to facilitate NTCRA activities. The location of vegetation stockpiles will be selected by the Hancock ANGB Environmental Manager. Clearing will conform to the environmental requirements described in Section 6.3.8.

3.3 SURFACE DEBRIS, VEGETATION, AND SOIL REMOVAL

A surface inspection and debris removal will be completed over 100 percent of the accessible areas on and surrounding the FIB structure and designated support areas to remove all visible debris prior to soil removal and FIB demolition.

Vegetation and soil will be removed from the top and sides of the FIB structure exterior. Vegetation will be cleared using hand and power tools, and an excavator, and will be stockpiled in a location selected by the Hancock ANG Base Environmental Manager. Soil will be removed using an excavator and one equipment operator to assess the construction and condition, and to facilitate demolition of the FIB.

The impact berm soil located within the FIB will be removed with a loader, excavator, and two equipment operators. Refer to SOP-11 in Appendix F for procedures regarding the use of earth moving machinery.

3.4 SOIL SIFTING

The sifting crews will excavate soil that may contain MEC, MD, and SAA using shielded earth moving machinery as discussed in the ESS (Appendix B). Refer to SOP-12 in Appendix F for procedures on mechanical sifting operations. Removing this material prior to demolition of the FIB will reduce the potential for double handling of the soil and adding additional debris. It will also facilitate subsurface investigation and removal of debris from below the FIB interior floor.

Soil from the impact berm will be placed directly into a portable vibratory screen located at a designated location away from the FIB work area. Transportation haul routes from the excavation zones to the sifter in the MRS with potential MEC shall be identified and followed in order to

maintain appropriate setbacks from personnel located outside the exclusion zones and the kill switch for the sifter. The UXOSO will ensure appropriate setbacks prior are identified and marked in the field prior to initiating sifting. A remotely operated kill switch will be manned by a UXO Technician positioned outside of the established setback in accordance with the ESS. The UXO Technician will kill power to the sifter if needed.

Soils removed from inside the FIB structure will be placed in hoppers which feed mechanical sieves to capture and separate out debris larger than 0.5 in. (or similar) from the soils. Each stockpile will be periodically spread to a thickness of no more than 1 ft to facilitate investigation by UXO Technicians using ferrous and/or all metals handheld magnetometers; the debris larger than 0.5 in. (or similar) will be inspected for potential MEC and MD.

Might II Shredder/Trommels or similar screeners will be used. If the Might II Shredder/Trommel is used, the shredder will be removed or disabled if MEC is confirmed. Modification of the screens may be required to meet the sifting requirements for this project.

The general operation for sifting will consist of the following:

- Set up sifter (0.5-in. screen size) and, as needed, conveyors. It is anticipated that one sifter will be used. Exclusion zones will be set up around each sifting area based on the HFD for the MGFD, as identified in Appendix B. Personnel that are not shielded shall not be in the exclusion zone during soil excavation, transportation of soil within the MRS, or soil sifting operations.

- Activate mechanical sifter remotely once all unshielded personnel are outside the exclusion zone to separate out debris larger than the screen size from the soils.

- Shielded personnel will load excavated soils into hoppers that feed the sifter using an excavator or loader. Segregate soils that pass-through sifter in a lined area. Inspect soils for debris larger than the screen size.

- UXO Technicians will visually inspect debris that does not pass through the sifter and separate out MEC, MD, and/or SAA in accordance with SOP-4, Munitions Debris Inspection. UXO Technicians will also inspect the soils that pass through the sifter for MEC.

- Dispose of non-munitions related debris as general refuse or recycle, as applicable.

- Dispose of MDAS in accordance with SOP-4, Munitions Debris Inspections. Dispose of MEC in accordance with SOP-6, Demolition/Disposal Operations.

- Soils will be stockpiled, sampled, and stabilized and transported offsite for disposal (if necessary), as detailed in Section 3.6.

3.5 MAG AND DIG

Once the impact berm has been removed, the interior to the FIB will be inspected, closely, with attention to areas potentially containing 20-mm target practice projectiles embedded in the wood lining of the FIB. Areas suspected or confirmed to contain 20-mm target practice projectiles or other debris will be marked with high visibility spray paint by UXO Technicians to assist in segregation of wood as it is removed from the FIB. At this time, wood covering the front exterior will also be inspected and marked. A UXO Technician, certified in man-lift operation, will perform the inspection to assess the interior and front of the FIB. All wood will be systematically inspected after it is removed from the FIB structure as described below, prior to transportation and disposal.

A UXO team will conduct an instrument-assisted (handheld magnetometer) investigation to identify and remove all detectable metallic debris from the interior subsurface of the FIB. The UXO Technicians will utilize systematic lanes to "mag and dig" detected anomalies, covering 100 percent of the FIB interior floor. Anomalies will be intrusively investigated by means of manual excavation using shovels. Based on suspected construction, it is anticipated that the floor of the FIB is soil. Each anomaly will be investigated and handled as described below.

The general operation for mag and dig will consist of the following:

- Establish 100-ft by 100-ft grids using stakes to cover the accessible MRS area planned for mag and dig. Survey each grid.

- Remove metallic surface debris in accordance with SOP-9, Surface Clearance Operations.

- Mag and dig subsurface anomalies within accessible MRS areas in accordance with SOP-5, Intrusive Operations.

3.6 SOIL SAMPLING, STABILIZATION, AND DISPOSAL

MC soil sampling of the FIB berm will be conducted after soil sifting is complete to confirm potential MC concentrations (i.e., lead and copper) are below the residential SCOs prior to redistributing soils across the MRS. The berm is estimated to contain 400 cubic yards of soil. One five-point composite soil sample will be collected per 200 cubic yards of sifted soil (or approximately two composite soil samples). Each composite soil sample will be collected from five discrete representative sample locations in the sifted soil and will be analyzed at an offsite laboratory via EPA SW846 Method 6010B for lead and copper as well as TCLP Metals to confirm soils are hazardous or non-hazardous. These composite soil samples will be used to confirm lead and copper concentrations in soil are below the NYSDEC Residential SCOs (NYSDEC 2006) of 400 mg/kg and 270 mg/kg, respectively, prior to regrading.

- If lead and/or copper concentrations in the sifted soils removed from the FIB are determined through laboratory analysis, to be below residential use SCOs, they will remain on site and be spread over the construction area using mechanical equipment following FIB demolition and removal.

- If lead and/or copper concentrations are determined to exceed residential use SCOs and meet requirements for nonhazardous disposal, the soils will be transported offsite for disposal at the Seneca Meadows Landfill.

- If soil does not meet requirements for non-hazardous disposal based on TCLP results then the soils will be chemically stabilized in place with the application of a dry, buffered compound (TerraBond®FBA) to soil stockpiles using a mini-excavator or track-mounted excavator. Water will be sprayed onto the mixed soil stockpile while an excavator continuously flips the soil to hydrate the entire stockpile and activate the TerraBond®FBA. The amendment will sit on the soil at least 24-hours before the soil is resampled to confirm that it meets Seneca Meadows Landfill's requirements for non-hazardous disposal and transported offsite for disposal.

Soil from the "floor" of the FIB will be screened using XRF using ex situ sampling methods at up to ten locations evenly spaced over the floor. XRF samples will be collected ex-situ in a zipper-type plastic bag (Ziploc bag) and screened in accordance with SOP 17 XRF Analysis. The lead concentration will be read from the instrument display and documented in field note. At locations where lead concentrations exceed 200 mg/kg, additional soil will be excavated in 6-in. lifts and the soil will be re-analyzed with the XRF. This process will be repeated until XRF readings are below 200 mg/kg. Once visual observations and ex-situ XRF readings indicate that impacted soils are removed, confirmatory grab soil samples will be collected in accordance with SOP 13 Soil Sampling. The confirmatory grab samples will be analyzed in the laboratory for lead and copper using EPA SW846 Method 6010B. The laboratory data will be used to verify the remaining lead and copper concentrations in soils are soil are below the residential use SCOs (400 mg/kg and 270 mg/kg, respectively), and thus demonstrate negligible human health and ecological risks are present at the site.

3.7 WOOD REMOVAL, INSPECTION, AND DISPOSAL

Wood timbers, covering the exterior and interior portions of the FIB will be removed using an excavator. The operator will carefully separate the wood from the concrete exterior and stockpile the pieces for inspection by UXO Technicians. It is estimated that between 5,000 and 6,500 linear feet of timbers were used to cover the exterior front and interior sections of the FIB.

It is anticipated that debris and projectiles are embedded in the wood as a result of use based on observations documented in the previous reports and memorandum. UXO Technicians will be utilized to inspect wood sections. It is expected that some sections will be damaged during removal. Each piece will be moved using an excavator and placed on a stand or blocks to elevate it from the ground. UXO Technicians will use visual observation and magnetometers to identify metallic anomalies and mark each with high visibility paint. All debris will be removed by the UXO Technician using hand tools. Once removed, each piece of debris will be inspected in accordance with the material potentially presenting an explosive hazard (MPPEH) inspection procedures described below. At such time when a section is determined free of all debris, it will be marked and moved to a stockpile until a QC (and quality assurance [QA] if appropriate) inspection has been performed.

EA will collect one sample for Toxicity Characteristic Leaching Procedure lead by EPA Method 6010C will be required prior to disposal of wood removed from MRS SR002 to Seneca Meadows Landfill. Representative samples will be conducted, by removing cores during the inspection process described above, from several pieces and composting into one sample at the laboratory. QC samples will be collected and analyzed.

Wood timbers sections will be cut to a maximum of 4 ft in length as required for disposal. The sections will be loaded into trucks and transported to Seneca Meadows Landfill for disposal. Manifests and Bills of Lading will accompany each load and will be recorded in the daily report.

3.8 DEMOLITION OF THE FIB STRUCTURE

The FIB structure will be demolished using an excavator. All work will be accomplished from areas adjacent to the structure; no demolition will occur from inside. The top and sides of the FIB will be collapsed into the center. Concrete will be crushed onsite, with reinforcing steel, if present, removed for recycling. Crushed concrete will be stockpiled and later loaded into trucks for transportation and recycling offsite. A loader and water truck will be onsite to accomplish loading and dust control, respectively.

3.9 SITE RESTORATION

Once the FIB structure has been demolished and debris removed, soil from within the work area will be scraped, and placed into a vibratory screener to remove any remaining debris that may be present from site activity. Provided the concentrations of lead and copper in screened soil from within the FIB are below residential use SCOs, the soil will be returned to the site and the entire area graded to blend to existing elevations surrounding the former FIB. Otherwise, the soils will be transported offsite for disposal.

If required disturbed areas will be restored to approximate pre-NTCRA conditions with backfill material meeting residential use soil clean up objectives.

3.10 MATERIAL MANAGEMENT AND DISPOSAL

3.10.1 Munitions with the Greatest Fragmentation Distance

A summary of the types of MEC potentially present at the MRS and the MGFD for the MRS is provided in Appendix B.

3.10.2 Minimum Separation Distances

The MSDs associated with candidate MEC items potentially present within the MRS are presented in the ESS (Appendix B). Exclusion zones will be based on the distances provided in the ESS for the MGFD listed for the MRS. If MEC with a greater fragmentation distance is encountered, the MSD will be adjusted in accordance with DDESB TP-16, *Methodologies for Calculating Primary Fragment Characteristics* (DDESB 2017), operations will continue, and EA will prepare an

amendment to the ESS for USACE to review and forward for DDESB approval. Quantity distance arcs will be adjusted appropriately in coordination with USACE-Omaha District.

3.10.3 MD Inspection

MD will be inspected in accordance with SOP-4, Munitions Debris Inspection (Appendix F).

3.10.4 MDAS Storage and Disposition

MDAS will be stored in 55-gallon drums or other suitable sealable and lockable containers, which will be shipped to a recycling facility for final disposition. Total weight of MDAS is documented during certification and verified upon receipt by the recycle facility. Each container is kept closed and locked, except when materials are being loaded into the container or the contents of the container are being inspected. Each container is closed in a manner that requires that the container seal be broken to gain access to the interior of the container. The material is shipped to Demil Metals, a recycle facility, at the end of the project or periodically, as required, for final disposition. Refer to SOP-4, Munitions Debris Inspection, for additional details.

3.10.5 MEC Removal and Demolition Procedures

EA will remove and dispose of all MEC encountered during the project.

3.10.5.1 MEC Identified in Place

While it is not anticipated that MEC will be encountered during this work, EA will be prepared and will account for, inspect, certify, and dispose of any MEC and Material Documented as an Explosive Hazard encountered in accordance with EM385-1-97, DDESB TP-16, and DoD Instruction 4140.62, *Management and Disposition of Material Potentially Presenting an Explosive Hazard*. EA will maintain and report a detailed accounting of all MEC encountered during intrusive activities.

MEC that is acceptable-to-move may be consolidated to one collection point within the MRS and detonated using one shot in lieu of conducting individual demolition shots. MEC items may be consolidated for disposal if determined acceptable-to move by the SUXOS and UXOSO and in accordance with USACE-Huntsville District *Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives Sites*, August 1998 (Terminology update March 2000).

MEC that is unacceptable-to-move will be blown in place. Demolition procedures will follow the guidelines of SOP-6 for Demolition/Disposal and SOP-7 for Explosives and Ammunition Transportation presented in Appendix F.

3.10.5.2 MEC Identified in Sifting Equipment

In the event MEC is identified within the sifting equipment, the sifter will be immediately shut off and de-energized. Once the sifting equipment is locked out (refer to Section 12.8 of Appendix D),

the UXO field team will dismantle the sifting equipment, if possible, and isolate the MEC item. MEC that is unacceptable-to-move will be removed by remote pull of the item from the sifter and then blown in place. The UXO team will make every effort to safely remove as much of the sifting equipment from the area prior to detonation and will use engineering controls to minimize the impact of the detonation. MEC that is acceptable-to-move will be moved and may be consolidated to one collection point within the MRS and detonated using one shot in lieu of conducting individual demolition shots. Demolition procedures will follow the guidelines of SOP-6 for Demolition/Disposal and SOP-7 for Explosives and Ammunition Transportation presented in Appendix F.

4. QUALITY CONTROL PLAN

4.1 INTRODUCTION

This QCP describes the QC approach and procedures that will be used to ensure quality throughout the NTCRA. This QCP covers QC requirements for the project as a whole while QC aspects for specific technical tasks are covered in other sections of this WP to provide continuity in the technical discussions. The QCP addresses the following topics:

- Identifies the project QC organization and defines each individual's respective authority, responsibilities, and qualifications.
- Defines project communication, documentation, and recordkeeping procedures.
- Establishes QC procedures, including the necessary supervision and tests, to ensure that work meets the requirements of the WP and applicable industry standards.

The requirements and systems established in this QCP are relevant and applicable to project work performed by EA and its subcontractors. Forms referenced in this plan are provided in Appendix G.

4.2 QUALITY MANAGEMENT STRUCTURE

The project team will maintain an organizational structure (Figure 2-1) based on the project management matrix system. While the PM is responsible for bringing together the different functions and activities to successfully complete the NTCRA, QC is the function that provides independent review and assessment for the PM and senior management. The QC responsibilities for specific project personnel are described in Section 2.2 of this WP.

4.3 PROJECT COMMUNICATION

During the NTCRA field work, the EA Team will meet daily with all onsite personnel, and subcontractor and field personnel to review the project status and discuss technical and safety issues. These meetings will be directed by the SUXOS and the UXOQCS/UXOSO, who will complete a Daily Safety Meeting Form (Attachment 3 to Appendix D [APP]) upon completion of the meeting. The Daily Safety Meeting Form provides a summary of topics, including QC issues, discussed during the meeting and provides a list of personnel in attendance. If necessary, additional meetings may be scheduled by the SUXOS, UXOQCS/UXOSO, or project personnel to discuss technical, quality, or safety issues at any time during the investigation. The Site Supervisor/SUXOS and UXOQCS/UXOSO may also meet individually with field personnel or the subcontractors, as necessary, to resolve problems.

During the field effort, the Site Supervisor/SUXOS will be in regular contact with the project management team. When significant problems or decisions requiring additional authority occur, the Site Supervisor will immediately contact the PM for assistance. Project communication will be documented as described in Section 4.11.

4.3.1 Quality Control Meetings

At least once per week during NTCRA field activities, or when determined necessary, a meeting will be held with the field operations management team. The Program QC Manager, UXOQCS, PM, Site Supervisor/SUXOS, and Data Manager (if assigned) will attend the QC meetings. The purpose of these meetings will be to discuss QC-related issues. The content of the meeting will be recorded by the Data Manager, reviewed and approved by the UXOQCS, and placed in the project QC file.

4.4 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. Specific qualifications and training required for UXO personnel are stated in Section 4.4.1.

4.4.1 Qualification and Training for UXO Personnel

Personnel assigned to positions of UXO Technician I, UXO Technician II, UXO Technician III, UXOQCS/UXOSO, or SUXOS will be qualified and certified in accordance with DDESB TP-18 (DDESB 2016).

4.4.2 UXO Training Documentation

Prior to the investigation, the UXOQCS/UXOSO will verify each site person and obtain copies of letters and certifications, as necessary, to complete the personnel qualifications form for each project person (Appendix G). This information will be maintained in the project files. Records of site-specific and routine training for personnel and visitors, as required by these project plans, will also be maintained in the project files.

4.4.3 Health and Safety Training

Health and safety training requirements for onsite project personnel have been established in accordance with OSHA requirements for hazardous site workers (29 CFR 1910.120) and are specified in the SSHP provided as Attachment 5 to the APP, which is Appendix D of this WP.

4.5 SUBMITTAL MANAGEMENT

Submittals include deliverables generated by the EA Team and may involve submittals generated by subcontractors. The PM will be responsible for the overall management and control of project submittals, as well as scheduling and tracking each submittal. The PM will establish and maintain a project submittal schedule that reflects the draft, draft final, and final deliverable status. The PM will also be responsible for establishing and maintaining a project file so that project documents may be retained and controlled appropriately. Document submittal activities have been incorporated into the project schedule. The PM will monitor the progress of project submittals and update the submittal schedule on a regular basis.

The Program QC Manager will be responsible for ensuring, through detailed review, that field QC submittals, as well as the materials and work they represent, are compliant with applicable contractual specifications and project plans.

4.5.1 Review of Plans and Specifications

During the preparatory phase for each definable feature of work (DFW), as discussed in Section 4.6.1, the UXOQCS will ensure that the DFWs are in accordance with WP requirements and request clarification whenever necessary. The primary purpose of this review is to identify and resolve potential conflicts before initiating work operations. To minimize schedule impacts, QC checks will be performed as early in the process as practical to allow sufficient time for evaluation and response formulation. The Program QC Manager will verify that WPs, drawings, and specifications (1) have been approved by their appropriate authority for implementation of a particular DFW, (2) are clear and complete, and (3) are executable and practical. Furthermore, these checks will include identifying discrepancies between the WP and industry standards and assessing and verifying site conditions and constraints.

4.5.2 Review and Approval of Submittals

Prior to delivery, project submittals will be reviewed and approved by appropriate members of the EA Team. Submittal reviews will be delegated by the PM and the review team will typically include the Senior Technical Reviewer, and PM. Technical documents (reports, plans, and/or engineering drawings) will be first reviewed by the PM and qualified technical staff.

4.5.3 QC Document Review and Submittal

The QC file will be maintained by the UXOQCS on behalf of the Program QC Manager and is an integral component of the project file. Field Change Requests, Nonconformance Reports, Corrective Action Requests, Corrective Action Plans, and other field-generated reports will be reviewed and accepted by the Program QC Manager before submittal to USACE-Omaha District, and to the UXOQCS, with as-needed support from the Data Manager as specified in Section 4.11, who will be responsible for maintaining this QC-related information and keeping the file current. QC documentation requirements include the following:

- Technical information will not be replaced or revised without receipt of a properly authorized Field Change Request (Appendix G), change order, or other approved revision.

- Copies of purchase orders or subcontracts requiring inspection will be provided to the Program QC Manager by the PM.

4.6 DEFINABLE FEATURES OF WORK

The project objectives and specific work tasks are discussed in Chapter 3. The DFWs for the NTCRA are divided into activities related to planning, field operations, and final project reports and closeout as summarized below.

4.6.1 Planning/Pre-Mobilization

- Geographic information system (GIS) setup
- Document management and control
- Data management
- Subcontracting
- Training of personnel
- Procurement of supplies.

4.6.2 Field Operations

- Installation entrance briefing and safety meeting
- Mobilization and site preparation
- Onsite training
- Surface sweep and visual survey
- Surface debris, vegetation, and soil removal
- Soil Sifting
- Soil sampling and, if necessary, stabilization and disposal offsite
- Intrusive investigation of target anomalies
- MPPEH procedures
- Wood removal, inspection, and disposal
- Demolition of the FIB structure
- Site restoration and demobilization.

4.6.3 Final Project Reports and Closeout

- Preparation of GIS maps
- Evaluation of analytical data
- Reports: preparing and obtaining approval
- Data archiving and project closeout.

4.7 FIVE PHASES OF CONTROL

The UXOQCS will be responsible for verifying compliance with this portion of the WP through implementation of a five-phase control process, which ensures that project activities comply with the approved plans and procedures. The specific QC monitoring requirements for each DFW are discussed below. This section specifies the minimum requirements that must be met and to what extent QC monitoring must be conducted and documented by the UXOQCS.

The UXOQCS will ensure that the five-phase control process is implemented for each DFW listed in Section 4.6. Each phase is considered relevant for obtaining necessary product quality. However, the preparatory and initial inspections are particularly invaluable in preventing problems. Work will not be performed on a DFW until the preparatory and initial phase inspections have been completed and any non-conformance issues are resolved. Implementation

and tracking of the DFWs will be accomplished through the use of the Inspection Schedule and Tracking form provided in Appendix G.

The five-phase control system is comprised of the preparatory, initial, follow-up, additional (if needed), and final phases.

4.7.1 Preparatory Phase Inspection

The Preparatory Phase comprises the planning and design process leading up to the actual NTCRA field activities. The UXOQCS will perform a Preparatory Phase Inspection before beginning each DFW. The purpose of this inspection is to review applicable specifications and plans to verify that the necessary resources, conditions, and controls are in place and compliant before work activities start. The Preparatory Phase Inspection will also verify that the SSHP adequately identifies all hazards associated with actual field conditions and that the SSHP promulgates the appropriate safe work practices. Upon completion of the inspection, the UXOQCS will complete the Preparatory Phase Inspection Checklist provided in Appendix G.

To perform the inspection, the UXOQCS or designee will review WPs and operating procedures. The UXOQCS will verify that required plans and procedures have been approved and are available to the field staff; field equipment is appropriate, available, functional, and properly calibrated for its intended/stated use; staff responsibilities have been assigned and communicated; staff have the necessary knowledge, expertise, and information to perform their jobs; arrangements for support services have been made; training in accordance with the requirements of this WP has occurred; and the prerequisite mobilization tasks have been completed. As part of the Preparatory Phase Inspection, the UXOQCS will verify that lessons learned during previous similar work have been incorporated, as appropriate, into the project procedures to prevent recurrence of past challenges. Project staff must correct or resolve discrepancies between existing conditions and the approved plans/procedures identified by the UXOQCS during the Preparatory Phase Inspection. The UXOQCS or designee will verify that unsatisfactory and/or nonconforming conditions have been corrected in the WP before beginning work.

4.7.2 Initial Phase Inspection

The Initial Phase occurs at the startup of field activities associated with a specific DFW. At the onset of a particular DFW, the UXOQCS will perform an Initial Phase Inspection and complete the Initial Phase Inspection Checklist provided in Appendix G. The main objectives of the inspection are to check preliminary work for compliance with procedures and specifications, establish an acceptable level of workmanship, check for omissions, and resolve differences of interpretation. The Initial Phase Inspection results will also be documented by the UXOQCS in the QC Log Book and summarized in the QC Report. Should results of the inspection be unsatisfactory, the Initial Phase Inspection will be rescheduled and performed again.

During the Initial Phase Inspection, the UXOQCS will ensure that discrepancies between site practices and approved plans or specifications are identified and resolved. The resolution of discrepancies is a critical step in the Initial Phase Inspection. As applicable, the appropriate Senior Technical Consultant (e.g., Site Supervisor/SUXOS, Project Chemist, Site Health and Safety

Manager, CIH, etc.) will guide the PM and project team members in resolving discrepancies. If discrepancies arise in establishing the baseline quality for a DFW, the responsibility for resolution falls to the PM. If the discrepancy cannot be resolved in a manner that satisfies the project requirements, it will be elevated to the program level (i.e., to the Program QC Manager) and a Nonconformance Report will be issued. With concurrence of the project team, the appropriate Senior Technical Consultant may direct a cessation of work activity if an unresolved discrepancy jeopardizes the results of the DFW or puts the project at risk of non-conformance.

4.7.3 Follow-Up Phase Inspection

Completion of the Initial Phase Inspection of QC activity leads directly into the Follow-Up Phase, which covers the routine day-to-day activities at the site. The UXOQCS will perform a Follow-up Phase Inspection at regular intervals while a particular DFW is performed. This inspection ensures continuous compliance and verifies an acceptable level of workmanship. To conduct and document these inspections, the UXOQCS will complete the Follow-up Phase Inspection Checklist provided in Appendix G. The UXOQCS will monitor onsite practices and operations taking place and verify continued compliance with the specifications and requirements of the WP and approved amendments. The UXOQCS will also verify that daily health and safety inspections are performed and documented as prescribed in the SSHP. Discrepancies between site practices and approved plans/procedures will be resolved and corrective actions for unsatisfactory and nonconforming conditions or practices will be resolved by the UXOQCS or designee before continuing work.

At the conclusion of each work day, the field teams will return to the project field office and provide the site supervisor/SUXOS and/or UXOQCS with any completed investigation forms, field notes, and inspection reports from that day's activities. Data will be collected by the UXOQCS or data manager at the conclusion of each field day. Any issues arising from the day's activities will be discussed between the Site Supervisor/SUXOS, UXOQCS, and appropriate field personnel. The UXOQCS will record these discussions, and resolutions or corrective actions arising from these discussions will be addressed during the following morning's safety meeting and recorded on the Daily QC Report.

4.7.4 Additional Inspections

Additional inspections performed on a particular DFW may be required at the discretion of the USACE-Omaha District, PM, Site Supervisor/SUXOS, appropriate Senior Technical Consultants, Program QC Manager, or UXOQCS. Additional preparatory and initial inspections would be warranted under the following conditions: unsatisfactory work, as determined by EA or USACE; changes in key personnel; resumption of work after a substantial period of inactivity (2 weeks or more); or changes to the project scope of work. These additional inspections will be documented on the appropriate inspection checklist forms and in the QC Log Book.

4.7.5 Final Phase Inspection

The Final Phase Inspection will be performed upon conclusion of the DFW and before closeout to verify that project requirements relevant to the particular DFW have been satisfied. Outstanding

and nonconforming items will be identified and documented on the Final Inspection Checklist in Appendix G.

4.8 LEAD AND COPPER ANALYSIS

Soil samples collected in support of this removal action will be shipped under appropriate chain of custody to TestAmerica Inc. (TestAmerica) for analysis. Sample analysis will be performed in accordance with DoD Environmental Laboratory Accreditation Program and the DoD QSM Version 5.1 as applicable (DoD 2017). A copy of TestAmerica's DoD Environmental Laboratory Accreditation Program certifications is provided in Appendix H. Analytical data will be reported in accordance with QSM requirements and reporting limits will be provided for the limit of quantitation (LOQ), limit of detection (LOD), and detection limit (DL). Non-detect values will be reported at the LOD and values reported below the LOQ and above the DL will be J-flagged signifying estimated values.

Analytical methods, analytes, reporting limits, and screening criteria are presented in Table 4-1.

In addition to daily calibration of field equipment, QC samples will be collected or generated during environmental sampling activities. QC samples include field duplicates, which will be collected at a frequency of 10%. TestAmerica will analyze for lead and copper in accordance with EPA SW846 Method 6010B. Internal fixed laboratory QC checks include matrix spike addition and analysis, reagent blank generation and analysis, laboratory duplicate, and laboratory control analyses. QC criterion presented in the DoD QSM Version 5.1 will be followed for these analyses (DoD 2017). The laboratory will perform MS/MSD samples at a frequency of 5%.

4.9 AUDIT PROCEDURES

The EA Corporate QC Manager will be responsible for verifying compliance with this QCP through audits and surveillance. The PM will inspect/audit the quality of work being performed for each DFW and verify that the work practices conform to specifications of this WP or other applicable guidance. Discrepancies will be communicated to the responsible individual and documented in the QC Log Book and Weekly QC Report. Corrective actions will be verified by the Program QC Manager and recorded in the Weekly QC Report.

The Inspection Schedule and Tracking Form (Appendix G) is to be used by the Program QC Manager for planning, scheduling, and tracking the progress of audits. The information on the form is to be current and reviewed by the Program QC Manager. Audit activities and corrective actions are to be documented by the Program QC Manager in accordance with this chapter and the audit records are to be maintained as part of the project QC file.

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Table 4-1 Reference Limits and Screening Criteria for Soil

Analyte	Analytical Method	CASRN	Units	EPA RSL[2]		NYSDEC Residential SCOs[3]	EPA Hazardous Waste Level: Maximum Concentration for the Toxicity Characteristic Contaminant [4]	Achievable Laboratory Limits[5]		
				Residential	Industrial	Residential		LOQ	LOD	DL
Copper	SW846	7440-50-8	mg/kg	310*	4700*	**270**	NA	2.5	0.500	0.17
Lead	SW846	7439-92-1	mg/kg	**400[1]**	800	400	NA	1.0	1.00	0.34
TCLP Copper	SW846	7440-50-8	mg/L	**NA**	NA	NA	NA	0.2	0.05	0.0180
TCLP Lead	SW846	7439-92-1	mg/L	**NA**	NA	NA	5	0.2	0.1	0.0390

Notes:
The most current version of the screening levels will be used at the time of the field sampling.
1. **Bold numbe**rs are the lowest screening criteria.
2. EPA Regional Screening Levels (RSLs) for industrial use scenarios for hazard index = 1.0, May 2018.
3. NYSDEC Residential Soil Cleanup Objectives (SCOs) from 6 NYCRR PART 375 Environmental Remediation Programs Subparts 375-1 to 375-4 & 375-6 dated December 14, 2006 (NYSDEC 2006).
4. Code of Federal Regulations Title 40 Chapter I, Subchapter I, Part 261, §261.24 Table 1
5. Achievable laboratory limits were provided by TestAmerica Inc.
* = A non-carcinogen; the original EPA RSL was divided by 10 to achieve Hazard Index of 0.1.
CASRN = Chemical Abstract Service Registry Number.
DL = Detection limit.
LOD = Limit of detection.
LOQ = Limit of quantitation.
mg/kg = milligram per kilogram.
NS = Not specified.
SW = EPA SW846-Test Methods for Evaluating Solid Waste, Third Edition and Updates.

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4.10 PREVENTATIVE AND CORRECTIVE ACTIONS

The preventative and corrective actions incorporated within this QCP are designed to prevent and correct quality problems that may arise during the NTCRA. The procedures facilitate process improvements and describe the available mechanisms to identify, document, and track discrepancies until a corrective action has been verified.

4.10.1 Preventive Measures

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 4.4, Personnel Qualification and Training; Section 4.5, Submittal Management; and Section 4.7, Five Phases of Control. Should these preventive measures fail, tracking and communicating discrepancies also provide a mechanism for preventing recurrence.

4.10.2 Continual Improvements

A continual improvement process will be implemented for the project. Project staff at all levels will be 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 can and should be improved (e.g., a bottleneck in production) and/or recommending an alternative practice that provides a benefit without compromising prescribed standards of quality. Project staff should bring their recommendations to the attention of the Site Supervisor through verbal or written means.

Deviations from established protocols will not to be implemented without prior written approval. Where a staff-initiated recommendation results in a tangible benefit to the project, public acknowledgment will be given by the PM.

4.10.3 Deficiency Identification and Resolution

While deficiency identification and resolution occur 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 project team is responsible for verifying that deficiencies are identified and documented as prescribed herein and corrected in a timely manner. Deficiencies identified by the project team will be corrected by operational staff and documented by the UXOQCS.

4.10.3.1 QC Failure Criteria

QC failure is defined as non-conformance with: (1) provisions of the WP, and (2) industry standards. QC pass/fail criteria are presented in Table 4-2. Sifted batches of material or grids that fail the Pass/Fail Criteria, or QA surveillance will be completely re-processed/re-cleared at no cost to the Government.

4.10.3.2 Equipment Failure

If equipment is not operating properly, it will be repaired or taken out of service and replaced with suitably operating equipment. On a case-by-case basis, the UXOQCS will evaluate whether the equipment failure has compromised data quality and will determine the appropriate corrective action.

Should any detection instrument fail to function or cannot detect items during the daily check, the operator and field team leader will determine and resolve the equipment failure. If the failure cannot be determined and repaired, the instrument will be shipped offsite for repair. A replacement will be used once it has been successfully processed through the daily check and has been confirmed and documented by the UXOQCS. The UXOQCS will review this type of failure on a case-by-case basis to determine whether the failed instrument may have compromised data quality.

4.10.3.3 Process and Procedural Failure

Process integrity is defined as conformance to specifications (i.e., requirements of the WP, regulations, and industry standards). Checks for process integrity will consist of visual observations of the methods used and will be a significant part of the Follow-Up Phase Inspections and documented for each DFW. Procedural integrity is defined as conformance to the requirements of the WP. Checks for procedural integrity will consist of observations of

Table 4-2 QC Procedures, Responsibilities, Criteria, and Actions

Activity	Definable Feature of Work	Responsible Personnel	Procedure	Frequency	Pass/Fail Criteria	Action if Failure Occurs
Planning/ Pre-mobilization	Establishment of a geographic information system (GIS)	Task Manager, GIS Manager	• Gather all GIS data from provided historical records, georeferenced project location, and develop GIS maps for conceptual site activities (e.g., grid network, minimum separation distance [MSD], hazard fragment distance [HFD], boundaries).	Once	• Scales are in feet, measurable using engineering scale. • Key map included. • Project name and location correct. • Grid network proper size. • HFD, MSDs in accordance with Department of Defense (DoD) Explosives Safety Board (DDESB) Technical Paper (TP) 16.	• Review all data/input with GIS staff. Do not proceed until corrections are reviewed and accepted by Lead Senior Technical Reviewer (STR). Notify Project Manager (PM) and Deputy PM (DPM).
	Document management and control	Task Manager, Technical Editor	• Follow established EA document control guidelines.	Once	• Document not in compliance with EA document control guidelines.	• Internal corrective action meeting.
	Subcontracting	PM or DPM, Procurement Manager, Contracts Manager, Health and Safety Manager	• Issue subcontractor requests for proposal or review blanket purchase orders.	Once	• Verify qualifications, safety record, training, and appropriate licenses are up to date and acceptable. Subcontracts are executed.	• Review Terms and Conditions for corrective actions.

Table 4-2 QC Procedures, Responsibilities, Criteria, and Actions

Activity	Definable Feature of Work	Responsible Personnel	Procedure	Frequency	Pass/Fail Criteria	Action if Failure Occurs
Planning/ Pre-mobilization (cont'd)	Personnel qualifications	Task Manager, Health and Safety Manager, Unexploded Ordnance (UXO) Safety Officer (UXOSO)	• Verify all health and training certification/qualifications for all proposed personnel are appropriate and current for assigned activities. • For UXO personnel, verify qualification in accordance with DDESB TP-18.	Once	• All personnel meet or exceed the training requirements and/or certifications for the assigned positions.	• Provide required training or replace personnel. Notify PM and DPM.
	Procurement of supplies/ materials	Site Supervisor/ Senior UXO Supervisor (SUXOS), Task Manager, Procurement Manager, Corporate Equipment Manager	• Order all supplies in accordance with corporate procurement policy. • Establish purchase requisitions. • Reserve corporate equipment.	Once	• All supplies and materials received. • Inspect supplies and material for damage. • Functions – check all equipment in accordance with operator or manufacturers' handbooks.	• Review purchase orders. • Review project schedule for schedule impacts. • Replace all defective supplies/materials and equipment. • Notify PM and DPM.
Field Operations	Site-specific training	Site Supervisor/ SUXOS, UXO Quality Control Specialist (UXOQCS)/ UXOSO	• Verify that all onsite personnel have been given the necessary site-specific training (e.g., global positioning system, data management, vendor escort, work plan, standard operating procedures [SOPs] etc.).	Once (for each new personnel, throughout field operations)	• Demonstrated knowledge of site-specific training topics through question and answer, equipment operational review, etc.	• Escort individual from project and exclude from site or complete onsite training for individual.

Table 4-2 QC Procedures, Responsibilities, Criteria, and Actions

Activity	Definable Feature of Work	Responsible Personnel	Procedure	Frequency	Pass/Fail Criteria	Action if Failure Occurs
Field Operations (cont'd)	Surface debris removal	SUXOS, UXOQCS	• Remove any visible debris on and surrounding the Firing-in-Buttress (FIB) structure and designated support areas • Inspect 100% of the accessible areas	Once	• Visual inspection of FIB area indicates no surface debris. • Discovery of surface debris constitutes a failure.	• Re-conduct surface debris removal over 100% of accessible areas
	Vegetation removal and soil excavation to facilitate FIB demolition	SUXOS, UXOQCS	• Remove vegetation and excavate soils in accordance with the Work Plan (WP) and SOP. • Sweep with magnetometer.	Once	• Visual inspection of FIB area indicates removal of vegetation and soil excavation. • One or more anomalies identified constitute a failure.	• Re-conduct surface debris removal over 100% of accessible areas
	Soil sifting from within FIB	SUXOS, UXOQCS	• Sift soils in accordance with WP and SOP. • Inspect screens for holes. • Inspect sifted soil piles for debris larger than screen mesh size (i.e., 0.5 inch [in.]).	Daily/each pile	• All debris larger than 0.5 in. do not pass through screen. • Discovery of debris larger than the mesh size of the screen being used in the process (e.g., larger than 0.5 in.) or MEC in the batch of sifted soil being inspected constitutes a failure.	• Replace or repair screens. • Re-screen soil.

Table 4-2 QC Procedures, Responsibilities, Criteria, and Actions

Activity	Definable Feature of Work	Responsible Personnel	Procedure	Frequency	Pass/Fail Criteria	Action if Failure Occurs
	Soil sampling sifted soils	SUXOS, UXOQCS	• Collect five-point composite soil samples from sifted soils in accordance with the WP and SOP. • Submit soil samples to the laboratory for lead and copper analysis using EPA SW846 Method 6010B, and TCLP lead and copper by EPA Method XX	1 sample per 200 cubic yards of soil	• Samples are not analyzed at laboratory per method requirements. • Lead and/or copper concentrations exceed residential SCOs and exceed landfill requirements for non-hazardous disposal. • If lead and/or copper fail TCLP, stabilize soil onsite prior to offsite disposal as non-hazardous waste	• Resample. • Stabilize soils, then resample.
	Soil sampling from the "floor" of FIB	SUXOS, UXOQCS	• Screen soil from the floor of the FIB using XRF • Collect confirmatory grab samples. • Submit soil samples to the laboratory for lead and copper analysis using EPA SW846 Method 6010B.	Up to 10 samples	• Samples are not analyzed at laboratory per method requirements. • Lead and/or copper concentrations exceed residential SCOs.	• Resample. • Remove additional soil from floor of FIB and resample.
	Wood timber removal	SUXOS, UXOQCS	• Remove wood timbers from the FIB • Inspect and remove MEC/UXO and munitions debris (MD) from wood	1 sample per 200 cubic yards of soil	• Lead and/or copper concentrations exceed residential SCOs and exceed landfill requirements for non-hazardous disposal.	• Dispose of wood timbers as hazardous waste
	Magnetometer-assisted surface clearance	SUXOS, UXOQCS	• Identify, remove, and document all surface MEC/UXO and munitions debris (MD). Identify and remove all non-munitions related debris.	Daily/each anomaly	• All detectable surface MEC/UXO removed. • Presence of surface MEC/UXO and MD constitutes a failure.	• Initiate corrective action request. • Notify PM and DPM.

Table 4-2 QC Procedures, Responsibilities, Criteria, and Actions

Activity	Definable Feature of Work	Responsible Personnel	Procedure	Frequency	Pass/Fail Criteria	Action if Failure Occurs
Field Operations (cont'd)	Subsurface clearance/ Intrusive investigation	SUXOS, UXOQCS	• Mag and dig in accordance with WP and SOP. • Intrusively investigate all subsurface anomalies within each grid.	Daily/each anomaly	• No presence of MEC/UXO/MD (excluding small arms ammunition) following investigation. • Selected anomaly detected to depth of detection of handheld magnetometers. • Following investigation, presence of MEC/UXO/MD (excluding small arms ammunition) at selected anomaly constitutes failure.	• Initiate corrective action request. • Notify PM and DPM. • Re-investigate anomaly location.
	Munitions potentially presenting an explosive hazard (MPPEH) procedures	SUXOS, UXOQCS	• Verify certification is conducted per WP MPPEH Management SOP and EM 385-1-97.	Daily/as required	• Discovery of any MPPEH within material certified as material documented as safe constitutes a failure.	• Initiate corrective action request. • Notify PM and DPM.
	Wood inspection, removal, and disposal	SUXOS, UXOQCS	• Identify, mark, and remove metallic anomalies. • QC inspection to verify wood is free of debris for disposal.	Once	• One or more anomalies identified constitute a failure.	• Manually remove anomalies

Table 4-2 QC Procedures, Responsibilities, Criteria, and Actions

Activity	Definable Feature of Work	Responsible Personnel	Procedure	Frequency	Pass/Fail Criteria	Action if Failure Occurs
Field Operations (cont'd)	FIB Demolition	SUXOS, UXOQCS	• Demolish FIB structure in accordance with WP and SOP.	Once	• Visual inspection of FIB area indicates no remaining debris	• Remove remaining debris
	Demobilization	Site Supervisor/ SUXOS, UXOSO/ UXOQCS, Data Manager	• Walk through by the installation and the United States Army Corps of Engineers (USACE).	Once	• Site condition found acceptable by the installation and USACE. • All excavations are backfilled.	• Develop final punch list of corrective action to return munitions response site (MRS) to acceptable condition. • Notify PM and DPM.
Final Project Report and Closeout (cont'd)	Site Specific Final Report (SSFR) preparation	PM/DPM, Task Manager, Lead STR	• Verify that SSFR has been prepared per USACE/DoD/Air National Guard guidance and provides the required information to meet project objectives.	Once per version submitted	• Report has been reviewed, comments addressed and resolved, and approved.	• Take appropriate action to obtain report approval.
		SUXOS Data Manger UXOQCS/ UXOSO	• Audit of the following items: tabulation of all MEC, MD, and other material recovered during the removal action is accurate and complete. • Daily records. • QC reports and results. • USACE 948 QA acceptance	Once	• Any missing report • Discrepancies in grid tracking	• Conduct corrective action meeting to determine discrepancies and required action.
	SSFR preparation (cont'd)	PM/DPM, Procurement Manager, Contracts Manager	• Submit SSFR • Verify purchase orders, vendors, and subcontractors have been closed out. • Run internal accounting commitment reports to verify outstanding balances.	Once	• Release of claims not received.	• Resolve issues with Contracts Manager and Procurement Manager.

specific procedures used, and the accuracy of those methods. The results of these inspections will be documented on the QC Surveillance Report for each DFW.

Non-conformance with process or procedural requirements will be addressed by the UXOQCS with the appropriate team leader (e.g., UXO Team Leader, survey crew leader, etc.). If the nonconformance is found to affect safety or overall product quality, work will cease until an appropriate resolution is identified and implemented, and the SUXOS/Site Supervisor will be notified. Once the UXOQCS, appropriate team leader, and SUXOS/Site Supervisor are satisfied with the suggested corrective action, the action will be implemented and documented on Form 4 and the QC Log Book.

If the failure directly affects product quality or is otherwise determined by the UXOQCS to require a follow-up action, a Nonconformance Report (provided in Appendix G) will be prepared and submitted to the subcontractor. The Nonconformance Report will include a detailed written description of the nonconformance item, and required follow-up actions, developed and signed by the UXOQCS. A copy of the completed form will be provided to the Site Supervisor and PM as notification of the failure. In response, the EA project team will have a period of 2 working days to provide a plan for corrective action for the failure, and not more than 5 working days from the date of issue of the Nonconformance Report to complete the corrective action. Once the corrective action has been completed, it will be documented on the form and, if approved, will be signed by the UXOQCS and PM. These signatures will indicate that the failed work has been corrected, accepted, and the Nonconformance Report will be closed. A copy of the Nonconformance Report and any relevant attachments will be placed in the project QC file, along with Follow-Up Phase Inspection (Appendix G) documents for that DFW.

If the failure of process or procedure occurs more than once for the area where a particular team is working, a Corrective Action Request will be prepared (provided in Appendix G). The Corrective Action Request will specify whether a Corrective Action Plan is needed. The Site Supervisor, SUXOS, and UXOQCS will meet with the appropriate team leader and members to determine the corrective course of action. During follow-up QC inspections, the UXOQCS will ensure and document in the UXOQCS Log Book and the QC Report that agreed upon corrective actions have been implemented.

4.10.4 Corrective Action Request

A Corrective Action Request (Appendix G) can be issued by any member of the project team, including subcontractor employees. If the individual issuing the Corrective Action Request is also responsible for correcting the problem, then he/she should document the results on Part B of the Corrective Action Request. Otherwise, the Corrective Action Request should be forwarded to the PM, who is then responsible for evaluating the validity of the request, formulating a resolution and developing a corrective strategy, assigning personnel and resources, and specifying and enforcing a schedule for corrective actions. Once a corrective action has been completed, the Corrective Action Request and supporting information will be forwarded to the Program QC Manager for closure. Sufficient information will be provided to allow the QC reviewer to verify the effectiveness of the corrective actions.

The recommendations provided in the Corrective Action Requests and implemented in the WP will be reviewed during Follow-Up QC inspections. The purposes of this Corrective Action Request review are to ensure that established protocols are implemented properly, verify that corrective action commitments are met, ensure that corrective actions are effective in resolving problems, identify trends within and among similar work units, and facilitate system root cause analysis of larger problems.

The Program QC Manager will determine whether a written Corrective Action Plan is necessary, based on whether or not any of the following are met: the Corrective Action Request 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. The Corrective Action Plan will be developed by the PM and approved and signed by the Program QC Manager. The Corrective Action Plan will indicate whether it is submitted for informational purposes or for review and approval. In either event, operational staff is encouraged to discuss corrective action strategy with the UXOQCS throughout the process.

4.10.4.1 Corrective Action Request Tracking

Each Corrective Action Request (Appendix G) must be given a unique identification number and tracked until corrective actions have been implemented in the field, documented in Part B of the Corrective Active Request Form, and the Corrective Action Request submitted to the PM for verification and closure.

4.11 LESSONS LEARNED AND OTHER DOCUMENTATION

The lessons learned through the discrepancy management process are documented in Corrective Action Requests and Corrective Action Plans. To share the lessons learned, these documents can be submitted to USACE-Omaha District through a Weekly QC Report, which summarizes the week's QC activities and includes a grouping of the Daily QC Reports and any other pertinent reports created during the week.

Corrective Action Requests should be cited in the Weekly QC Report. Minor deficiencies identified during a QC audit that are readily correctable and can be verified in the field are to be documented in the QC Log Book and Weekly QC Report without initiating a Corrective Action Request. Discrepancies that cannot be readily corrected will be documented by the UXOQCS on a Corrective Action Request and in the Weekly QC Report. Copies of Corrective Action Requests will be referenced in and attached to the Weekly QC Report. Corrective Action Plans will also be attached to Weekly QC Reports to document the final outcome of the deficiency. Similar or related deficiencies may be addressed on a single Corrective Action Plan.

4.12 LOGS AND RECORDS

Original field logs and records will be maintained by the UXOQCS as part of the project files.

The initial project file will be structured to include a copy of the following documents and information:

- Schedule and progress reports
- WPs, industry standards, and procedures including addenda and modifications
- Work orders and other contract modifications
- Equipment manufacturer's certificates
- Equipment check records
- Location and survey records
- Telephone conversation logs
- Meeting minutes and agenda
- Inspection logs and schedules
- Site maps
- Qualifications and training records of all site personnel
- Photo documentation
- Chain of custodies
- Non-conformance and corrective action reports.

Field forms are provided in Appendix G. These forms may be completed in electronic format and consequently the appearance will be altered slightly; however, the overall content will remain the same. Project activities will be documented as summarized in Table 4-3.

4.12.1 Field Log Books

The Site Supervisor, SUXOS, UXOQCS, and each field team leader will be responsible for maintaining paginated, bound, and dated hard copy Field Log Books to record activities that occur each work day. Each log book entry will be event-, area-, or site-specific and clearly noted accordingly. At the conclusion of the project, log book entries will become a permanent part of the contract record.

4.12.2 Safety Log Book

The UXOSO will also maintain a log book that summarizes daily safety activities. This Safety Log Book will document compliance with the APP. Safety Log Books will be maintained as paginated, bound, and dated hard copy logs. The Safety Log Books will record such information as the date, start and stop times of work, weather conditions, names of field team personnel, specific description of the work being conducted, break times, names and times of visitors to the site, and any incidents or other unusual events that occur on that day. This includes documentation of the performance and content of daily health and safety meetings. The APP (Appendix D) provides additional details on the Safety Log Book. These log books will describe conditions or activities leading up to or contributing to a safety incident or lost time due to safety. Safety Log Books will be turned over to the PM and become a permanent part of the contract record.

Table 4-3 Project Documentation

Phase	Responsible Person	Document/Report	Frequency
Entire Project	Project Manager	Progress Report	Monthly
Entire Project	Project Manager	Corrective Action Plan	As needed
Field	Project Manager	Field Change Request Form	As needed
Field	Site Supervisor	Site Supervisor Daily	Daily
Field	SUXOS	SUXOS Daily Report	Daily
Field	SUXOS	Chain of Custody	As needed for soil sampling
Field	UXOSO	Visitors Log	Daily
Field	UXOSO	Safety Meeting/Training Record	Daily
Field	UXOSO	Safety Inspection Report	Weekly or more frequently, as needed
Field	UXOQCS	Daily QC Form	Daily
Field	UXOQCS	Non-Conformance Report	As needed
Field	Team Leader	Tailgate Meeting Form	Daily
Field	Team Leader	Dig Sheets	Daily
Field	Data Manager	QC Meeting Summary	Weekly
Field	Data Manager	Grid Tracker Report	Daily
Field	UXOQCS	Preparatory Phase Inspection Checklist	As needed
Field	UXOQCS	Initial Phase Inspection checklist	As needed
Field	UXOQCS	Follow-Up Inspection Checklist	As needed
Field	UXOQCS	Final Inspection Checklist	As needed

NOTES: QC = Quality control.
SUXOS = Senior UXO Supervisor.
UXO = Unexploded ordnance.
UXOQCS = UXO Quality Control Specialist.
UXOSO = UXO Safety Officer.

4.12.3 Daily QC Reports

Daily work activity summary reports will be maintained by the UXOQCS. These daily reports may include, but are not limited to, the following items:

- QC reports and findings.

The Daily QC activities will be recorded on the Daily QC Report (Appendix G). The Daily QC Reports provide backup information and are intended to aid in the preparation of the Weekly QC Report as discussed below.

4.12.4 Weekly QC Reports

The UXOQCS is responsible for preparing and submitting a Weekly QC Report to the Program QC Manager and PM. The Weekly QC Report is to be submitted to the Program QC Manager on the first workday following the dates covered by the report. The Weekly QC Report is to provide an overview of QC activities during the week, 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.

4.12.5 Quality Control Log Book

The UXOQCS will maintain QC Log Book(s) that summarize field QC inspections. These log books will document compliance with the WP and specify workmanship acceptability. Each log book will be portable and dedicated to the event or site. QC Log Books will be maintained as paginated, bound, and dated hard copy logs. The area and DFW being inspected, and the date will be recorded. Each log book entry will be event-, area-, or site-specific and clearly noted accordingly. QC Log Books will be turned over to the PM and become a permanent part of the contract record, in addition to the completed specific QC forms specified above.

4.12.6 Test, Maintenance, and Calibration Records

Any equipment test, maintenance, or calibration task will be documented in a field log book by the individual performing the task. Testing and maintenance of equipment such as radios, cell phones, vehicles, and machinery will be performed per the manufacturer's specifications, and this WP. At a minimum the test, calibration, or maintenance log will contain the date and time of the task, equipment name and identification numbers, name of individual performing the task, and results of the task. Upon project closeout, all tests, maintenance, and calibration records will be included in the project QC file.

The UXOQCS will be responsible for ensuring that the tests are performed, and 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 will be complete when retesting has been performed and the corrective action verified on a deficiency log.

4.12.7 Training Records

The UXOSO will maintain a file for each site employee to document qualifications and the successful completion of the required training courses for that particular employee. The documentation may be a certificate, letter, memorandum, or other written form of documentation but must include the training completion date(s). If any required refresher training courses do not take place by the anniversary date of the employee's initial training, there should be a record in the employee's file indicating why the training has been delayed and when the training will be completed.

4.12.8 Photographs

Files of digital photos, along with detailed descriptions or captions, will be provided to the SUXOS and Data Manager at the completion of each work day. Digital photo copies will be kept in a specific computer file folder and transferred to disk to become part of the contract record. Any non-digital hard copies of photos along with the photographic log book or ledger will be maintained in the project file.

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5. EXPLOSIVES MANAGEMENT PLAN

5.1 INTRODUCTION

During execution of the NTCRA, demolition support may be required. EA will perform MEC disposal through open detonation procedures. Explosives will be provided by a local vendor on an as-needed basis. MEC will be marked and guarded until disposal is accomplished. Explosives will not be stored for this project. EA will coordinate work activities with personnel from Hancock Field.

5.2 LICENSES AND PERMITS

A State of New York Blasters License is required by the State when explosive operations are being conducted at Hancock Field.

5.3 ACQUISITION

EA has a current Bureau of Alcohol, Tobacco, Firearms and Explosives (BATF) license to purchase and use explosives. This license will be available for federal, state, or local inspection during site characterization operations. Explosives acquisition, including a description and estimate of quantity, the acquisition source, and a summary of the explosives to be acquired, is summarized in the subsections below.

5.3.1 Description and Estimated Quantities

The SUXOS will only order the appropriate number of explosives required to perform the necessary disposal/venting of MEC. It is anticipated that not more than 50-lb net explosive weight of commercial counter charges, initiating explosives, and venting charges for disposal and demilitarization operations is needed.

5.3.2 Acquisition Source

EA will purchase explosives from a licensed commercial explosives vendor.

5.3.3 Listing of Proposed Explosives

The types of explosives that may be used at Hancock Field and their associated MC are listed below.

- Cast Booster (Hazard Classification/Compatibility Group 1.1D)—Trinitrotoluene and pentaerythritol tetranitrate (PETN)
- Jet Perforators (Hazard Classification/Compatibility Group 1.4S)—32-gram shape charge, cyclotrimethylene trinitramine
- Detonating Cord (Hazard Classification/Compatibility Group 1.4D)—80 grain per foot, pentaerythritol tetranitrate

- Blasting Caps (Hazard Classification/Compatibility Group 1.4B)—With Nonel leads, lead azide, lead styphnate, PETN

- Nonel Shock Tube (Hazard Classification/Compatibility Group 1.4S) – PETN, lead azide, lead, silicon, selenium, lead tetroxide, titanium dioxide, barium chromate, lead chromate, barium sulfate, potassium perchlorate, silica, molybdenum, tungsten, aluminum, antimony, HMX.

Note: The MC associated with Nonel are expected to be consumed during detonation.

5.4 INITIAL RECEIPT

Shipments of explosives will be by commercial carrier from the explosive's supplier. The explosives supplier is responsible for all permits and documentation required by federal, state, and local regulations. Base security and the Explosives Safety Officer for Hancock Field will be notified in advance of the anticipated date and time for the delivery of explosives. The SUXOS and UXOSO will meet the shipment at the front gate and escort the commercial carrier to the site where the explosives will be used.

On receipt, the type, quantity, and lot number of each explosive item will be checked against the manifest and recorded on the Explosives Usage Record as provided in SOP-10 in Appendix F. Procedures for reconciling receipt discrepancies in quantities shipped and quantities received from the explosive's vendor are outlined in SOP-10 in Appendix F. The original receipt documents and the Explosives Usage Record will be maintained on file by the SUXOS and UXOQCS.

5.5 STORAGE

Explosives will not be stored onsite. Explosives will be delivered on an "on call" basis. Total control of explosives will be maintained while the explosives are onsite.

5.6 TRANSPORTATION

Transportation of explosives will be by commercial carrier from the explosive's supplier. The explosives supplier is responsible for all permits and documentation required by federal, state, and local regulations.

5.6.1 Procedures for Transportation from Storage to Disposal Location

Even though permits are not required for the transportation of small quantities of explosives to be used onsite, EA will use the most expeditious route to the MRS when transporting demolition material. Refer to SOP-7, Explosives Transportation, in Appendix F.

In accordance with Department of Transportation regulations, EA will transport explosives in Institute of Makers of Explosives (IME)-22 containers to the disposal sites.

EA will comply with the following requirements:

- Initiating explosives, such as blasting caps, will remain separated at all times. Blasting caps may be transported in the same vehicle as long as they are in a separate IME-22 container (49 CFR 173.63) and secured away from other items.

- Compatibility requirements will be observed.

- Only UXO Technicians III and above may be issued and transport explosive materials. The receiving party will sign the receipt documents for accountability.

- Operators transporting Hazard Division (49 CFR 173.50) 1.4 explosives will have a valid driver's license.

- Drivers will comply with posted speed limits but will not exceed a safe and reasonable speed for conditions. Vehicles transporting explosives off-road will not exceed 25 miles per hour.

- Personnel will not ride in the cargo compartment with explosives or MEC.

- Specific Hancock Field requirements for transporting explosives will be observed.

5.6.2 Explosive Transportation Vehicle Requirements

Explosives will be transported in placarded vehicles (Appendix F, SOP-7), as applicable. Vehicles transporting explosives or MEC will be inspected daily using the EA Explosive Vehicle On-Site Inspection Form or a DD Form 626 (found in Appendix F, SOP-7), and will be properly placarded in accordance with 49 CFR, 172, Subpart F, if required.

- Vehicle engine will not be running when loading/unloading explosives.

- Explosive-loaded vehicle wheels will be chocked when parked.

- Beds of vehicles will have a wooden bed liner, dunnage, or sand bags to protect the explosives from contact with the metal bed and fittings.

- Vehicles transporting explosives will have a first aid kit, two 2A10BC-rated fire extinguishers, and means of communications.

5.7 RECEIPT PROCEDURES

The SUXOS and the demolition supervisor will strictly control access to all explosives. All receipts, issues, turn-ins, and inventories of explosives will be properly documented and verified, through physical count, by the SUXOS and UXOQCS/UXOSO. Receipt procedures accounting for each item of explosives from initial delivery, until the item is expended, are provided in SOP-10 in Appendix F. The authorized individuals for the receipt of explosives, procedures for

reconciling receipt documents, and record management and accountability are summarized in the subsections below.

5.7.1 Authorized Individuals

EA is required to provide explosives distributors with documentation of individuals authorized to request and receive explosives. The individual authorized to receive, and issue explosives is the SUXOS. The SUXOS will designate in writing the individual who is authorized to transport and use explosives. The demolition supervisor (UXO Technician III) performing demolition will sign and date the explosives usage record certifying that the explosives were used for their intended purpose.

5.7.2 Procedures for Reconciling Receipt Documents

The SUXOS will reconcile the delivery shipping documentation with the requested amounts ordered and received at the time of receipt. Any shortages or overages will be reported to the PM, who will contact the explosives distributor and reconcile any differences. In addition, he/she will notify the onsite USACE Ordnance and Explosives Safety Specialist (OESS) if present.

5.7.3 Records Management and Accountability

All original explosive records will be forwarded to the EA Corporate office for retention in accordance with regulations and requirements. Copies of all records will be maintained onsite by the site SUXOS and will be available for inspection by authorized agencies. Their respective lot number will track explosive items until the item is expended or transferred to an approved agency.

5.8 INVENTORY PROCEDURES

Complete explosives inventories will also be conducted after any issues/turn-ins of demolition material. Any remaining demolition material will be returned to the explosive's provider.

5.8.1 Physical Inventory Procedures

The SUXOS will strictly control access to all explosives. No explosives will be stored on-site. All issues and turn-ins of explosives will be properly documented and verified, through physical count, by the SUXOS or his/her approved designee. On receipt, the type, quantity, and lot number of each explosive item are recorded as provided in SOP-10 (Appendix F).

The SUXOS will review all requests for explosives from the individual operating sites and only sufficient explosives for the day's operations will be requested and issued. Issues of explosives will be recorded on the Explosives Usage Record and annotated in the Daily Report. This procedure will ensure that the issued explosives are accounted for while they are in the possession of individual users. The end user of explosives will certify on the Explosives Usage Record that the explosives were used for their intended purpose.

Entries made on the Explosives Usage Record will be verified through physical count by the SUXOS or demolition supervisor when drawing or turning in the explosives and certified by the UXOQCS:

- At the end of each disposal operation, the UXOQCS and the Demolition Team leader will reconcile the entries on each Explosives Usage Record and turn these records over to the SUXOS. The record of ordnance items destroyed with the explosives consumed will be kept in the Daily Report.

- Entries made on the Explosives Usage Record will be verified through physical count by the demolition supervisor when drawing or turning in the explosives and the UXOQCS will verify the record.

5.8.2 Procedures for Reconciling Inventory Discrepancies

As no explosives will be stored on-site, no inventory of items is necessary.

5.9 REPORTING LOSS OR THEFT OF EXPLOSIVE MATERIALS

If it is confirmed that explosives are missing, it will be reported immediately to the EA PM who will immediately report the discrepancies and results of these inventories to the EA Program Manager. If the EA Program Manager is not reachable, the EA PM will make the report to the BATF within 24 hours of discovery. The BATF contact phone number for theft or loss is 1-888-283-2662.

5.10 DISPOSAL OF REMAINING EXPLOSIVES

The BATF requires an accounting of all explosives purchased and used. Therefore, at the end of the project, all unused explosives will be either:

- Be disposed of by detonation, or
- Have custody and accountability transferred to the explosive's distributor.

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6. ENVIRONMENTAL PROTECTION PLAN

6.1 INTRODUCTION

This Environmental Protection Plan is written to describe the approach, methods, and operational procedures to minimize pollution, protect and conserve natural resources, restore damage, and control noise and dust during the NTCRA. Project activities will comply with all ARARs (USACE-Omaha 2016).

Field activities may include preparation of the site; surface clearance; investigation and removal of possible MEC/MD; MEC removal and detonation (if needed); disposal of MPPEH/MD; vegetation and soil removal, sifting, and disposal; demolition; and site restoration (as needed).

EA will perform excavations to confirm the presence or absence of munitions and explosives. If the presence of MEC is confirmed, EA will dispose of the MEC.

6.2 ENVIRONMENTAL CONSIDERATIONS

As discussed in Section 1.2, this NTCRA is being completed under CERCLA. Section 121(d)(1) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act, requires that remedial actions must attain a degree of cleanup that ensures protection of human health and the environment. ARARs include federal standards, requirements, criteria, and limitations under state environmental or facility siting regulations. Although the requirements of CERCLA Section 121 generally apply as a matter of law only to remedial actions, the EPA's policy for response actions is that ARARs will be identified and attained to the extent practicable.

Section 121(e)(1) of CERCLA exempts this NTCRA from having to obtain permits (local, state or federal) for actions conducted within the area of contamination; however, the "substantive requirements" of such permits must still be met. The MRS boundaries are the area of contamination boundaries.

6.2.1 Endangered/Threatened Species

No threatened or endangered species have been observed at the FIB (MRS SR002). There are no archaeological or cultural sites present at the MRS (ANG 2016).

6.2.2 Wetlands

Wetlands are located in the southern and eastern portion of Hancock Field; however, no wetlands occur within the FIB (MRS SR002) (ANG 2016).

6.2.3 Cultural, Archaeological, and Water Resources

There are no archaeological or cultural sites present at the MRS (ANG 2016).

Surface drainage near the MRS is south and southeast toward the North Branch of Ley Creek. The North Branch of Ley Creek is located approximately 250 ft west of MRS SR002 and flows from north to south (ANG 2016).

The lake sediments underlying the installation contain an unconfined, non-sole-source water table aquifer, which can be found at an average depth of 3 ft bgs. However, due to low yield resulting from low transmissivity, the aquifer is not a suitable source of potable water. A confined aquifer is found in the bedrock below the glacial till (ANG 2016).

6.2.4 Existing Waste Disposal Sites

No known waste disposal sites exist at the project sites. In the event that a waste disposal site is identified, the field team will immediately inform the USACE-Omaha District PM and Hancock Field Base Environmental Manager and cease field activities at the site.

6.3 MITIGATION PROCEDURES

6.3.1 Manifesting, Transportation, and Disposal of Wastes

Solid wastes generated during the project will be stored in plastic bags for disposal as municipal waste by a local disposal facility.

6.3.2 Burning Activities

No burning activities will take place during this project.

6.3.3 Dust and Emission Control

Dust will be controlled during soil disturbance activities by applying water as needed. A county approved hydrant backflow preventer is required when using water from the hydrant near the site.

6.3.4 Spill Control and Prevention

Spill control and prevention is addressed in the APP (Appendix D).

6.3.5 Sediment and Erosion Controls

The substantive requirements for sediment and erosion controls will be met by placing mulch socks, sediment logs, straw wattles or equivalent socks downgradient of excavation and soil stockpiles. Sediment and erosion controls will be maintained throughout the active field work. After vegetation is established, the socks will be cut open and contents spread across the ground. Sock fabric material and any stakes will be disposed of offsite in a landfill.

6.3.6 Storage Areas and Temporary Facilities

No site job trailer is anticipated for this project. Access to vehicles and nearby buildings will be used as necessary for facilities. Any material storage will be located within the MRS boundary.

6.3.7 Access Routes

EA does not anticipate the need to develop or improve roads for site access. To the greatest extent practical, field teams will use developed roads and surfaces to access work locations within the project site.

6.3.8 Tree and Shrub Protection and Restoration

Limited vegetation removal will be performed to facilitate data acquisition and the safe conduct of project activities. This will include the removal of brush and trees around the FIB exterior as needed to execute the work. EA will make every effort to minimize the number of trees being removed.

6.3.9 Control of Water Run-On and Run-Off

Excavation activities will not disturb the local drainage patterns. At the conclusion of field activities, excavated areas will be blended to existing topography to the extent practical.

6.4 MINIMIZING AREAS OF DISTURBANCE

Procedures for minimizing areas of disturbance include such measures as:

- Driving on established roads as much as possible
- Limiting vehicle trips in areas without roads
- Replacing soil into holes that result from excavation and the detonation of MEC and/or MPPEH

6.5 POST-ACTIVITY CLEANUP

At the conclusion of field activities, EA will remove project materials and solid wastes from the project site. Provided the concentrations of lead and copper in screened soil from within the FIB are below residential use SCOs, the soil will be returned to the site and the entire area graded to blend to existing elevations surrounding the former FIB. Otherwise, the soils will be transported offsite for disposal.

Sediment and erosion controls will be removed upon vegetation establishment to similar pre-NTCRA conditions. After vegetation is established, the mulch filter socks will be cut open and the mulch spread across the ground to achieve a mulch thickness of less than one inch. Sock fabric and stakes will be removed and disposed of offsite.

6.6 AIR MONITORING

Real-time air monitoring for particulate levels at the perimeter of the exclusion zone will be performed during intrusive activities. Continuous monitoring will be performed at upwind and

downwind perimeters of the exclusion zones. The real time monitoring equipment will be capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes for comparison to the airborne particulate action level.

If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed.

7. REFERENCES

Air National Guard (ANG). 2016. *Final Non-Time Critical Removal Action Site-Specific Final Report for Munitions Response Sites SR001 and SR002, Hancock Air National Guard Base, Syracuse, New York.* 01 March.

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New York State Department of Environmental Conservation (NYSDEC). 2006. *6NCYRR, Part 375: Environmental Remediation Programs, Subpart 375-6: Remedial Program Soil Cleanup Objectives.* Accessed online: https://www.dec.ny.gov/docs/remediation_hudson _pdf/part375.pdf

———. 2014. *Fact Sheet: Cleanup Action to Begin at Hancock Air National Guard Base*. May.

Schneider, R.J. and J.A. Kochefko. 2015. *Memorandum for Record, Subject: Site Visit of SR002, Firing-In Buttress at Hancock Field, New York.* April.

Sky Research, Inc. 2012. *Hancock Field ANGB CSE Phase II Report (Final)*. United States Army Corps of Engineers, Omaha District. November 2012.

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———. 2008. *Explosives – Safety and Health Requirements Manual*. Engineer Manual 385-1-97. 15 September 2008. Includes Errata Sheets 1 through 6 dates 1 June, 13 July, and 16 July 2009; 21 July 2010; and 17 May 2013.

———. 2014. *Safety and Health Requirements Manual*. Engineer Manual 385-1-1. 30 November.

United States Army Corps of Engineers (USACE) – Omaha District. 2016. *Final Engineering Evaluation/Cost Analysis Military Munitions Response Program Hancock Field Air National Guard Base Syracuse, New York.* July.

———. USACE – Omaha District. 2013. *Final Engineering Evaluation/Cost Analysis, Hancock Field Air National Guard Base, Syracuse, New York.* April.

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Appendix A

Performance Work Statement

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Section C - Descriptions and Specifications

PWS MAY 2015

PERFORMANCE-BASED CONTRACT

PEFORMANCE WORK STATEMENT (PWS)

FOR THE

Air National Guard (ANG)
Military Munitions Response Program (MMRP)

Hancock Field Air National Guard Base, New York

May 2015

Introduction

The goals of this performance work statement (PWS) are: complete a surface and subsurface debris removal at the firing in buttress at Hancock Air National Guard Base (ANGB) in Syracuse, Ney York.

This PWS is being conducted under the Air National Guard's (ANG) military munitions response program (MMRP). The goal of the MMRP is to make munitions response sites (MRS) safe for reuse and to protect human health and the environment. The MMRP addresses the unique munitions and explosives of concern (MEC) and munitions constituents (MC) issues associated with MRSs.

1 Location and FUDS Property Information

Hancock Field is located at the Syracuse Hancock International Airport in New York. It is approximately five miles north of the City of Syracuse in Onondaga County. The current installations consist of several buildings and operations facilities that are separated into two main tracts of land.

Hancock Field was built in 1942, as a staging area, repairing and re-outfitting B-17 and B-24 aircraft used in the World War II. Three 5,500 foot runways were also built the same year. In addition, the First Concentration Command, later known as the Air Service Command, used the base to assemble and test B-24 aircraft. In 1946, the City of Syracuse took over the Mattydale Bomber Base, and in 1948, the base was dedicated as a commercial airfield. The Clarence E. Hancock Airport opened in September 1949. Hancock Airport was awarded international airport status in 1970.

1.1 Property Name (FUDS Property Number), City, State

Firing-in-Buttress, SR002, Hancock ANGB, Syracuse, New York

The Firing-in-Buttress (FIB), SR002 was used as a backstop for test firing of up to .50 caliber ammunition from F-86 aircraft. One large caliber round, identified as a 3.5 inch rocket, high explosive antitank (HEAT), M28A2, was embedded in the top portion of railroad ties which form the top of the FIB catch box. This item was removed by the explosive ordnance disposal (EOD) team prior to the comprehensive site evaluation (CSE) phase II field work. The FIB is constructed of wooden railroad ties, concrete and sod.

Previous work conducted at the FIB include a CSE Phase I, CSE Phase II, EE/CA, AM, non-time critical removal action (NTCRA), and site specific final report (SSFR).

The NTCRA field work was conducted for lead-contaminated soil. During the field work, additional 20-mm target practice projectiles and various pieces of 3.5 inch rockets were located.

2 Scope of Work

The Contractor will provide a non-time critical removal action (NTCRA) of all surface and subsurface debris, wooden baffles, concrete and any other visible debris within the FIB structure. This PWS will include an engineering evaluation / cost analysis (EE/CA), action memorandum (AM), work plan (WP), explosive safety documentation, site specific final report (SSFR), and after action report (AAR). The objective of the field work is to remove all surface and subsurface debris, removal all wooden timbers, and any other debris (concrete or other) that may be present within the FIB structure. It is not anticipated that munitions constituents will be included in the PWS as the previous NTCRA has removed all MC associated with lead-contaminated soil. If any soil is removed off site, all necessary characterization samples shall be collected for proper disposal. Following the field effort, the munitions response site prioritization protocol (MRSPP) shall be updated in accordance with (IAW) all applicable guidance.

Guidance and Policy Clarifications

In accordance with ANG MMRP, all phases will comply with requirements of the comprehensive environmental response, compensation and liability act (CERCLA) of 1980.

All munitions response actions will be conducted in full compliance with USACE, Department of the Army, Department of Defense (DoD) and local/state requirements regarding personnel, equipment and procedures.

All deliverables must be IAW the applicable environmental protection agency (EPA) and Air Force (AF) guidance.

References

The Contractor shall follow all appropriate guidance and statutory requirements during the execution of this PWS.

Review of Available Information

There are many available sources of information that may be used to perform the work covered under this PWS. Previous archive search reports (ASR), CSE Phase I report, CSE Phase II report, and site specific final report (SSFR).

These documents may be made available to the proposing Contractor upon request.

The Contractor shall review these documents and ensure that the information is factually documented and presented prior to incorporating the information.

Deliverables

2.1.1 **Engineering Evaluation / Cost Analysis (EE/CA)**

The Contractor shall prepare an engineering evaluation / cost analysis (EE/CA). The EE/CA shall include an analysis of various alternatives per the EPA guidance followed by the necessary public notice and comment period.

The EE/CA shall be approved by the USACE Project Manager prior to initiation of work. One hard copy and one electronic copy of the Final PMP shall be submitted to the USACE Project Manager, who will distribute it as necessary. The versions shall include internal draft, draft, draft final and final.

2.1.1 **Action Memorandum**

Following the EE/CA, an action memorandum (AM) shall be written selecting the path forward of the NTCRA at the FIB. The AM shall be completed at internal draft, draft, draft final and final. The Final AM will require the necessary signatures prior to producing the final document.

2.1.2 **Work Plan**

Before conducting the RI field work, a RI work plan will be developed. The work plan shall include the clear and concise technical approach that will be utilized during the field work. It shall include, at a minimum, haul routes, landfill information, safety information, technical approach, contact information, etc. The documents shall be accepted by the USACE project manager prior to payment of milestones.

The Contractor shall assume the below submission to be necessary. The documents shall be accepted by the USACE Project Manager prior to payment of milestones.

2.1.3 **In-Field Documentation**

The Contractor shall prepare daily quality control report during the field work. They shall include at a minimum: a daily log of all personnel on site, visitors on site, significant findings during the field effort, any issues during the field effort and daily weather. All daily reports shall be retained electronically by the Contractor and include in an appendix of the RI Report.

2.1.4 **Site Specific Final Report**

Following the finalization of the field work, the Contractor shall develop a sites specific final report (SSFR). The purpose of the SSFR is to document what was done during the field work. It should be clear, concise and easy to follow. The documents shall be accepted by the USACE Project Manager prior to payment of milestones.

2.1.5 **After Action Report**

Following the field work, an after action report shall be conducted in order to close out the necessary explosive safety plan with the department of defense explosive safety board (DDESB). The documents shall be accepted by the USACE Project Manager prior to payment of milestones.

2.1.6 **Progress Reports**

The Contractor shall provide monthly progress updates upon award of this contract. The monthly progress report shall be sent directly to the USACE PM. As invoices are submitted to the USACE bill payer, the PM shall receive a separate email at that time with a progress report and the milestone payment schedule.

2.1.7 Electronic GIS and EDD Files: All report mapping, figures, survey and topographic data, contaminant migration maps, geologic cross sections, conceptual site models, etc.) shall be presented in GIS files. GIS files shall be submitted compatible with Environmental Systems Research Institute (ESRI) 9.x (shapefiles or personal geodatabases) format (or other format if directed). All GIS data shall be made compliant to the Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) (http://www.sdsfie.org/). GIS files shall also meet any upgrade to all Corps of Engineers systems throughout the duration of the contract. All GIS data shall be collected using the local State Plane coordinate system using the North American Datum of 1983 and the North American Vertical Datum of 1988. All files shall be collected using linear units of US Survey feet for both the horizontal and vertical.

If any CADD files are produced, they shall be digitized into files compatible with Microstation vector format (or other format if directed in the individual task order). CADD files shall also meet any upgrade to all Corps of Engineers systems throughout the duration of the contract.

Electronic GIS and CADD files will be sent on a separate CD from other electric deliverables and sent directly to the USACE PM.

All laboratory data for samples analyzed by commercial laboratories shall be submitted into an ERPMIS acceptable format.

3 Schedule

The work outlined in this PWS shall be complete by 29 November 2019. This time frame allows sufficient time for regulatory review, issuance of the plans, field work and reports.

4 Contractor Proposal

The Contractor's budget shall also include costs for travel to the site for purpose of site/environs reconnaissance, and to local/regional and state governmental agencies. The contractor shall supply all labor, equipment, and materials necessary to achieve the performance objectives of this PWS. The proposal and deliverables described above shall be clear, concise and written using standard English. They shall correctly use all technical and regulatory terminology.

The request for proposal should be referenced with regards to the evaluation criteria and specifics to include in the proposal.

5 USACE Points of Contact

Contract Specialist (Omaha District

The contract specialist and main point of contract through the proposal process for this PWS will be Julie K. Siderwicz, U.S. Army Corps of Engineers, Omaha District, Attn: CENWO-CT, 1616 Capitol Ave, Omaha, NE 68102, Email Julie.K.Siderwicz@usace.army.mil, Phone 402.995.2063.

Section E - Inspection and Acceptance

INSPECTION AND ACCEPTANCE TERMS

Supplies/services will be inspected/accepted at:

CLIN	INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
0001	Destination	Government	Destination	Government

Section F - Deliveries or Performance

DELIVERY INFORMATION

CLIN	DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
0001	POP 21-SEP-2015 TO 16-NOV-2017	N/A	COE PROGRAMS MANAGEMENT BRANCH LINDA DIBEL USAED, OMAHACENWO-PM-P 1616 CAPITOL AVE OMAHA NE 68102-4901 402-995-2791 FOB: Destination	966752

Section G - Contract Administration Data

GENERAL INFORMATION
Please reference Contract **W9128F-13-D-0006, Task Order 0002** on all submittals and invoices. Contractor is required to include the contract number on the invoice, so that receipt and payment may be expeditiously processed.

PROGRESS PAYMENTS ARE AUTHORIZED, SUBJECT TO APPROVAL FROM CONTRACTING OFFICER'S REPRESENTATIVE. ELECTRONIC FUNDS TRANSFER WILL BE THE METHOD OF PAYMENT. PLEASE ENSURE ALL ACCOUNT INFORMATION IS CURRENT AND PROVIDED TO THE FINANCE AND ACCOUNTING CENTER, MILLINGTON, TN.

Points of Contact:

Contracting: Julia Siderewicz at (402) 995-2063 or via email at julie.k.siderewicz@usace.army.mil
Invoicing: Adam Little at (402) 995-2730 or Linda Dibel (402) 293-2791 or via email at adam.r.little@usace.army.mil or linda.s.dibel@usace.army.mil

INVOICING/PAYMENT

Electronic funds transfer capability (a.k.a. direct deposit) is required for receipt of payment for services rendered under the resulting contract. Bill only for services rendered and sends the invoices to the attention of Mr. Adam Little. Contractor is required to include the contract number on all invoices so that receipt and payment for the supplies may be expeditiously processed. Submit invoices to:

U.S. Army Corps of Engineers, Omaha District
ATTN: Adam Little or Linda Dibel - CENWO-PM-HB
1616 Capitol Ave
Omaha, NE 68102-4901

CONTRACT TYPE

This is a Fixed Price task order.

STATE AND LOCAL SALES TAXES

The U.S. Army Corps of Engineers is exempt from paying state and local taxes per Title 4, US Code 104-107.

ACCOUNTING AND APPROPRIATION DATA

AA: 21520200000 088061 3230678K0H49300812000 ENVR 25066
AMOUNT: $297,985.00
CIN W59XQG526109160001: $297,985.00

Section I - Contract Clauses

CLAUSES INCORPORATED BY REFERENCE

252.232-7003	Electronic Submission of Payment Requests and Receiving Reports	JUN 2012

CLAUSES INCORPORATED BY FULL TEXT

OMBUDSMAN (24 Sept 2014)

Task and Delivery Order Ombudsman. IAW FAR 16.505(B)(6) referring to FAR Part 16 "Ordering". The head of the agency has designated a task-order contract and delivery-order contract ombudsman. The ombudsman must review complaints from contractors and ensure they are afforded a fair opportunity to be considered, consistent with the procedures in the contract. The ombudsman is a senior agency official who is independent of the contracting officer and may be the agency's competition advocate.

Primary:

USACE RPARC
Mr. Denver S. Heath
US Army Corps of Engineers
Southwestern Division
1100 Commerce St. Room 824
Dallas, TX 75242-1317
Phone: 1-469-487-7151
E-Mail Denver.S.Heath@usace.army.mil

Alternate:

USACE HQ DOC
Colonel Kevin P. Stoddard
Deputy Director of Contracting
US Army Corps of Engineers
441 G Street NW
Washington, DC 20314-1000
Phone: 202-761-4707
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(End of clause)

UAI 15.504-100 Award to Successful Offeror

Only a warranted Contracting Officer (either a Procuring Contracting Officer (PCO), or an Administrative Contracting Officer (ACO)), acting within their delegated limits, has the authority to issue modifications or otherwise change the terms and conditions of this contract. If an individual other than the Contracting Officer attempts to make changes to the terms and

conditions of this contract you shall not proceed with the change and shall immediately notify the Contracting Officer.

Section J - List of Documents, Exhibits and Other Attachments

SCA
WD 05-2383 (Rev.-17) was first posted on www.wdol.gov on 07/14/2015

REGISTER OF WAGE DETERMINATIONS UNDER THE SERVICE CONTRACT ACT
By direction of the Secretary of Labor

U.S. DEPARTMENT OF LABOR
EMPLOYMENT STANDARDS ADMINISTRATION
WAGE AND HOUR DIVISION
WASHINGTON D.C. 20210

Daniel W. Simms
Director

Division of
Wage Determinations

Wage Determination No.: 2005-2383
Revision No.: 17
Date Of Revision: 07/08/2015

Note: Executive Order (EO) 13658 establishes an hourly minimum wage of $10.10 for 2015 that applies to all contracts subject to the Service Contract Act for which the solicitation is issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.10 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

State: New York

Area: New York Counties of Broome, Cayuga, Chemung, Chenango, Cortland, Hamilton, Herkimer, Madison, Oneida, Onondaga, Oswego, Otsego, Tioga, Tompkins

Fringe Benefits Required Follow the Occupational Listing

OCCUPATION CODE - TITLE	FOOTNOTE	RATE
01000 - Administrative Support And Clerical Occupations		
01011 - Accounting Clerk I		12.91
01012 - Accounting Clerk II		14.49
01013 - Accounting Clerk III		17.66
01020 - Administrative Assistant		19.48
01040 - Court Reporter		18.96
01051 - Data Entry Operator I		11.55
01052 - Data Entry Operator II		12.77
01060 - Dispatcher, Motor Vehicle		15.33
01070 - Document Preparation Clerk		12.14
01090 - Duplicating Machine Operator		12.14
01111 - General Clerk I		11.53
01112 - General Clerk II		12.58
01113 - General Clerk III		14.12
01120 - Housing Referral Assistant		18.00
01141 - Messenger Courier		10.65
01191 - Order Clerk I		11.93
01192 - Order Clerk II		13.02
01261 - Personnel Assistant (Employment) I		13.96
01262 - Personnel Assistant (Employment) II		15.62
01263 - Personnel Assistant (Employment) III		17.25
01270 - Production Control Clerk		18.77
01280 - Receptionist		11.29
01290 - Rental Clerk		12.13
01300 - Scheduler, Maintenance		13.63
01311 - Secretary I		13.63
01312 - Secretary II		15.67
01313 - Secretary III		17.45
01320 - Service Order Dispatcher		12.29
01410 - Supply Technician		19.48
01420 - Survey Worker		14.47
01531 - Travel Clerk I		11.19
01532 - Travel Clerk II		12.07
01533 - Travel Clerk III		12.96
01611 - Word Processor I		12.29
01612 - Word Processor II		13.80
01613 - Word Processor III		15.43
05000 - Automotive Service Occupations		
05005 - Automobile Body Repairer, Fiberglass		23.28
05010 - Automotive Electrician		18.24

05040 - Automotive Glass Installer	17.63
05070 - Automotive Worker	17.63
05110 - Mobile Equipment Servicer	16.32
05130 - Motor Equipment Metal Mechanic	18.96
05160 - Motor Equipment Metal Worker	17.63
05190 - Motor Vehicle Mechanic	17.25
05220 - Motor Vehicle Mechanic Helper	15.63
05250 - Motor Vehicle Upholstery Worker	16.95
05280 - Motor Vehicle Wrecker	17.63
05310 - Painter, Automotive	18.24
05340 - Radiator Repair Specialist	17.63
05370 - Tire Repairer	14.34
05400 - Transmission Repair Specialist	18.96
07000 - Food Preparation And Service Occupations	
07010 - Baker	11.05
07041 - Cook I	10.78
07042 - Cook II	12.06
07070 - Dishwasher	8.91
07130 - Food Service Worker	9.34
07210 - Meat Cutter	16.17
07260 - Waiter/Waitress	9.99
09000 - Furniture Maintenance And Repair Occupations	
09010 - Electrostatic Spray Painter	18.28
09040 - Furniture Handler	13.59
09080 - Furniture Refinisher	18.28
09090 - Furniture Refinisher Helper	15.63
09110 - Furniture Repairer, Minor	16.95
09130 - Upholsterer	20.09
11000 - General Services And Support Occupations	
11030 - Cleaner, Vehicles	10.11
11060 - Elevator Operator	10.11
11090 - Gardener	14.37
11122 - Housekeeping Aide	11.12
11150 - Janitor	11.12
11210 - Laborer, Grounds Maintenance	12.34
11240 - Maid or Houseman	9.99
11260 - Pruner	17.78
11270 - Tractor Operator	14.53
11330 - Trail Maintenance Worker	12.34
11360 - Window Cleaner	12.77
12000 - Health Occupations	
12010 - Ambulance Driver	15.13
12011 - Breath Alcohol Technician	14.88
12012 - Certified Occupational Therapist Assistant	17.45
12015 - Certified Physical Therapist Assistant	17.79
12020 - Dental Assistant	15.13
12025 - Dental Hygienist	26.52
12030 - EKG Technician	24.38
12035 - Electroneurodiagnostic Technologist	24.38
12040 - Emergency Medical Technician	15.13
12071 - Licensed Practical Nurse I	13.30
12072 - Licensed Practical Nurse II	14.88
12073 - Licensed Practical Nurse III	16.60
12100 - Medical Assistant	12.44
12130 - Medical Laboratory Technician	18.73
12160 - Medical Record Clerk	13.27
12190 - Medical Record Technician	14.85
12195 - Medical Transcriptionist	15.34
12210 - Nuclear Medicine Technologist	31.04
12221 - Nursing Assistant I	9.40
12222 - Nursing Assistant II	10.57
12223 - Nursing Assistant III	11.54
12224 - Nursing Assistant IV	12.95
12235 - Optical Dispenser	20.61
12236 - Optical Technician	14.38
12250 - Pharmacy Technician	13.77
12280 - Phlebotomist	12.95
12305 - Radiologic Technologist	25.19
12311 - Registered Nurse I	21.73
12312 - Registered Nurse II	26.58
12313 - Registered Nurse II, Specialist	26.58
12314 - Registered Nurse III	32.15
12315 - Registered Nurse III, Anesthetist	32.15
12316 - Registered Nurse IV	38.54

12317 - Scheduler (Drug and Alcohol Testing)		18.44
13000 - Information And Arts Occupations		
13011 - Exhibits Specialist I		18.42
13012 - Exhibits Specialist II		22.83
13013 - Exhibits Specialist III		27.93
13041 - Illustrator I		18.42
13042 - Illustrator II		22.83
13043 - Illustrator III		27.93
13047 - Librarian		25.28
13050 - Library Aide/Clerk		10.80
13054 - Library Information Technology Systems Administrator		22.83
13058 - Library Technician		12.68
13061 - Media Specialist I		16.47
13062 - Media Specialist II		18.42
13063 - Media Specialist III		20.55
13071 - Photographer I		15.46
13072 - Photographer II		17.29
13073 - Photographer III		21.43
13074 - Photographer IV		26.21
13075 - Photographer V		31.71
13110 - Video Teleconference Technician		17.17
14000 - Information Technology Occupations		
14041 - Computer Operator I		14.77
14042 - Computer Operator II		16.52
14043 - Computer Operator III		18.43
14044 - Computer Operator IV		23.63
14045 - Computer Operator V	(see 1)	
14071 - Computer Programmer I		20.57
14072 - Computer Programmer II		24.53
14073 - Computer Programmer III	(see 1)	
14074 - Computer Programmer IV	(see 1)	
14101 - Computer Systems Analyst I	(see 1)	
14102 - Computer Systems Analyst II	(see 1)	
14103 - Computer Systems Analyst III	(see 1)	
14150 - Peripheral Equipment Operator		14.77
14160 - Personal Computer Support Technician		24.05
15000 - Instructional Occupations		
15010 - Aircrew Training Devices Instructor (Non-Rated)		27.87
15020 - Aircrew Training Devices Instructor (Rated)		34.05
15030 - Air Crew Training Devices Instructor (Pilot)		40.44
15050 - Computer Based Training Specialist / Instructor		27.87
15060 - Educational Technologist		27.22
15070 - Flight Instructor (Pilot)		40.44
15080 - Graphic Artist		22.64
15090 - Technical Instructor		19.66
15095 - Technical Instructor/Course Developer		24.06
15110 - Test Proctor		15.87
15120 - Tutor		15.87
16000 - Laundry, Dry-Cleaning, Pressing And Related Occupations		
16010 - Assembler		8.54
16030 - Counter Attendant		8.54
16040 - Dry Cleaner		9.91
16070 - Finisher, Flatwork, Machine		8.63
16090 - Presser, Hand		8.63
16110 - Presser, Machine, Drycleaning		8.63
16130 - Presser, Machine, Shirts		8.63
16160 - Presser, Machine, Wearing Apparel, Laundry		8.63
16190 - Sewing Machine Operator		10.50
16220 - Tailor		11.09
16250 - Washer, Machine		8.96
19000 - Machine Tool Operation And Repair Occupations		
19010 - Machine-Tool Operator (Tool Room)		20.84
19040 - Tool And Die Maker		21.55
21000 - Materials Handling And Packing Occupations		
21020 - Forklift Operator		14.75
21030 - Material Coordinator		18.77
21040 - Material Expediter		18.77
21050 - Material Handling Laborer		13.66
21071 - Order Filler		10.41
21080 - Production Line Worker (Food Processing)		14.75
21110 - Shipping Packer		13.30
21130 - Shipping/Receiving Clerk		13.30
21140 - Store Worker I		13.30

21150 - Stock Clerk	17.62
21210 - Tools And Parts Attendant	14.75
21410 - Warehouse Specialist	14.75
23000 - Mechanics And Maintenance And Repair Occupations	
23010 - Aerospace Structural Welder	25.82
23021 - Aircraft Mechanic I	24.88
23022 - Aircraft Mechanic II	25.82
23023 - Aircraft Mechanic III	26.88
23040 - Aircraft Mechanic Helper	19.11
23050 - Aircraft, Painter	22.56
23060 - Aircraft Servicer	21.64
23080 - Aircraft Worker	22.46
23110 - Appliance Mechanic	18.24
23120 - Bicycle Repairer	14.34
23125 - Cable Splicer	29.40
23130 - Carpenter, Maintenance	19.98
23140 - Carpet Layer	19.67
23160 - Electrician, Maintenance	23.73
23181 - Electronics Technician Maintenance I	21.84
23182 - Electronics Technician Maintenance II	23.49
23183 - Electronics Technician Maintenance III	24.58
23260 - Fabric Worker	18.65
23290 - Fire Alarm System Mechanic	20.85
23310 - Fire Extinguisher Repairer	17.73
23311 - Fuel Distribution System Mechanic	28.12
23312 - Fuel Distribution System Operator	23.24
23370 - General Maintenance Worker	16.05
23380 - Ground Support Equipment Mechanic	24.88
23381 - Ground Support Equipment Servicer	20.62
23382 - Ground Support Equipment Worker	21.69
23391 - Gunsmith I	17.73
23392 - Gunsmith II	19.83
23393 - Gunsmith III	21.23
23410 - Heating, Ventilation And Air-Conditioning Mechanic	19.43
23411 - Heating, Ventilation And Air Contditioning Mechanic (Research Facility)	20.16
23430 - Heavy Equipment Mechanic	19.24
23440 - Heavy Equipment Operator	24.79
23460 - Instrument Mechanic	21.23
23465 - Laboratory/Shelter Mechanic	20.57
23470 - Laborer	11.58
23510 - Locksmith	20.37
23530 - Machinery Maintenance Mechanic	20.06
23550 - Machinist, Maintenance	17.18
23580 - Maintenance Trades Helper	15.63
23591 - Metrology Technician I	21.23
23592 - Metrology Technician II	22.08
23593 - Metrology Technician III	22.84
23640 - Millwright	20.70
23710 - Office Appliance Repairer	20.09
23760 - Painter, Maintenance	18.10
23790 - Pipefitter, Maintenance	27.88
23810 - Plumber, Maintenance	21.26
23820 - Pneudraulic Systems Mechanic	21.23
23850 - Rigger	21.23
23870 - Scale Mechanic	20.82
23890 - Sheet-Metal Worker, Maintenance	20.85
23910 - Small Engine Mechanic	19.26
23931 - Telecommunications Mechanic I	25.96
23932 - Telecommunications Mechanic II	26.86
23950 - Telephone Lineman	25.89
23960 - Welder, Combination, Maintenance	18.96
23965 - Well Driller	21.23
23970 - Woodcraft Worker	21.23
23980 - Woodworker	16.32
24000 - Personal Needs Occupations	
24570 - Child Care Attendant	9.84
24580 - Child Care Center Clerk	12.27
24610 - Chore Aide	9.75
24620 - Family Readiness And Support Services Coordinator	14.52
24630 - Homemaker	13.64
25000 - Plant And System Operations Occupations	

25010 - Boiler Tender		24.39
25040 - Sewage Plant Operator		18.54
25070 - Stationary Engineer		24.39
25190 - Ventilation Equipment Tender		18.72
25210 - Water Treatment Plant Operator		18.28
27000 - Protective Service Occupations		
27004 - Alarm Monitor		16.51
27007 - Baggage Inspector		13.35
27008 - Corrections Officer		21.94
27010 - Court Security Officer		21.74
27030 - Detection Dog Handler		16.29
27040 - Detention Officer		21.94
27070 - Firefighter		23.44
27101 - Guard I		13.35
27102 - Guard II		16.29
27131 - Police Officer I		22.40
27132 - Police Officer II		24.88
28000 - Recreation Occupations		
28041 - Carnival Equipment Operator		11.05
28042 - Carnival Equipment Repairer		11.40
28043 - Carnival Equpment Worker		8.99
28210 - Gate Attendant/Gate Tender		13.80
28310 - Lifeguard		11.01
28350 - Park Attendant (Aide)		15.44
28510 - Recreation Aide/Health Facility Attendant		11.27
28515 - Recreation Specialist		19.13
28630 - Sports Official		12.29
28690 - Swimming Pool Operator		18.62
29000 - Stevedoring/Longshoremen Occupational Services		
29010 - Blocker And Bracer		24.08
29020 - Hatch Tender		24.08
29030 - Line Handler		24.08
29041 - Stevedore I		21.05
29042 - Stevedore II		24.98
30000 - Technical Occupations		
30010 - Air Traffic Control Specialist, Center (HFO)	(see 2)	35.77
30011 - Air Traffic Control Specialist, Station (HFO)	(see 2)	24.66
30012 - Air Traffic Control Specialist, Terminal (HFO)	(see 2)	27.16
30021 - Archeological Technician I		15.31
30022 - Archeological Technician II		17.07
30023 - Archeological Technician III		21.22
30030 - Cartographic Technician		23.74
30040 - Civil Engineering Technician		21.56
30061 - Drafter/CAD Operator I		16.43
30062 - Drafter/CAD Operator II		19.13
30063 - Drafter/CAD Operator III		21.29
30064 - Drafter/CAD Operator IV		25.23
30081 - Engineering Technician I		14.27
30082 - Engineering Technician II		16.02
30083 - Engineering Technician III		18.70
30084 - Engineering Technician IV		22.20
30085 - Engineering Technician V		27.16
30086 - Engineering Technician VI		32.86
30090 - Environmental Technician		19.67
30210 - Laboratory Technician		18.00
30240 - Mathematical Technician		23.49
30361 - Paralegal/Legal Assistant I		17.28
30362 - Paralegal/Legal Assistant II		21.92
30363 - Paralegal/Legal Assistant III		26.81
30364 - Paralegal/Legal Assistant IV		32.44
30390 - Photo-Optics Technician		23.49
30461 - Technical Writer I		21.13
30462 - Technical Writer II		25.85
30463 - Technical Writer III		31.27
30491 - Unexploded Ordnance (UXO) Technician I		22.74
30492 - Unexploded Ordnance (UXO) Technician II		27.51
30493 - Unexploded Ordnance (UXO) Technician III		32.97
30494 - Unexploded (UXO) Safety Escort		22.74
30495 - Unexploded (UXO) Sweep Personnel		22.74
30620 - Weather Observer, Combined Upper Air Or Surface Programs	(see 2)	21.29
30621 - Weather Observer, Senior	(see 2)	22.77
31000 - Transportation/Mobile Equipment Operation Occupations		
31020 - Bus Aide		10.64

31030 - Bus Driver	14.20
31043 - Driver Courier	12.21
31260 - Parking and Lot Attendant	9.46
31290 - Shuttle Bus Driver	13.14
31310 - Taxi Driver	10.00
31361 - Truckdriver, Light	13.14
31362 - Truckdriver, Medium	17.61
31363 - Truckdriver, Heavy	17.68
31364 - Truckdriver, Tractor-Trailer	17.68
99000 - Miscellaneous Occupations	
99030 - Cashier	9.10
99050 - Desk Clerk	10.17
99095 - Embalmer	26.64
99251 - Laboratory Animal Caretaker I	10.66
99252 - Laboratory Animal Caretaker II	11.47
99310 - Mortician	27.29
99410 - Pest Controller	15.84
99510 - Photofinishing Worker	11.97
99710 - Recycling Laborer	14.91
99711 - Recycling Specialist	17.56
99730 - Refuse Collector	13.58
99810 - Sales Clerk	11.34
99820 - School Crossing Guard	9.90
99830 - Survey Party Chief	20.03
99831 - Surveying Aide	12.59
99832 - Surveying Technician	17.23
99840 - Vending Machine Attendant	14.59
99841 - Vending Machine Repairer	16.15
99842 - Vending Machine Repairer Helper	14.59

ALL OCCUPATIONS LISTED ABOVE RECEIVE THE FOLLOWING BENEFITS:

HEALTH & WELFARE: $4.27 per hour or $170.80 per week or $740.13 per month

VACATION: 2 weeks paid vacation after 1 year of service with a contractor or successor; 3 weeks after 8 years, 4 weeks after 15 years, and 5 weeks after 25 years. Length of service includes the whole span of continuous service with the present contractor or successor, wherever employed, and with the predecessor contractors in the performance of similar work at the same Federal facility. (Reg. 29 CFR 4.173)

HOLIDAYS: A minimum of eleven paid holidays per year: New Year's Day, Martin Luther King Jr's Birthday, Washington's Birthday, Good Friday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans' Day, Thanksgiving Day, and Christmas Day. A contractor may substitute for any of the named holidays another day off with pay in accordance with a plan communicated to the employees involved.) (See 29 CFR 4.174)

THE OCCUPATIONS WHICH HAVE NUMBERED FOOTNOTES IN PARENTHESES RECEIVE THE FOLLOWING:

1) COMPUTER EMPLOYEES: Under the SCA at section 8(b), this wage determination does not apply to any employee who individually qualifies as a bona fide executive, administrative, or professional employee as defined in 29 C.F.R. Part 541. Because most Computer System Analysts and Computer Programmers who are compensated at a rate not less than $27.63 (or on a salary or fee basis at a rate not less than $455 per week) an hour would likely qualify as exempt computer professionals, (29 C.F.R. 541. 400) wage rates may not be listed on this wage determination for all occupations within those job families. In addition, because this wage determination may not list a wage rate for some or all occupations within those job families if the survey data indicates that the prevailing wage rate for the occupation equals or exceeds $27.63 per hour conformances may be necessary for certain nonexempt employees. For example, if an individual employee is nonexempt but nevertheless performs duties within the scope of one of the Computer Systems Analyst or Computer Programmer occupations for which this wage determination does not specify an SCA wage rate, then the wage rate for that employee must be conformed in accordance with the conformance procedures described in the conformance note included on this wage determination.

Additionally, because job titles vary widely and change quickly in the computer industry, job titles are not determinative of the application of the computer professional exemption. Therefore, the exemption applies only to computer employees who satisfy the compensation requirements and whose primary duty consists of:
(1) The application of systems analysis techniques and procedures, including consulting with users, to determine hardware, software or system functional specifications;
(2) The design, development, documentation, analysis, creation, testing or modification of computer systems or programs, including prototypes, based on and related to user or system design specifications;
(3) The design, documentation, testing, creation or modification of computer programs related to machine operating systems; or
(4) A combination of the aforementioned duties, the performance of which requires the same level of skills. (29 C.F.R. 541.400).

2) AIR TRAFFIC CONTROLLERS AND WEATHER OBSERVERS - NIGHT PAY & SUNDAY PAY: If you work at night as part of a regular tour of duty, you will earn a night differential and receive an additional 10% of basic pay for any hours worked between 6pm and 6am. If you are a full-time employed (40 hours a week) and Sunday is part of your regularly scheduled workweek, you are paid at your rate of basic pay plus a Sunday premium of 25% of your basic rate for each hour of Sunday work which is not overtime (i.e. occasional work on Sunday outside the normal tour of duty is considered overtime work).

HAZARDOUS PAY DIFFERENTIAL: An 8 percent differential is applicable to employees employed in a position that represents a high degree of hazard when working with or in close proximity to ordinance, explosives, and incendiary materials. This includes work such as screening, blending, dying, mixing, and pressing of sensitive ordance, explosives, and pyrotechnic compositions such as lead azide, black powder and photoflash powder. All dry-house activities involving propellants or explosives. Demilitarization, modification, renovation, demolition, and maintenance operations on sensitive ordnance, explosives and incendiary materials. All operations involving regrading and cleaning of artillery ranges.

A 4 percent differential is applicable to employees employed in a position that represents a low degree of hazard when working with, or in close proximity to ordance, (or employees possibly adjacent to) explosives and incendiary materials which involves potential injury such as laceration of hands, face, or arms of the employee engaged in the operation, irritation of the skin, minor burns and the like; minimal damage to immediate or adjacent work area or equipment being used. All operations involving, unloading, storage, and hauling of ordance, explosive, and incendiary ordnance material other than small arms ammunition. These differentials are only applicable to work that has been specifically designated by the agency for ordance, explosives, and incendiary material differential pay.

** UNIFORM ALLOWANCE **

If employees are required to wear uniforms in the performance of this contract (either by the terms of the Government contract, by the employer, by the state or local law, etc.), the cost of furnishing such uniforms and maintaining (by laundering or dry cleaning) such uniforms is an expense that may not be borne by an employee where such cost reduces the hourly rate below that required by the wage determination. The Department of Labor will accept payment in accordance with the following standards as compliance:

The contractor or subcontractor is required to furnish all employees with an adequate number of uniforms without cost or to reimburse employees for the actual cost of the uniforms. In addition, where uniform cleaning and maintenance is made the responsibility of the employee, all contractors and subcontractors subject to this wage determination shall (in the absence of a bona fide collective bargaining agreement providing for a different amount, or the furnishing of contrary affirmative proof as to the actual cost), reimburse all employees for such cleaning and maintenance at a rate of $3.35 per week (or $.67 cents per day). However, in those instances where the uniforms furnished are made of "wash and wear" materials, may be routinely washed and dried with other personal garments, and do not require any special treatment such as dry cleaning, daily washing, or commercial laundering in order to meet the cleanliness or appearance standards set by the terms of the Government contract, by the contractor, by law, or by the nature of the work, there is no requirement that employees be reimbursed for uniform maintenance costs.

The duties of employees under job titles listed are those described in the "Service Contract Act Directory of Occupations", Fifth Edition, April 2006, unless otherwise indicated. Copies of the Directory are available on the Internet. A

links to the Directory may be found on the WHD home page at http://www.dol.gov/esa/whd/ or through the Wage Determinations On-Line (WDOL) Web site at http://wdol.gov/.

REQUEST FOR AUTHORIZATION OF ADDITIONAL CLASSIFICATION AND WAGE RATE {Standard Form 1444 (SF 1444)}

Conformance Process:

The contracting officer shall require that any class of service employee which is not listed herein and which is to be employed under the contract (i.e., the work to be performed is not performed by any classification listed in the wage determination), be classified by the contractor so as to provide a reasonable relationship (i.e., appropriate level of skill comparison) between such unlisted classifications and the classifications listed in the wage determination. Such conformed classes of employees shall be paid the monetary wages and furnished the fringe benefits as are determined. Such conforming process shall be initiated by the contractor prior to the performance of contract work by such unlisted class(es) of employees. The conformed classification, wage rate, and/or fringe benefits shall be retroactive to the commencement date of the contract. {See Section 4.6 (C)(vi)} When multiple wage determinations are included in a contract, a separate SF 1444 should be prepared for each wage determination to which a class(es) is to be conformed.

The process for preparing a conformance request is as follows:

1) When preparing the bid, the contractor identifies the need for a conformed occupation(s) and computes a proposed rate(s).

2) After contract award, the contractor prepares a written report listing in order proposed classification title(s), a Federal grade equivalency (FGE) for each proposed classification(s), job description(s), and rationale for proposed wage rate(s), including information regarding the agreement or disagreement of the authorized representative of the employees involved, or where there is no authorized representative, the employees themselves. This report should be submitted to the contracting officer no later than 30 days after such unlisted class(es) of employees performs any contract work.

3) The contracting officer reviews the proposed action and promptly submits a report of the action, together with the agency's recommendations and pertinent information including the position of the contractor and the employees, to the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, for review. (See section 4.6(b)(2) of Regulations 29 CFR Part 4).

4) Within 30 days of receipt, the Wage and Hour Division approves, modifies, or disapproves the action via transmittal to the agency contracting officer, or notifies the contracting officer that additional time will be required to process the request.

5) The contracting officer transmits the Wage and Hour decision to the contractor.

6) The contractor informs the affected employees.

Information required by the Regulations must be submitted on SF 1444 or bond paper.

When preparing a conformance request, the "Service Contract Act Directory of Occupations" (the Directory) should be used to compare job definitions to insure that duties requested are not performed by a classification already listed in the wage determination. Remember, it is not the job title, but the required tasks that determine whether a class is included in an established wage determination. Conformances may not be used to artificially split, combine, or subdivide classifications listed in the wage determination.

ORDER FOR SUPPLIES OR SERVICES

PAGE 1 OF 24

1. CONTRACT/PURCH. ORDER/ AGREEMENT NO.	2. DELIVERY ORDER/ CALL NO.	3. DATE OF ORDER/CALL (YYYYMMMDD)	4. REQ./ PURCH. REQUEST NO.	5. PRIORITY
W9128F-13-D-0006	W9128F17F0163	2017 Sep 18	W59XQG72521133	

6. ISSUED BY CODE W9128F
U.S. ARMY CORPS OF ENGINEERS, OMAHA DIST
CONTRACTING OFFICE
1616 CAPITOL AVENUE
OMAHA NE 68102-4901

7. ADMINISTERED BY *(if other than 6)* CODE
SEE ITEM 6

8. DELIVERY FOB
[X] DESTINATION
[ ] OTHER
(See Schedule if other)

9. CONTRACTOR CODE 7V713 FACILITY
NAME AND ADDRESS
EA ENGINEERING, SCIENCE, AND TECHNOLOGY,
LEE BECKER
225 SCHILLING CIR STE 400
HUNT VALLEY MD 21031-1124

10. DELIVER TO FOB POINT BY (Date) (YYYYMMMDD)
SEE SCHEDULE

11. MARK IF BUSINESS IS
[ ] SMALL
[ ] SMALL DISADVANTAGED
[ ] WOMEN-OWNED

12. DISCOUNT TERMS
Net 30 Days

13. MAIL INVOICES TO THE ADDRESS IN BLOCK
See Item 15

14. SHIP TO CODE 966752
COE PROGRAMS MANAGEMENT BRANCH
LINDA DIBEL
USAED, OMAHACENWO-PM-P
1616 CAPITOL AVE
OMAHA NE 68102-4901

15. PAYMENT WILL BE MADE BY CODE 964145
US ARMY CORPS OF ENGRS FINANCE CENTER
5722 INTEGRITY DRIVE
MILLINGTON TN 38054-5005

MARK ALL PACKAGES AND PAPERS WITH IDENTIFICATION NUMBERS IN BLOCKS 1 AND 2.

16. TYPE OF ORDER			
	DELIVERY/ CALL	X	This delivery order/call is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract.
	PURCHASE		Reference your quote dated Furnish the following on terms specified herein. REF:

ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.

NAME OF CONTRACTOR | SIGNATURE | TYPED NAME AND TITLE | DATE SIGNED (YYYYMMMDD)

[ ] If this box is marked, supplier must sign Acceptance and return the following number of copies:

17. ACCOUNTING AND APPROPRIATION DATA/ LOCAL USE
See Schedule

18. ITEM NO.	19. SCHEDULE OF SUPPLIES/ SERVICES	20. QUANTITY ORDERED/ ACCEPTED*	21. UNIT	22. UNIT PRICE	23. AMOUNT
	SEE SCHEDULE				

* *If quantity accepted by the Government is same as quantity ordered, indicate by X. If different, enter actual quantity accepted below quantity ordered and encircle.*

24. UNITED STATES OF AMERICA
TEL: 402-995-2071
EMAIL: Jeffrey.W.Wyant@usace.army.mil
BY: JEFFREY W WYANT
Jeffrey W. Wyant
CONTRACTING / ORDERING OFFICER

25. TOTAL $199,843.70
26. DIFFERENCES

27a. QUANTITY IN COLUMN 20 HAS BEEN
[ ] INSPECTED [ ] RECEIVED [ ] ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED

b. SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE | c. DATE (YYYYMMMDD) | d. PRINTED NAME AND TITLE OF AUTHORIZED GOVERNMENT REPRESENTATIVE

e. MAILING ADDRESS OF AUTHORIZED GOVERNMENT REPRESENTATIVE

f. TELEPHONE NUMBER | g. E-MAIL ADDRESS

28. SHIP NO. | 29. DO VOUCHER NO. | 30. INITIALS

[ ] PARTIAL [ ] FINAL

31. PAYMENT
[ ] COMPLETE [ ] PARTIAL [ ] FINAL

32. PAID BY

33. AMOUNT VERIFIED CORRECT FOR

34. CHECK NUMBER

35. BILL OF LADING NO.

36. I certify this account is correct and proper for payment.
a. DATE (YYYYMMMDD) | b. SIGNATURE AND TITLE OF CERTIFYING OFFICER

37. RECEIVED AT	38. RECEIVED BY	39. DATE RECEIVED (YYYYMMMDD)	40. TOTAL CONTAINERS	41. S/R ACCOUNT NO.	42. S/R VOUCHER NO.

Section B - Supplies or Services and Prices

ITEM NO	SUPPLIES/SERVICES	MAX QUANTITY	UNIT	UNIT PRICE	MAX AMOUNT
0001		199,843.70	Job	$1.00	$199,843.70

Hancock Field ANG BaseSoil Removal
FFP
Complete a Proposed Plan (PP), Record of Decision (ROD), No Further Action Explosive Safety Submission (ESS), Munitions Constituents (MC) Laboratory Verification Sampling, Work Plan (WP) Addendum and Removal of Contaminated Soils at the Firing in Buttress (FIB) SR002 at Hancock Air National Guard Base (ANGB) in Syracuse, New York IAW PWS as revised dated 23 Aug 2017.
FOB: Destination
MILSTRIP: W59XQG72521133
PURCHASE REQUEST NUMBER: W59XQG72521133

MAX NET AMT		$199,843.70
ACRN AA		$199,843.70

CIN: W59XQG725211330001

ITEM NO	SUPPLIES/SERVICES	MAX QUANTITY	UNIT	UNIT PRICE	MAX AMOUNT
0002		UNDEFINED		UNDEFINED	$0.00

Contract Manpoer Reporting
FFP
Not Separately PricedThe contractor shall report ALL contractor labor hours (including subcontractor labor hours) required for performance of services under this contract for the U.S. Army Corps of Engineers, Omaha District [Requiring Activity's Unit Identification Code (UIC): W07106] via a secure data collection site. The contractor is required to completely fill in all required data fields using the following web address: http://www.ecmra.mil/

MAX NET AMT	$0.00

Section C - Descriptions and Specifications

PWS 23 AUG 2017

PERFORMANCE WORK STATEMENT (PWS)
FOR THE

Air National Guard (ANG)
Military Munitions Response Program (MMRP)
TO SUPPORT

Hancock Field Air National Guard Base

Munitions Response Site
Firing in Buttress (FIB) SR002

Removal of Contaminated Soils

Syracuse, New York

17 Aug 2017
Rev. 23 Aug 2017

Introduction

The goals of this Performance Work Statement (PWS) are: to complete a Proposed Plan (PP), Record of Decision (ROD), No Further Action Explosive Safety Submission (ESS), Munitions Constituents (MC) Laboratory Verification Sampling, Work Plan (WP) Addendum and Removal of Contaminated Soils at the Firing in Buttress (FIB) SR002 at Hancock Air National Guard Base (ANGB) in Syracuse, New York.

This PWS is being conducted under the Air National Guard's (ANG) military munitions response program (MMRP). The goal of the MMRP is to make munitions response sites (MRS) safe for reuse and to protect human health and the environment. The MMRP addresses the unique munitions and explosives of concern (MEC) and MC issues associated with MRSs.

1 Location

Hancock Field is located at the Syracuse Hancock International Airport in New York. It is approximately five miles north of the City of Syracuse in Onondaga County. The current installations consist of several buildings and operations facilities that are separated into two main tracts of land.

Hancock Field was built in 1942, as a staging area, repairing and re-outfitting B-17 and B-24 aircraft used in the World War II. Three 5,500 foot runways were also built the same year. In addition, the First Concentration Command, later known as the Air Service Command, used the base to assemble and test B-24 aircraft. In 1946, the City of Syracuse took over the Mattydale Bomber Base, and in 1948, the base was dedicated as a commercial airfield. The Clarence E. Hancock Airport opened in September 1949.
Hancock Airport was awarded international airport status in 1970.

1.1 Firing-in-Buttress, SR002, Hancock ANGB, Syracuse, New York

The FIB, SR002 was used as a backstop for test firing of up to .50 caliber ammunition from F-86 aircraft. One large caliber round, identified as a
3.5 inch rocket, high explosive antitank (HEAT), M28A2, was embedded in the top portion of railroad ties which form the top of the FIB catch box. This item was removed by the explosive ordnance disposal (EOD) team prior to the comprehensive site evaluation (CSE) phase II field work. The FIB is constructed of wooden railroad ties, concrete and sod.

Previous work conducted at the FIB include a CSE Phase I, CSE Phase II, EE/CA, AM, non-time critical removal action (NTCRA), and site specific final report (SSFR).

The NTCRA field work was conducted for lead-contaminated soil. During the field work, additional 20-mm target practice projectiles and various pieces of 3.5 inch rockets were located.

2 Scope of Work

The Contractor will provide a Proposed Plan (PP), Record of Decision (ROD), No Further Action Explosive Safety Submission (ESS), Munitions Constituents (MC) Laboratory Verification Sampling, Work Plan (WP) Addendum and Removal of Contaminated Soils.

2.1 Guidance and Policy Clarifications

In accordance with ANG MMRP, all phases will comply with requirements of the comprehensive environmental response, compensation and liability act (CERCLA) of 1980.

All munitions response actions will be conducted in full compliance with USACE, Department of the Army, Department of Defense (DoD) and local/state requirements regarding personnel, equipment

and procedures.

All deliverables must be IAW the applicable environmental protection agency (EPA) and Air Force (AF) guidance.

2.2 References

The Contractor shall follow all appropriate guidance and statutory requirements during the execution of this PWS.

2.3 Review of Available Information

There are many available sources of information that may be used to perform the work covered under this PWS. Previous archive search reports (ASR), CSE Phase I report, CSE Phase II report, and site specific final report (SSFR).

These documents may be made available to the proposing Contractor upon request.

The Contractor shall review these documents and ensure that the information is factually documented and presented prior to incorporating the information.

2.4 Deliverables

2.4.1 Proposed Plan (PP)

The Contractor shall prepare a Proposed Plan for FIB SR002, drafted IAW applicable guidance. The PP shall summarize the information in the EE/CA ~~FS~~ regarding the remedial action objectives (RAOs) evaluated and present the USACE preliminary recommendation for the site. Any applicable public participation and notices shall be completed. The content and format of the PP will be IAW EPA 540-R-98-031 July 1999 ~~USACE EM 1110-1-18, April 2006~~. The EPA document can be found at: https://www.epa.gov/sites/production/files/2015-02/documents/rod_guidance.pdf

The PP shall be approved by the USACE Project Manager prior to initiation of work. One hard copy and one electronic copy of the Final PP shall be submitted to the USACE Project Manager. The versions shall include internal draft, draft, draft final and final.

2.4.2 Record of Decision (ROD)

The Contractor shall prepare a Record of Decision (ROD) for FIB SR002. The ROD shall be utilized to document and select the remedial action for the MRS. The Contractor will be responsible for gaining the necessary signatures on the ROD from the appropriate approval authorities. The content and format of the ROD will be IAW EPA 540-R-98-031 July 1999 ~~USACE EM 1110-1-18, April 2006~~. The versions shall include internal draft, draft, draft final and final. The final ROD will require the necessary signatures prior to producing the final document.

2.4.3 Work Plan (WP) Addendum

The work plan shall include the clear and concise technical approach that will be utilized during the field work. It shall include, at a minimum, haul routes, landfill information, specific soil cleanup procedures, monitoring, safety information and precautions, technical approach, contact information, etc. The contractor shall assume the below submission to be necessary. The WP addendum shall be approved by the USACE Project Manager prior to initiation of work. One hard copy and one

electronic copy of the Final WP addendum shall be submitted to the USACE Project Manager. The versions shall include internal draft, draft, draft final and final. The document shall be accepted by the USACE project manager prior to payment of milestones.

2.4.4 Laboratory Verification Sampling for Munitions Constituents (MC)

The Contractor shall prepare laboratory verification sampling for munitions constituents (MC) contained within the remaining soils of FIB SR002 in order to prove the remaining MC concentrations in soils are below the regulatory and ecological risk criteria, demonstrating that potential human health and ecological risks no longer exist at the site.

2.4.5 No Further Action Explosives Safety Submission (ESS)

Following the finalization of the field work, the Contractor shall develop a Department of Defense Explosives Safety Board (DDESB) approved No Further Action Explosives Safety Submission (ESS). The purpose of the ESS is to identify the MRS and provide justification for the no further action determination. The determination of the no further action status for the MRS will be made by the project delivery team in coordination with the appropriate state regulatory agency. One hard copy and one electronic copy of the Final No Further Action ESS shall be submitted to the USACE Project Manager. The versions shall include internal draft, draft, draft final and final. The document shall be accepted by the USACE Project Manager prior to payment of milestones.

2.4.6 Removal of Munitions Constituents (MC) Contaminated Soils

If soils meet requirements for non-hazardous disposal, contaminated soils will be loaded, transported and disposed of offsite following all applicable guidance and statutory requirements. If the lead concentrations exceed requirements for non-hazardous disposal, the soil will be stabilized on site and then loaded, transported and disposed of offsite following all applicable guidance and statutory requirements. Cost assumes a Firm Fixed Unit Rate (rate per ton) which will be invoiced based on landfill weight receipts. As invoices are submitted to the USACE bill payer, the PM shall receive a separate email at that time with a progress report and the milestone payment schedule.

2.4.7 Electronic GIS and EDD Files

All report mapping, figures, survey and topographic data, contaminant migration maps, geologic cross sections, conceptual site models, etc.) shall be presented in GIS files. GIS files shall be submitted compatible with Environmental Systems Research Institute (ESRI) 9.x (shapefiles or personal geodatabases) format (or other format if directed). All GIS data shall be made compliant to the Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) (http://www.sdsfie.org/). GIS files shall also meet any upgrade to all Corps of Engineers systems throughout the duration of the contract. All GIS data shall be collected using the local State Plane coordinate system using the North American Datum of 1983 and the North American Vertical Datum of 1988. All files shall be collected using linear units of US Survey feet for both the horizontal and vertical.

If any CADD files are produced, they shall be digitized into files compatible with Microstation vector format (or other format if directed in the individual task order). CADD files shall also meet any upgrade to all Corps of Engineers systems throughout the duration of the contract.

Electronic GIS and CADD files will be sent on a separate CD from other electric deliverables and sent directly to the USACE PM.

All laboratory data for samples analyzed by commercial laboratories shall be submitted into an ERPMIS acceptable format.

3 Schedule

The work outlined in this PWS shall be complete by 29 November 2019. This timeframe shall allow for sufficient time for regulatory review, issuance of the plans, field work and reports.

4 Contractor Proposal

The Contractor's budget shall also include costs for travel to the site for purposes of the Proposed Plan Public Meeting, and to local/regional and state governmental agencies. The contractor shall supply all labor, equipment, and materials necessary to achieve the performance objectives of this PWS. The proposal and deliverables described above shall be clear, concise and written using standard English. They shall correctly use all technical and regulatory terminology.

The request for proposal should be referenced with regards to the evaluation criteria and specifics to include in the proposal.

5 Contracting Manpower Reporting

5.1 Contracting Manpower Reporting

The Office of the Assistant Secretary of the Army (Manpower & Reserve Affairs) operates and maintains a secure Army data collection site where the contractor will report ALL contractor manpower (including subcontractor manpower) required for performance of this contract. The contractor is required to completely fill in all the information in the format using the following web address: https://ecmra.mil (https://cmra.army.mil). The required information includes: (1) Contracting Office, Contracting Officer, Contracting Officer's Technical Representative; (2) Contract number, including task and delivery order number; (3) Beginning and end dates covered by reporting period; (4) Contractor name, address, phone number, e-mail address, identity of contractor employee entering data; (5) Estimated direct labor hours (including sub-contractor); (6) Estimated direct labor dollars paid this reporting period (including sub-contractor); (7) Total payments (including subcontractor); (8) Predominant Federal Service Code (FSC) reflecting services provided by contractor (and separate predominant FSC for each sub-contractor if different); (9) Estimated data collection cost; (10) Organizational title associated with the Unit Identification Code (UIC) for the Army Requiring Activity (the Army Requiring Activity is responsible for providing the contractor with its UIC for the purposes of reporting this information); (11) Locations where contractor and sub-contractors perform the work (specified by zip code in the United States and nearest City, Country, when in an overseas location, using standardized nomenclature provided on website); (12) Presence of deployment or contingency contract language; and, (13) Number of contractor and sub-contractor employees deployed in theater this reporting period (by country). As part of its submission, the contractor will also provide the estimated total cost (if any) incurred to comply with this reporting requirement. Reporting period will be the period of performance not to exceed 12 months ending September 30 of each government fiscal year and must be reported by 31 October of each calendar year. "*
*Note: Information from the secure web site is considered to be proprietary in nature when the contract number and contractor identity are associated with the direct labor hours and direct labor dollars. At no time will any data be released to the public with the contractor name and contract number associated with the data. For internal Army analysis, the reports and queries from the database shall not

contain proprietary data.

5.2 **Veterans Employment Emphasis for U.S. Army Corps of Engineers Contracts**

In addition to complying with the requirements outlined in FAR Part 22.13, FAR Provision 52.222-38, FAR Clause 52.222-35, FAR Clause 52.222-37, DFARS 222.13 and Department of Labor regulations, U.S. Army Corps of Engineers (USACE) contractors and subcontractors at all tiers are encouraged to promote the training and employment of U.S. veterans while performing under a USACE contract. While no set-aside, evaluation preference, or incentive applies to the solicitation or performance under the resultant contract, USACE contractors are encouraged to seek out highly qualified veterans to perform services under this contract. The following resources are available to assist USACE contractors in their outreach efforts:
Federal Veteran employment information at https://www.fedshirevets.gov
Department of Labor Veterans Employment Assistance http://www.dol.gov/vets/
Department of Veterans Affairs–VOW to Hire Heroes Act
http://benefits.va.gov/vow/
Army Wounded Warrior Program –
http://wtc.army.mil/modules/employers/index.html
U.S. Chamber of Commerce Foundation–Hiring Our Heroes
https://www.uschamberfoundation.org/hiring-our-heroes
Guide to Hiring Veterans – Reference Material
https://obamawhitehouse.archives.gov/blog/2012/04/10/white-house-business-councils-guide-hiring-veterans

5.3 **Sustainability Requirements**

Green Procurement is the purchase of environmentally preferable products and services and is known as *sustainable acquisitions* and *Green Procurement*. Practicing Green Procurement takes into consideration economic facets, environmental considerations, and resource efficiency.
Here are some of the benefits of Green Procurement:
• Prevents pollution and reduces environmental impact
• Increases energy security and independence
• Protects and conserves natural resources
• Minimizes waste
• Supports new markets and job creation
• Supports the USACE Campaign Plan and Sustainability Plan Goals
• Saves $$ by reducing waste
• It is a Federal mandate!
Some Mandatory Environmental Initiatives are as follows:
• Energy Star
• Federal Energy Management Program (FEMP)-Designated Products
• WaterSense
• BioPreferred/Biobased
• Environmentally Preferable Purchasing (EPP)
• Electronic Product Environmental Assessment Tool (EPEAT)
• Significant New Alternatives Policy (SNAP)
• Recovered Materials
FAR Part 23 requires Federal agencies to ensure that 95% of new contract actions require products that are:
• Energy-efficient
• Biobased
• Non-ozone depleting
• Water-efficient
• Environmentally preferable

• Made with recovered materials

The Contractor shall review and follow scope, purpose, applicability, and policy of FAR Part 23 and FAR 52.223-4 requirements, as they pertain to their specific contract/task order requirements to meet sustainability acquisitions or Green procurement initiatives. Some examples of sustainability achievements are:

• Car-pooling to meeting from local offices
• Doubled-sided documents using recycled paper
• Submittal of documents through electronic methods
• Use of energy-efficient products
• Use of non-toxic or low-toxic products
• Reconditioned or remanufactured supplies or materials

5.4 Antiterrorism Operations Security Provision

All contractor and all associated sub-contractors employees shall comply with applicable installation, facility and area commander installation/facility access and local security policies and procedures (provided by government representative). Contractor workforce must comply with all personal identity verification requirements as directed by DoD, Headquarters, Department of the Army (HQDA) and/or local policy. In addition to the changes otherwise authorized by the changes clause of this contract, should the Force Protection Condition at any individual facility or installation change, the Government may require changes in contractor security matters or processes.

The contractor and all associated sub-contractors shall receive a brief/training (provided by the COR) on the local suspicious activity reporting program. This locally developed training will be used to inform employees of the types of behavior to watch for and instruct employees to report suspicious activity to the project manager, security representative or law enforcement entity. This training shall be completed within 30 calendar days of contract award and within 30 calendar days of new employees commencing performance with the results reported to the COR no later than (NLT) 5 calendar days after the completion of the training.

All new contractor employees will complete Level I Operations Security (OPSEC) Training within 30 calendar days of their reporting for duty. Additionally, all contractor employees must complete annual OPSEC awareness training. The contractor shall submit certificates of completion for each affected contractor and subcontractor employee, to the COR within 5 calendar days after completion of training. OPSEC awareness training is available at the following websites: https://www.iad.gov/ioss/or http://www.cdse.edu/catalog/operations-security.html.

The Contractor must pre-screen Candidates using the E-verify Program http://www.uscis.gov/e-verify website to meet the established employment eligibility requirements. Contractor must ensure that the Candidate has two valid forms of Government issued identification prior to enrollment to ensure the correct information is entered into the E-verify system. An initial list of verified/eligible Candidates must be provided to the COR no later than 3 business days after the initial contract award.

6 USACE Points of Contact

Contract Specialist (Omaha District)

The contract specialist and main point of contract through the proposal process for this PWS will be:

John Tucker
U.S. Army Corps of Engineers
Omaha District
Attn: CENWO-CT
1616 Capitol Ave, Omaha, NE 68102
Email John.H.Tucker@usace.army.mil

Section E - Inspection and Acceptance

INSPECTION AND ACCEPTANCE TERMS

Supplies/services will be inspected/accepted at:

CLIN	INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
0001	Destination	Government	Destination	Government
0002	N/A	N/A	N/A	N/A

Section F - Deliveries or Performance

DELIVERY INFORMATION

CLIN	DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	DODAAC / CAGE
0001	POP 18-SEP-2017 TO 29-NOV-2019	N/A	COE PROGRAMS MANAGEMENT BRANCH LINDA DIBEL USAED, OMAHACENWO-PM-P 1616 CAPITOL AVE OMAHA NE 68102-4901 402-995-2791 FOB: Destination	966752
0002	N/A	N/A	N/A	N/A

Section G - Contract Administration Data

ADMINISTRATIVE INFORMATION
Please reference Contract **W9128F-13-D-0006, Task Order W9128F17F0163** on all submittals and invoices.
Contractor is required to include the contract number and task order on the invoice, so that receipt and payment may beexpeditiously processed.

PROGRESS PAYMENTS ARE AUTHORIZED, SUBJECT TO APPROVAL FROM CONTRACTINGOFFICER'S REPRESENTATIVE. ELECTRONIC FUNDS TRANSFER WILL BE THE METHOD OFPAYMENT. PLEASE ENSURE ALL ACCOUNT INFORMATION IS CURRENT AND PROVIDEDTO THE FINANCE AND ACCOUNTING CENTER, MILLINGTON, TN.

Points of Contact:
Contracting: John Tucker at (402) 995-2824 or via email at john.h.tucker@usace.army.mil@usace.army.mil
Project Manager: James Bouvier at (402) 995-2504 or via email at james.bouvier@usace.army.mil
Invoicing: Linda Dibel (402) 293-2791 or via email at linda.s.dibel@usace.army.mil

INVOICING/PAYMENT
Electronic funds transfer capability (a.k.a. direct deposit) is required for receipt of payment for services rendered under the resulting contract. Bill only for services rendered and sends the invoices to the attention of Mr. Dave Johansen. Contractor is required to include the contract number on all invoices so that receipt and payment for the supplies may be expeditiously processed. Submit invoices to:

U.S. Army Corps of Engineers, Omaha District
ATTN: James Bouvier or Linda Dibel - CENWO-PM-H
1616 Capitol Ave
Omaha, NE 68102-4901

CONTRACT TYPE
This is a Fixed Price task order.

STATE AND LOCAL SALES TAXES
The U.S. Army Corps of Engineers is exempt from paying state and local taxes per Title 4, US Code 104-107.

ACCOUNTING AND APPROPRIATION DATA

AA: 21720200000 088061 32306CG76F49300816000 ENVR 25066
AMOUNT: $199,843.70

ACRN	CLIN/SLIN	CIN	AMOUNT
AA	0001	W59XQG725211330001	$199,843.70

Section I - Contract Clauses

CLAUSES INCORPORATED BY REFERENCE

252.232-7003	Electronic Submission of Payment Requests and Receiving Reports	JUN 2012

CLAUSES INCORPORATED BY FULL TEXT

OMBUDSMAN (25 Nov 2015)

Task and Delivery Order Ombudsman. IAW FAR 16.505(B)(6) referring to FAR Part 16 "Ordering". The head of the agency has designated a task-order contract and delivery-order contract ombudsman. The ombudsman must review complaints from contractors and ensure they are afforded a fair opportunity to be considered, consistent with the procedures in the contract. The ombudsman is a senior agency official who is independent of the contracting officer and may be the agency's competition advocate.

HQ USACE DOC
Jacqueline C. Woodson
Acquisition Support Division Chief
Director of Contracting
US Army Corps of Engineers
7701 Telegraph Road
Alexandria VA, 22315
Phone: 1-703-428-6323
E-Mail Jaqueline.C.Woodson@usace.army.mil
(End of clause)

UAI 5115.504 AWARD TO SUCCESSFUL OFFEROR

Only a warranted Contracting Officer (either a Procuring Contracting Officer (PCO) or an Administrative Contracting Officer (ACO)), acting within their appointed limits, has the authority to issue modifications or otherwise change the terms and conditions of this contract. If an individual other than the Contracting Officer attempts to make changes to the terms and conditions of this contract, you shall not proceed with the change and shall immediately notify the Contracting Officer. Proceeding with any work not authorized by the Contracting Officer will be at the Contractor’s own risk.

Section J - List of Documents, Exhibits and Other Attachments

SCA WAGE DETERM 25 JUL 2017
WD 15-4163 (Rev.-3) was first posted on www.wdol.gov on 08/01/2017
****

REGISTER OF WAGE DETERMINATIONS UNDER THE SERVICE CONTRACT ACT
By direction of the Secretary of Labor

U.S. DEPARTMENT OF LABOR
EMPLOYMENT STANDARDS ADMINISTRATION
WAGE AND HOUR DIVISION
WASHINGTON D.C. 20210

Wage Determination No.: 2015-4163
Revision No.: 3
Date Of Revision: 07/25/2017

Daniel W. Simms
Director

Division of
Wage Determinations

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.20 for calendar year 2017 applies to all contracts subject to the Service Contract Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

State: New York

Area: New York Counties of Madison, Onondaga, Oswego

Fringe Benefits Required Follow the Occupational Listing

OCCUPATION CODE - TITLE	FOOTNOTE	RATE
01000 - Administrative Support And Clerical Occupations		
01011 - Accounting Clerk I		14.83
01012 - Accounting Clerk II		16.65
01013 - Accounting Clerk III		18.63
01020 - Administrative Assistant		23.57
01035 - Court Reporter		18.96
01041 - Customer Service Representative I		12.96
01042 - Customer Service Representative II		14.57
01043 - Customer Service Representative III		15.90
01051 - Data Entry Operator I		12.05
01052 - Data Entry Operator II		13.15
01060 - Dispatcher, Motor Vehicle		18.55
01070 - Document Preparation Clerk		12.40
01090 - Duplicating Machine Operator		12.40
01111 - General Clerk I		12.71
01112 - General Clerk II		13.87
01113 - General Clerk III		15.57
01120 - Housing Referral Assistant		19.10
01141 - Messenger Courier		12.89
01191 - Order Clerk I		14.43
01192 - Order Clerk II		15.75
01261 - Personnel Assistant (Employment) I		15.31
01262 - Personnel Assistant (Employment) II		17.12
01263 - Personnel Assistant (Employment) III		18.98
01270 - Production Control Clerk		22.72
01290 - Rental Clerk		12.13
01300 - Scheduler, Maintenance		15.32
01311 - Secretary I		15.32
01312 - Secretary II		17.14

01313 - Secretary III	19.10
01320 - Service Order Dispatcher	14.87
01410 - Supply Technician	23.57
01420 - Survey Worker	16.95
01460 - Switchboard Operator/Receptionist	13.66
01531 - Travel Clerk I	11.42
01532 - Travel Clerk II	12.32
01533 - Travel Clerk III	13.23
01611 - Word Processor I	14.47
01612 - Word Processor II	16.25
01613 - Word Processor III	18.18
05000 - Automotive Service Occupations	
05005 - Automobile Body Repairer, Fiberglass	23.28
05010 - Automotive Electrician	18.24
05040 - Automotive Glass Installer	17.63
05070 - Automotive Worker	17.63
05110 - Mobile Equipment Servicer	16.32
05130 - Motor Equipment Metal Mechanic	18.96
05160 - Motor Equipment Metal Worker	17.63
05190 - Motor Vehicle Mechanic	17.25
05220 - Motor Vehicle Mechanic Helper	15.63
05250 - Motor Vehicle Upholstery Worker	16.95
05280 - Motor Vehicle Wrecker	17.63
05310 - Painter, Automotive	18.24
05340 - Radiator Repair Specialist	17.63
05370 - Tire Repairer	14.34
05400 - Transmission Repair Specialist	18.96
07000 - Food Preparation And Service Occupations	
07010 - Baker	12.53
07041 - Cook I	13.05
07042 - Cook II	14.60
07070 - Dishwasher	9.42
07130 - Food Service Worker	10.35
07210 - Meat Cutter	16.17
07260 - Waiter/Waitress	10.23
09000 - Furniture Maintenance And Repair Occupations	
09010 - Electrostatic Spray Painter	18.28
09040 - Furniture Handler	13.59
09080 - Furniture Refinisher	18.28
09090 - Furniture Refinisher Helper	15.63
09110 - Furniture Repairer, Minor	16.95
09130 - Upholsterer	20.09
11000 - General Services And Support Occupations	
11030 - Cleaner, Vehicles	10.43
11060 - Elevator Operator	12.23
11090 - Gardener	15.56
11122 - Housekeeping Aide	12.23
11150 - Janitor	12.23
11210 - Laborer, Grounds Maintenance	12.34
11240 - Maid or Houseman	10.33
11260 - Pruner	17.78
11270 - Tractor Operator	14.53
11330 - Trail Maintenance Worker	12.34
11360 - Window Cleaner	14.05
12000 - Health Occupations	
12010 - Ambulance Driver	15.41
12011 - Breath Alcohol Technician	16.63
12012 - Certified Occupational Therapist Assistant	19.71
12015 - Certified Physical Therapist Assistant	19.18
12020 - Dental Assistant	16.85
12025 - Dental Hygienist	32.09
12030 - EKG Technician	28.86

12035 - Electroneurodiagnostic Technologist		28.86
12040 - Emergency Medical Technician		15.41
12071 - Licensed Practical Nurse I		14.86
12072 - Licensed Practical Nurse II		16.63
12073 - Licensed Practical Nurse III		18.53
12100 - Medical Assistant		14.60
12130 - Medical Laboratory Technician		22.66
12160 - Medical Record Clerk		16.06
12190 - Medical Record Technician		17.97
12195 - Medical Transcriptionist		16.22
12210 - Nuclear Medicine Technologist		36.86
12221 - Nursing Assistant I		10.58
12222 - Nursing Assistant II		11.90
12223 - Nursing Assistant III		12.99
12224 - Nursing Assistant IV		14.59
12235 - Optical Dispenser		22.67
12236 - Optical Technician		14.38
12250 - Pharmacy Technician		13.77
12280 - Phlebotomist		14.39
12305 - Radiologic Technologist		27.71
12311 - Registered Nurse I		21.73
12312 - Registered Nurse II		26.58
12313 - Registered Nurse II, Specialist		26.58
12314 - Registered Nurse III		32.15
12315 - Registered Nurse III, Anesthetist		32.15
12316 - Registered Nurse IV		38.54
12317 - Scheduler (Drug and Alcohol Testing)		19.08
12320 - Substance Abuse Treatment Counselor		21.93
13000 - Information And Arts Occupations		
13011 - Exhibits Specialist I		21.33
13012 - Exhibits Specialist II		26.41
13013 - Exhibits Specialist III		32.32
13041 - Illustrator I		21.33
13042 - Illustrator II		26.41
13043 - Illustrator III		32.32
13047 - Librarian		29.26
13050 - Library Aide/Clerk		11.77
13054 - Library Information Technology Systems Administrator		26.41
13058 - Library Technician		12.68
13061 - Media Specialist I		19.07
13062 - Media Specialist II		21.33
13063 - Media Specialist III		23.77
13071 - Photographer I		15.53
13072 - Photographer II		17.37
13073 - Photographer III		21.51
13074 - Photographer IV		26.32
13075 - Photographer V		31.84
13090 - Technical Order Library Clerk		15.74
13110 - Video Teleconference Technician		20.66
14000 - Information Technology Occupations		
14041 - Computer Operator I		14.77
14042 - Computer Operator II		16.52
14043 - Computer Operator III		18.43
14044 - Computer Operator IV		23.63
14045 - Computer Operator V		27.62
14071 - Computer Programmer I	(see 1)	20.57
14072 - Computer Programmer II	(see 1)	24.53
14073 - Computer Programmer III	(see 1)	
14074 - Computer Programmer IV	(see 1)	
14101 - Computer Systems Analyst I	(see 1)	
14102 - Computer Systems Analyst II	(see 1)	

14103 - Computer Systems Analyst III (see 1)
14150 - Peripheral Equipment Operator 14.77
14160 - Personal Computer Support Technician 24.05
14170 - System Support Specialist 30.26
15000 - Instructional Occupations
15010 - Aircrew Training Devices Instructor (Non-Rated) 28.19
15020 - Aircrew Training Devices Instructor (Rated) 34.10
15030 - Air Crew Training Devices Instructor (Pilot) 40.87
15050 - Computer Based Training Specialist / Instructor 28.19
15060 - Educational Technologist 28.98
15070 - Flight Instructor (Pilot) 40.87
15080 - Graphic Artist 22.64
15085 - Maintenance Test Pilot, Fixed, Jet/Prop 40.87
15086 - Maintenance Test Pilot, Rotary Wing 40.87
15088 - Non-Maintenance Test/Co-Pilot 40.87
15090 - Technical Instructor 23.48
15095 - Technical Instructor/Course Developer 28.73
15110 - Test Proctor 18.96
15120 - Tutor 18.96
16000 - Laundry, Dry-Cleaning, Pressing And Related Occupations
16010 - Assembler 10.33
16030 - Counter Attendant 10.33
16040 - Dry Cleaner 11.99
16070 - Finisher, Flatwork, Machine 10.44
16090 - Presser, Hand 10.44
16110 - Presser, Machine, Drycleaning 10.44
16130 - Presser, Machine, Shirts 10.44
16160 - Presser, Machine, Wearing Apparel, Laundry 10.44
16190 - Sewing Machine Operator 12.65
16220 - Tailor 13.16
16250 - Washer, Machine 10.85
19000 - Machine Tool Operation And Repair Occupations
19010 - Machine-Tool Operator (Tool Room) 21.49
19040 - Tool And Die Maker 24.75
21000 - Materials Handling And Packing Occupations
21020 - Forklift Operator 17.48
21030 - Material Coordinator 22.72
21040 - Material Expediter 22.72
21050 - Material Handling Laborer 14.27
21071 - Order Filler 10.91
21080 - Production Line Worker (Food Processing) 17.48
21110 - Shipping Packer 15.37
21130 - Shipping/Receiving Clerk 15.37
21140 - Store Worker I 13.97
21150 - Stock Clerk 18.50
21210 - Tools And Parts Attendant 17.48
21410 - Warehouse Specialist 17.48
23000 - Mechanics And Maintenance And Repair Occupations
23010 - Aerospace Structural Welder 28.91
23019 - Aircraft Logs and Records Technician 24.00
23021 - Aircraft Mechanic I 27.85
23022 - Aircraft Mechanic II 28.91
23023 - Aircraft Mechanic III 29.91
23040 - Aircraft Mechanic Helper 21.20
23050 - Aircraft, Painter 26.84
23060 - Aircraft Servicer 24.00
23070 - Aircraft Survival Flight Equipment Technician 26.84
23080 - Aircraft Worker 25.50
23091 - Aircrew Life Support Equipment (ALSE) Mechanic I 25.50
23092 - Aircrew Life Support Equipment (ALSE) Mechanic II 27.85

23110 - Appliance Mechanic	21.24
23120 - Bicycle Repairer	17.35
23125 - Cable Splicer	32.34
23130 - Carpenter, Maintenance	19.98
23140 - Carpet Layer	23.66
23160 - Electrician, Maintenance	27.36
23181 - Electronics Technician Maintenance I	26.42
23182 - Electronics Technician Maintenance II	27.83
23183 - Electronics Technician Maintenance III	28.87
23260 - Fabric Worker	22.27
23290 - Fire Alarm System Mechanic	23.07
23310 - Fire Extinguisher Repairer	21.16
23311 - Fuel Distribution System Mechanic	34.02
23312 - Fuel Distribution System Operator	28.12
23370 - General Maintenance Worker	17.89
23380 - Ground Support Equipment Mechanic	27.85
23381 - Ground Support Equipment Servicer	24.00
23382 - Ground Support Equipment Worker	25.50
23391 - Gunsmith I	21.16
23392 - Gunsmith II	23.66
23393 - Gunsmith III	25.69
23410 - Heating, Ventilation And Air-Conditioning Mechanic	21.37
23411 - Heating, Ventilation And Air Contidioning Mechanic (Research Facility)	22.18
23430 - Heavy Equipment Mechanic	23.28
23440 - Heavy Equipment Operator	26.28
23460 - Instrument Mechanic	25.69
23465 - Laboratory/Shelter Mechanic	24.89
23470 - Laborer	14.01
23510 - Locksmith	24.65
23530 - Machinery Maintenance Mechanic	24.28
23550 - Machinist, Maintenance	20.79
23580 - Maintenance Trades Helper	18.32
23591 - Metrology Technician I	25.69
23592 - Metrology Technician II	26.72
23593 - Metrology Technician III	27.63
23640 - Millwright	25.05
23710 - Office Appliance Repairer	20.82
23760 - Painter, Maintenance	18.10
23790 - Pipefitter, Maintenance	30.67
23810 - Plumber, Maintenance	25.73
23820 - Pneudraulic Systems Mechanic	25.69
23850 - Rigger	25.69
23870 - Scale Mechanic	23.66
23890 - Sheet-Metal Worker, Maintenance	22.94
23910 - Small Engine Mechanic	19.26
23931 - Telecommunications Mechanic I	26.63
23932 - Telecommunications Mechanic II	27.65
23950 - Telephone Lineman	25.89
23960 - Welder, Combination, Maintenance	20.42
23965 - Well Driller	25.69
23970 - Woodcraft Worker	25.69
23980 - Woodworker	19.75
24000 - Personal Needs Occupations	
24550 - Case Manager	14.52
24570 - Child Care Attendant	10.92
24580 - Child Care Center Clerk	13.61
24610 - Chore Aide	11.61
24620 - Family Readiness And Support Services Coordinator	14.52
24630 - Homemaker	14.52

25000 - Plant And System Operations Occupations	
25010 - Boiler Tender	29.01
25040 - Sewage Plant Operator	20.91
25070 - Stationary Engineer	29.01
25190 - Ventilation Equipment Tender	22.09
25210 - Water Treatment Plant Operator	20.91
27000 - Protective Service Occupations	
27004 - Alarm Monitor	19.74
27007 - Baggage Inspector	14.39
27008 - Corrections Officer	24.13
27010 - Court Security Officer	23.91
27030 - Detection Dog Handler	16.29
27040 - Detention Officer	24.13
27070 - Firefighter	23.44
27101 - Guard I	14.39
27102 - Guard II	16.29
27131 - Police Officer I	27.10
27132 - Police Officer II	30.11
28000 - Recreation Occupations	
28041 - Carnival Equipment Operator	12.16
28042 - Carnival Equipment Repairer	12.96
28043 - Carnival Worker	9.45
28210 - Gate Attendant/Gate Tender	13.80
28310 - Lifeguard	11.01
28350 - Park Attendant (Aide)	15.44
28510 - Recreation Aide/Health Facility Attendant	11.27
28515 - Recreation Specialist	19.13
28630 - Sports Official	12.29
28690 - Swimming Pool Operator	18.62
29000 - Stevedoring/Longshoremen Occupational Services	
29010 - Blocker And Bracer	27.06
29020 - Hatch Tender	27.06
29030 - Line Handler	27.06
29041 - Stevedore I	25.47
29042 - Stevedore II	28.49
30000 - Technical Occupations	
30010 - Air Traffic Control Specialist, Center (HFO) (see 2)	37.52
30011 - Air Traffic Control Specialist, Station (HFO) (see 2)	25.87
30012 - Air Traffic Control Specialist, Terminal (HFO) (see 2)	28.49
30021 - Archeological Technician I	18.42
30022 - Archeological Technician II	20.60
30023 - Archeological Technician III	25.51
30030 - Cartographic Technician	25.51
30040 - Civil Engineering Technician	26.09
30051 - Cryogenic Technician I	28.26
30052 - Cryogenic Technician II	31.22
30061 - Drafter/CAD Operator I	18.42
30062 - Drafter/CAD Operator II	20.60
30063 - Drafter/CAD Operator III	22.96
30064 - Drafter/CAD Operator IV	28.26
30081 - Engineering Technician I	14.27
30082 - Engineering Technician II	16.02
30083 - Engineering Technician III	18.70
30084 - Engineering Technician IV	22.20
30085 - Engineering Technician V	27.16
30086 - Engineering Technician VI	32.86
30090 - Environmental Technician	19.67
30095 - Evidence Control Specialist	25.51
30210 - Laboratory Technician	20.06
30221 - Latent Fingerprint Technician I	28.26
30222 - Latent Fingerprint Technician II	31.22
30240 - Mathematical Technician	25.51

30361 - Paralegal/Legal Assistant I		19.01
30362 - Paralegal/Legal Assistant II		23.64
30363 - Paralegal/Legal Assistant III		28.93
30364 - Paralegal/Legal Assistant IV		34.99
30375 - Petroleum Supply Specialist		31.22
30390 - Photo-Optics Technician		25.51
30395 - Radiation Control Technician		31.22
30461 - Technical Writer I		24.94
30462 - Technical Writer II		30.52
30463 - Technical Writer III		36.92
30491 - Unexploded Ordnance (UXO) Technician I		23.85
30492 - Unexploded Ordnance (UXO) Technician II		28.85
30493 - Unexploded Ordnance (UXO) Technician III		34.58
30494 - Unexploded (UXO) Safety Escort		23.85
30495 - Unexploded (UXO) Sweep Personnel		23.85
30501 - Weather Forecaster I		28.26
30502 - Weather Forecaster II		34.37
30620 - Weather Observer, Combined Upper Air Or Surface Programs	(see 2)	22.96
30621 - Weather Observer, Senior	(see 2)	25.51
31000 - Transportation/Mobile Equipment Operation Occupations		
31010 - Airplane Pilot		28.85
31020 - Bus Aide		12.87
31030 - Bus Driver		17.18
31043 - Driver Courier		13.06
31260 - Parking and Lot Attendant		10.38
31290 - Shuttle Bus Driver		14.05
31310 - Taxi Driver		11.00
31361 - Truckdriver, Light		14.05
31362 - Truckdriver, Medium		17.61
31363 - Truckdriver, Heavy		21.40
31364 - Truckdriver, Tractor-Trailer		21.40
99000 - Miscellaneous Occupations		
99020 - Cabin Safety Specialist		14.07
99030 - Cashier		9.54
99050 - Desk Clerk		10.17
99095 - Embalmer		27.29
99130 - Flight Follower		23.85
99251 - Laboratory Animal Caretaker I		12.90
99252 - Laboratory Animal Caretaker II		13.88
99260 - Marketing Analyst		30.07
99310 - Mortician		27.29
99410 - Pest Controller		15.84
99510 - Photofinishing Worker		13.94
99710 - Recycling Laborer		17.77
99711 - Recycling Specialist		20.92
99730 - Refuse Collector		16.16
99810 - Sales Clerk		11.34
99820 - School Crossing Guard		9.90
99830 - Survey Party Chief		22.61
99831 - Surveying Aide		14.22
99832 - Surveying Technician		19.45
99840 - Vending Machine Attendant		14.88
99841 - Vending Machine Repairer		17.89
99842 - Vending Machine Repairer Helper		14.88

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors, applies to all contracts subject to the Service Contract Act for which

the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is the victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

ALL OCCUPATIONS LISTED ABOVE RECEIVE THE FOLLOWING BENEFITS:

HEALTH & WELFARE: $4.41 per hour or $176.40 per week or $764.40 per month

HEALTH & WELFARE EO 13706: $4.13 per hour, or $165.20 per week, or $715.87 per month

VACATION: 2 weeks paid vacation after 1 year of service with a contractor or successor; 3 weeks after 8 years, 4 weeks after 15 years, and 5 weeks after 25 years. Length of service includes the whole span of continuous service with the present contractor or successor, wherever employed, and with the predecessor contractors in the performance of similar work at the same Federal facility. (Reg. 29 CFR 4.173)

HOLIDAYS: A minimum of eleven paid holidays per year: New Year's Day, Martin Luther King Jr's Birthday, Washington's Birthday, Good Friday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans' Day, Thanksgiving Day, and Christmas Day. A contractor may substitute for any of the named holidays another day off with pay in accordance with a plan communicated to the employees involved.) (See 29 CFR 4.174)

THE OCCUPATIONS WHICH HAVE NUMBERED FOOTNOTES IN PARENTHESES RECEIVE THE FOLLOWING:

1) COMPUTER EMPLOYEES: Under the SCA at section 8(b), this wage determination does not apply to any employee who individually qualifies as a bona fide executive, administrative, or professional employee as defined in 29 C.F.R. Part 541. Because most Computer System Analysts and Computer Programmers who are compensated at a rate not less than $27.63 (or on a salary or fee basis at a rate not less than $455 per week) an hour would likely qualify as exempt computer professionals, (29 C.F.R. 541. 400) wage rates may not be listed on this wage determination for all occupations within those job families. In addition, because this wage determination may not list a wage rate for some or all occupations within those job families if the survey data indicates that the prevailing wage rate for the occupation equals or exceeds $27.63 per hour conformances may be necessary for certain nonexempt employees. For example, if an individual employee is nonexempt but nevertheless performs duties within the scope of one of the Computer Systems Analyst or Computer Programmer occupations for which this wage determination does not specify an SCA wage rate, then the wage rate for that employee must be conformed in accordance with the conformance procedures described in the conformance note included on this wage determination.

Additionally, because job titles vary widely and change quickly in the computer industry, job titles are not determinative of the application of the computer professional exemption. Therefore, the exemption applies only to computer employees who satisfy the compensation requirements and whose primary duty consists of:

(1) The application of systems analysis techniques and procedures, including consulting with users, to determine hardware, software or system functional specifications;

(2) The design, development, documentation, analysis, creation, testing or modification of computer systems or programs, including prototypes, based on and

related to user or system design specifications;
(3) The design, documentation, testing, creation or modification of computer programs related to machine operating systems; or
(4) A combination of the aforementioned duties, the performance of which requires the same level of skills. (29 C.F.R. 541.400).

2) AIR TRAFFIC CONTROLLERS AND WEATHER OBSERVERS - NIGHT PAY & SUNDAY PAY: If you work at night as part of a regular tour of duty, you will earn a night differential and receive an additional 10% of basic pay for any hours worked between 6pm and 6am. If you are a full-time employed (40 hours a week) and Sunday is part of your regularly scheduled workweek, you are paid at your rate of basic pay plus a Sunday premium of 25% of your basic rate for each hour of Sunday work which is not overtime (i.e. occasional work on Sunday outside the normal tour of duty is considered overtime work).

** HAZARDOUS PAY DIFFERENTIAL **

An 8 percent differential is applicable to employees employed in a position that represents a high degree of hazard when working with or in close proximity to ordnance, explosives, and incendiary materials. This includes work such as screening, blending, dying, mixing, and pressing of sensitive ordnance, explosives, and pyrotechnic compositions such as lead azide, black powder and photoflash powder. All dry-house activities involving propellants or explosives. Demilitarization, modification, renovation, demolition, and maintenance operations on sensitive ordnance, explosives and incendiary materials. All operations involving re-grading and cleaning of artillery ranges.

A 4 percent differential is applicable to employees employed in a position that represents a low degree of hazard when working with, or in close proximity to ordnance, (or employees possibly adjacent to) explosives and incendiary materials which involves potential injury such as laceration of hands, face, or arms of the employee engaged in the operation, irritation of the skin, minor burns and the like; minimal damage to immediate or adjacent work area or equipment being used. All operations involving, unloading, storage, and hauling of ordnance, explosive, and incendiary ordnance material other than small arms ammunition. These differentials are only applicable to work that has been specifically designated by the agency for ordnance, explosives, and incendiary material differential pay.

** UNIFORM ALLOWANCE **

If employees are required to wear uniforms in the performance of this contract (either by the terms of the Government contract, by the employer, by the state or local law, etc.), the cost of furnishing such uniforms and maintaining (by laundering or dry cleaning) such uniforms is an expense that may not be borne by an employee where such cost reduces the hourly rate below that required by the wage determination. The Department of Labor will accept payment in accordance with the following standards as compliance:

The contractor or subcontractor is required to furnish all employees with an adequate number of uniforms without cost or to reimburse employees for the actual cost of the uniforms. In addition, where uniform cleaning and maintenance is made the responsibility of the employee, all contractors and subcontractors subject to this wage determination shall (in the absence of a bona fide collective bargaining agreement providing for a different amount, or the furnishing of contrary affirmative proof as to the actual cost), reimburse all employees for such cleaning and maintenance at a rate of $3.35 per week (or $.67 cents per day). However, in those instances where the uniforms furnished are made of "wash and wear" materials, may be routinely washed and dried with other personal garments, and do not require any special treatment such as dry cleaning, daily washing, or commercial laundering in order to meet the cleanliness or appearance standards set by the terms of the Government contract, by the contractor, by law, or by the nature of the work,

there is no requirement that employees be reimbursed for uniform maintenance costs.

** SERVICE CONTRACT ACT DIRECTORY OF OCCUPATIONS **

The duties of employees under job titles listed are those described in the "Service Contract Act Directory of Occupations", Fifth Edition (Revision 1), dated September 2015, unless otherwise indicated.

** REQUEST FOR AUTHORIZATION OF ADDITIONAL CLASSIFICATION AND WAGE RATE, Standard Form 1444 (SF-1444) **

Conformance Process:

The contracting officer shall require that any class of service employee which is not listed herein and which is to be employed under the contract (i.e., the work to be performed is not performed by any classification listed in the wage determination), be classified by the contractor so as to provide a reasonable relationship (i.e., appropriate level of skill comparison) between such unlisted classifications and the classifications listed in the wage determination (See 29 CFR 4.6(b)(2)(i)). Such conforming procedures shall be initiated by the contractor prior to the performance of contract work by such unlisted class(es) of employees (See 29 CFR 4.6(b)(2)(ii)). The Wage and Hour Division shall make a final determination of conformed classification, wage rate, and/or fringe benefits which shall be paid to all employees performing in the classification from the first day of work on which contract work is performed by them in the classification. Failure to pay such unlisted employees the compensation agreed upon by the interested parties and/or fully determined by the Wage and Hour Division retroactive to the date such class of employees commenced contract work shall be a violation of the Act and this contract. (See 29 CFR 4.6(b)(2)(v)). When multiple wage determinations are included in a contract, a separate SF-1444 should be prepared for each wage determination to which a class(es) is to be conformed.

The process for preparing a conformance request is as follows:

1) When preparing the bid, the contractor identifies the need for a conformed occupation(s) and computes a proposed rate(s).

2) After contract award, the contractor prepares a written report listing in order the proposed classification title(s), a Federal grade equivalency (FGE) for each proposed classification(s), job description(s), and rationale for proposed wage rate(s), including information regarding the agreement or disagreement of the authorized representative of the employees involved, or where there is no authorized representative, the employees themselves. This report should be submitted to the contracting officer no later than 30 days after such unlisted class(es) of employees performs any contract work.

3) The contracting officer reviews the proposed action and promptly submits a report of the action, together with the agency's recommendations and pertinent information including the position of the contractor and the employees, to the U.S. Department of Labor, Wage and Hour Division, for review (See 29 CFR 4.6(b)(2)(ii)).

4) Within 30 days of receipt, the Wage and Hour Division approves, modifies, or disapproves the action via transmittal to the agency contracting officer, or notifies the contracting officer that additional time will be required to process the request.

5) The contracting officer transmits the Wage and Hour Division's decision to the contractor.

6) Each affected employee shall be furnished by the contractor with a written copy of such determination or it shall be posted as a part of the wage determination (See 29 CFR 4.6(b)(2)(iii)).

Information required by the Regulations must be submitted on SF-1444 or bond paper.

When preparing a conformance request, the "Service Contract Act Directory of Occupations" should be used to compare job definitions to ensure that duties requested are not performed by a classification already listed in the wage determination. Remember, it is not the job title, but the required tasks that determine whether a class is included in an established wage determination. Conformances may not be used to artificially split, combine, or subdivide classifications listed in the wage determination (See 29 CFR 4.152(c)(1)).

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Appendix B

Explosive Safety Submission

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DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD
4800 MARK CENTER DRIVE, SUITE 16E12
ALEXANDRIA VIRGINIA, 22350

DDESB-PE

FEB 11 2016

MEMORANDUM FOR HEADQUARTERS AIR FORCE SAFETY CENTER
ATTENTION: SEWC

SUBJECT: DDESB Approval of Non-Time Critical Removal Action, Explosives Safety Submission, Firing-In Buttress, Hancock Field Air National Guard Base, Onondaga County, NY

References: (a) HQ AFSEC/SEWC Memorandum of 29 January 2016, Subject: Explosives Safety Submission (ESS), Munitions and Explosives of Concern (MEC) Non-Time Critical Removal Action (NTCRA) for a former Firing-In Buttress (SR002) at Hancock Field ANGB, NY

(b) DoD 6055.09-M, DoD Ammunition and Explosives Safety Standards, date varies by volume

(c) DDESB TP-15, Approved Protective Construction, Revision 3, May 2010

(d) DDESB TP-16, Methodologies for Calculating Primary Fragment Characteristics, Revision 4, 2 August 2012

(e) AFSEC/SEWC, AFMAN 91-201, 12 January 2011

The Department of Defense Explosives Safety Board (DDESB) Staff has reviewed the subject non-time critical removal action explosives safety submission (NTCRA-ESS) forwarded by reference (a) against the requirements of reference (b). Based on the information provided, approval is granted for removal and treatment of material potentially presenting an explosive hazard (MPPEH) and munitions and explosives of concern (MEC) at Hancock Field Air National Guard Base, Onondaga County, NY. This approval is based on the following:

a. The efforts addressed in this NTCRA-ESS involve manual unintentional detonation operations (to include mechanized unintentional detonation operations employing anomaly avoidance), mechanized low input unintentional detonation operations, and intentional detonations supporting munitions response actions within Munitions Response Site (MRS) Firing-In Buttress (SR002).

b. The property is currently vacant with no use and the anticipated future use is not expected to change.

c. The munition with the greatest fragmentation distance (MGFD) for the MRS SR002 is the 20mm M97 HEI Projectile; the minimum separation distance (MSD) for teams for

manual unintentional detonation operations is 14 feet (ft) and 73 ft for low input mechanized unintentional detonation operations, based respectively on K40 of the 20mm M56A4 Projectile and the hazardous fragment distance (HFD) of the 20mm Mk I HEI Projectile; the MSD for nonessential personnel from manual and low input mechanized unintentional detonation operations is 73 ft based on the HFD of the 20mm Mk I HEI Projectile; the MSD for all personnel from intentional detonations is 651 ft based on the maximum fragment distance (MFD) horizontal of the MGFD; and the MSD for aircraft from intentional detonations is 491 ft based on the MFD vertical of the 20mm Mk I HEI Projectile.

d. Collection points and consolidated shots are authorized provided the Air Force ensures usage of reference (c), paragraph C6.2.7.5.

e. The use of sandbags, water mitigation systems and earth tamping is authorized as an engineering control for intentional detonations involving the MEC identified in reference (a) provided the Air Force ensures usage per reference (c), paragraph C6.2.7.5.

f. Operators of mechanized equipment will be shielded from hazardous fragments based on an unintentional detonation from mechanized operations involving the MEC identified in reference (a). The use of barricades/shields is authorized as an engineering control to prevent fragment penetration provided the Air Force ensures usage per reference (d). Additionally, operators will be provided blast overpressure protection of 8 ft based on K24 of the 20mm M56A4 Projectile.

g. The use of hearing protection is authorized as an engineering control for unintentional detonation operations to provide equivalent K24 blast overpressure protection for essential personnel at 6 ft based on K18 of the 20mm M56A4 Projectile. The Air Force shall ensure the use of double hearing protection which provides > 9 decibel (dB) attenuation.

h. Demolition materials, per reference (a), will be delivered as needed. Handling of commercial explosives must comply with reference (e).

i. If a munition with an unknown fill or chemical warfare material is encountered, all work will cease pending Air Force assessment of the need to submit a Chemical Safety Submission.

j. Prior to initiation and through completion of on-site explosives operations, all nonessential personnel will be evacuated and prevented from entering any area/facility encumbered by the MSD required for the operation being conducted, or explosives operations will be suspended if nonessential personnel enter the MSD.

k. MPPEH will be inspected and classified as material documented as safe prior to release to the public.

If changes occur during or after completion of this effort that could increase explosive hazards to site workers or the public due to the presence of military munitions at the site, an amendment to this NTCRA-ESS must be submitted to DDESB for review and approval.

The point of contact for this action is Ms. Kristene Bigej, (571) 372-6705, DSN 372-6705, E-mail address: kristene.a.bigej.civ@mail.mil.

THIERRY L. CHIAPELLO
Executive Director

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EXPLOSIVES SAFETY SUBMISSION

MUNITIONS AND EXPLOSIVES OF CONCERN NON-TIME CRITICAL REMOVAL ACTION

Firing-In Buttress (SR002)

HANCOCK FIELD AIR NATIONAL GUARD BASE
Syracuse, New York

January 2016

Prepared by:

EA Engineering, P.C.
6712 Brooklawn Parkway, Suite 104
Syracuse, New York 13211

and

U.S. ARMY CORPS OF ENGINEERS
Military Munitions Design Center, Omaha, Nebraska

TABLE OF CONTENTS

1 BACKGROUND

1.1 SITE LOCATION

Hancock Field Air National Guard Base (ANGB) is located at the Syracuse Hancock International Airport, approximately 5 miles north of the City of Syracuse in Onondaga County, New York.

This Explosives Safety Submission (ESS) has been prepared to support the non-time critical removal action (NTCRA) at the Firing-In Buttress (SR002) at Hancock Field ANGB which is being accomplished under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA).

1.2 SITE DESCRIPTION

1.2.1 Terrain and Vegetation

The Firing-In Buttress (SR002) includes approximately 0.03 acres of land with relatively flat to gently sloping topography. An NTCRA will be conducted within the Firing-In Buttress (SR002), which consists of a wood and concrete structure and soil within the structure. The area immediately around it is gently sloped with dense vegetation. The terrain and vegetation at the Firing-In Buttress (SR002) is not expected to hinder site operations.

1.2.2 Soil Conditions

Soils at Hancock Field ANGB are composed of silts with varying amounts of clay and fine to medium sand. Specifically, soils within the wood structure at the Firing-In Buttress (SR002) consist primarily of sandy soils, which are expected to perform well during sifting operations. Subsurface soils beneath the berm consist of Ontario loam. Soil conditions are not anticipated to hinder site operations.

1.3 SITE HISTORY

The Firing-In Buttress (SR002) MRS consists of the Firing-In Buttress (FIB), constructed of wooden railroad ties, concrete, and sod. The structure is comprised of concrete with the interior and front face covered with wood timbers. The exterior is covered with grass sod and vegetation. The opening of the structure is approximately 15 feet (ft) high and 80 ft wide. The inside of the wooden structure contains the soil impact berm. The intended use of the MRS was as a backstop and safety berm to clear jammed rounds from aircraft gun systems. It was also used by F-86 aircraft for test firings of gun systems and boresight alignment of up to .50-caliber ammunition. Based on the munitions debris (MD) observed in the FIB, 20-mm target practice (TP) projectiles were also used at the FIB. Additionally, MD from a 3.5-inch rocket was found. The MRS has been inactive since 1976.

1.4 CURRENT AND FUTURE LAND USE

The Firing-In Buttress (SR002) includes approximately 0.03 acres of land which is vacant and has no current use. No changes to land use are anticipated.

1.5 PROJECT AREA

The Firing-In Buttress (SR002) MRS at Hancock Field ANGB is covered by this ESS.

1.5.1 General

A description of the Firing-In Buttress (SR002) MRS is given in Section 1.1 and a summary of - the munitions response action is provided in Table 1-1.

Table 1-1. Munitions Response Actions

Munitions Response Site	Total Acreage	Munitions Response Action	Institutional Controls
Firing-In Buttress (SR002)	0.03	• Remove all surface and subsurface debris, wooden baffles, concrete and any other visible debris within the FIB structure including potential MEC and MD • Conduct a subsurface clearance via mag and dig following removal of the berm within the FIB structure • Remove FIB structure	None

1.5.2 Historical and Characterization Data Analysis

In 2009 a Comprehensive Site Evaluation (CSE) Phase I investigation was conducted at Hancock Field ANGB. The CSE Phase I investigation consisted of a historical records review of munitions usage at the installation and site visit. During the site visit a 3.5-inch rocket, HEAT, M28A2, was documented as embedded in the top portion of the wood timbers, which forms the top of the FIB catch box. The CSE Phase I concluded MEC and MC could be present at the Firing-In Buttress (SR002) and it was designated as a munitions response area (MRA).

In November 2012 the CSE Phase II Report was issued documenting the results of the investigation. The CSE Phase II investigation concluded no evidence of MEC was identified at the Firing-In Buttress (SR002) munitions response site (MRS), but recommended a munitions response action based on the concentrations of lead detected in the soils located within the FIB structure.

A NTCRA was completed between 16 June and 22 August 2014, which included the removal of lead contaminated soils at Firing-In Buttress (SR002). During the NTCRA, 20-mm TP projectiles and debris associated with M28A2 3.5-inch rockets were recovered.

A site visit, documented as a Memorandum for Record (MFR) dated 28 April 2015, was conducted by USACE Omaha to inspect the MRS and evaluate the MRS's potential to contain MEC following the completion of the 2014 NTCRA. During the site visit it was confirmed that the soil inside the FIB structure contains 20-mm TP projectiles and 50 caliber projectiles and that the wooden structure can be expected to contain 20mm TP projectiles, 50 caliber projectiles and fragmentation from 3.5 inch rockets.

1.6 REASON FOR MEC

The site history in Section 1.3 provides the reason for MEC on the property.

Table 1-2. Type and Depth of MEC Recovered

Munitions Response Site	MEC/MD Recovered	Maximum Depth of MEC Recovered During Site Investigation (inches)	Maximum Geophysical Detection Depth (inches below ground surface [bgs])
Firing-In Buttress (SR002)[1]	20-mm Target Practice (TP) projectiles	Surface (from berm within FIB)	5
	3.5 inch Rocket M28A2	Surface (embedded in FIB structure)	38

Notes:

1. The CSE Phase II Report indicated that although a 3.5-inch rocket was discovered during the Phase I and a spacer from a 3.5-inch Rocket was discovered during the Phase II investigation there is a high probability, based upon the historic use of the MRS, that these two items were the result of an isolated incident. Furthermore, as documented in the MFR dated 28 April 2015 the soil remaining inside the FIB structure was identified to contain 20-mm TP projectiles and 50 caliber projectiles. Based on the analog magnetometer survey conducted during the site visit, the MFR concluded that it is unlikely that an intact 3.5-inch rocket or warhead is present inside the FIB structure. Based on this information a 20-mm TP projectile was selected as the MGFD. However, if during the NTCRA anything associated with a 3.5-inch rocket is identified that suggests an intact 3.5-inch rocket may be present, work will stop immediately, the MGFD will be updated, and the ESQD arcs will be adjusted accordingly.

2 MAPS

A Site Overview Map and the Explosive Safety Quantity Distance (ESQD) Map are included in Appendix A. Map A-1 presents the location of the Firing-In Buttress (SR002) MRS. Map A-2 shows the ESQDs that will be used during the RA.

3 EXPLOSIVE SAFETY QUANTITY DISTANCE

3.1 MUNITIONS WITH THE GREATEST FRAGMENTATION DISTANCE

Table 3-1 presents the minimum separation distances (MSDs) associated with possible MEC items potentially present at the Firing-In Buttress (SR002) MRS (based on historical records of munitions used and/or found onsite). Exclusion zones will be based on the distances provided in Table 3-1 for the munitions with the greatest fragmentation distance (MGFD). If MEC with a greater fragmentation distance is encountered the MSD will be adjusted in accordance with the Department of Defense (DoD) Explosives Safety Board (DDESB) *Technical Paper 16 Methodologies for Calculating Primary Fragment Characteristics*. The ESQD arcs will be adjusted accordingly, and an amendment to this ESS will be submitted for approval.

3.2 MEC AREAS

The MSD restrictions for MEC areas for nonessential personnel will be applied during all MEC operations. Preliminary site work such as surveying, laying grid lanes and anomaly detection do not require the establishment of a MSD for Q-D purposes. Essential personnel are defined as those on-site contractor and DoD personnel required to participate in the MEC removal IAW EM 385-1-97. All other personnel are non-essential personnel. The outer boundaries of the MSD arcs are depicted on Map A-2. The team separation distance at this site will be the greatest K40 overpressure distance shown in Table 3-1. Positive control of the exclusion zone (EZ) based on the MSD will be maintained at all times that MEC operations are being conducted. Prior to beginning MEC operations, the contractor will ensure that there are no non-essential personnel within the EZ and the contractor will ensure that the EZ remains clear of non-essential personnel throughout the MEC operations.

The UXO Team may use hardened EMM to remove material, spread the material or process it through a mechanical screen plant, and inspect it for the presence of munitions. This is classified as low input mechanized MEC as there will be intentional contact with MEC, but no intent to deform the munitions. Personnel operating mechanized equipment will maintain the K24 separation distance (K18 if using double hearing protection). The Team Separation Distance (TSD) and the Minimum Separation Distances (MSD) for essential and nonessential personnel are presented in Table 3-1. Shielding will be IAW Fragmentation Data Review Form for the MGFD located in Appendix B.

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Table 3-1 Minimum Separation Distances for the Firing-In Buttress (SR002)

MRS	MGFD	Unintentional Detonations				Intentional Detonations			
						Without Engineering Controls		With Engineering Controls[2]	
		Hazard Fragment Distance (HFD)[5]	K40 Overpressure[4]	K24 Overpressure	K18 Overpressure[3]	Maximum Fragment Distance-Horizontal (MFD-H)	Maximum Fragment Distance – Vertical (MFD-V)	Single Sandbag Mitigation[6]	Double Sandbag Mitigation
Firing-In Buttress (SR002)	20-mm Mk 1 HEI Projectile	**73**	12	7	5	645	**491**	25	12.5
	20-mm M97 HEI	66	11	6	5	**651**	476	25	12.5
	20-mm M56A4	65	**14**	**8**	**6**	535	427	25	12.5

Notes:
1. The Fragmentation Data Review Form for the MGFD is located in Appendix B dated 22 September 2015.
2. Intentional MSD will be adjusted based on items being destroyed, use of engineering controls, and the disposal procedures used.
3. For personnel using double hearing protection and shielded during mechanized operations.
4. Team Separation Distance for non-mechanized operations.
5. Team Separation distance for mechanized operations and MSD for Non-Essential Personnel.
6. Single Sandbag Mitigation, 20-inch required wall and roof thickness.
7. The minimum separation distances that will be applied during intrusive operations appear in **bold font** and are underlined.

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3.3 DEMOLITION EXPLOSIVES

Explosives will be provided by a local vendor on an as-needed basis. MEC will be marked and guarded until disposal is accomplished.

Explosives will not be stored for this project.

3.4 PLANNED OR ESTABLISHED DEMOLITION AREAS

MEC will be disposed of in the areas where the item(s) are encountered. MEC that is acceptable to move may be consolidated to one location within an MRS to reduce the number of demolition shots and the fragmentation contamination. MEC items may be consolidated for disposal if determined acceptable-to move by the Senior UXO Supervisor (SUXOS) and UXO Safety Officer (UXOSO) and in accordance with USACE Huntsville District *Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives Sites*, August 1998 (Terminology update March 2000).

3.5 FOOTPRINT AREAS

3.5.1 Blow-in-Place

If an item cannot be moved, blow-in-place (BIP) procedures will be performed. All MEC that are BIP will be well documented, and their position will be shown on the site map and input to the database. Engineering controls will be used when necessary. The MSDs for intentional detonations are shown in Table 3-1, as designated for intentional detonations, and MSD calculation sheets are provided in Appendix B.

3.5.2 Collection Points

Collection points are those areas used to temporarily accumulate MEC determined acceptable to move by the SUXO and UXOSO pending destruction at the end of the day. MEC items at collection points must be laid out as shown in "*Procedures for Demolitions of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites*." The maximum net explosive weight (NEW) at a collection point will be limited such that the K40 overpressure distance for the total NEW does not exceed the HFD for the area.

3.5.3 Consolidated Shots

If determined acceptable-to-move by the SUXOS and UXOSO consolidating multiple MEC may be anticipated for this project, US Army Engineering and Support Center, Huntsville (USAESCH) publication "*Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites*," dated March 2000 will be used and a copy of this report will be available on site. The maximum NEW for a consolidated shot will be limited such that the K328 overpressure distance for the total NEW (including donor charges) does not exceed the MSD for the intentional detonation.

3.6 MAXIMUM CREDIBLE EVENT

Soils within the MRS are not expected to contain sufficient concentrations of explosives to result in an explosives hazard; therefore, no maximum credible event (MCE) is calculated.

4 START DATE

NTCRA activities are scheduled to begin in April 2019

5 MEC MIGRATION

The depth of the frost line for Syracuse, New York, where Hancock Field ANGB is located, is approximately 73 inches as per the Unified Facilities Criteria 3-310-01. This is considered to be the maximum depth where frost may occur, and thus the maximum depth where frost-related migration of MEC is possible. However, based on the former use of the MRS as a FIB, significant migration into the subsurface is not anticipated.

6 DETECTION EQUIPMENT AND RESPONSE TECHNIQUES

The techniques planned to be employed within the Firing-In Buttress (SR002) to detect and recover MEC are detailed in this section.

6.1 REMOVAL DEPTH

At the Firing-In Buttress (SR002) MEC and MD will be removed from the former impact area/berm inside the FIB to original grade (0 ft. bgs) using excavation and sifting operations. The berm is approximately 400 cubic yards with a maximum height of 15 ft above ground surface. The remaining subsurface anomalies will be intrusively investigated and removed to depth.

6.2 DETECTION EQUIPMENT

Analog detectors will be used as an adjunct to visual searching, to verify removal actions, to guide intrusive work, and to perform a subsurface clearance. The instruments chosen for this NTCRA were selected based on proven capability for the detection required for the targets of interest. These detectors will primarily be the Schonstedt GA 52cx, but may include other commercially available detectors.

6.3 SWEEP PROCEDURES

A visual surface clearance will not be performed during this project.

6.4 EXCLUSION ZONE CONTROL

Prior to beginning intrusive operations, all non-essential personnel will withdraw to the HFD as depicted on Map A-1.

All non-essential personnel will be evacuated from the EZ and will remain outside the EZ until all MEC operations are completed. Once MEC operations commence, positive control of the EZ will be maintained and only essential personnel will be allowed inside the EZ.
Access to exclusion zones will be controlled by visual observation, signage, road guards, roadblocks, or a combination of these.

6.5 INTRUSIVE ACTIVITIES

6.5.1 Soil Excavation and Sifting

MEC and MD will be removed from the former impact area/berm inside the FIB structure using excavation and sifting operations. The UXO team will excavate soil using EMM shielded in accordance with the Fragmentation Data Sheet (See Appendix B and Table 3-1) for the MGFD.

Soils removed from inside the FIB structure will be placed in hoppers which feed mechanical sieves to capture and separate out debris larger than 0.5 inches (or similar) from the soils. The debris larger than 0.5 inches (or similar) will be inspected for potential MEC and MD.

Sifting operations will have the capability of being remotely shut down from a "Kill" switch located at, or outside of the K24 distance.

6.5.2 Subsurface Clearance

The UXO team will conduct a subsurface clearance of the interior of the FIB using the mag and dig approach. MEC and/or MD identified during the subsurface clearance will be removed.

6.5.3 Demolition of FIB Structure

As part of the NTCRA the FIB structure will be disassembled and removed from the MRS; however, based on site documentation it is anticipated MD is embedded in the wood. UXO Technicians will inspect wood sections using visual observations and magnetometers to identify and remove any metallic anomalies prior to offsite disposal. All metallic debris will be removed by UXO Technicians using hand tools. Once removed, each piece of debris will be inspected in accordance with MPPEH inspection procedures.

6.6 QUALITY CONTROL AND QUALITY ASSURANCE

Quality Control (QC) for this project will be in accordance with the Quality Assurance Surveillance Plan (QASP) and conducted using the three-phase control process; preparatory, initial, and follow-up inspection/audits to ensure all processes are in control and opportunities for improving processes are captured and implemented. The UXO Quality Control Specialist (UXOQCS) is organizationally independent from the field MEC remediation management chain of command.

Upon conclusion of the NTCRA, the UXOQCS will conduct surface and subsurface QC inspections to validate the processes were implemented properly. If the area passes, the QC

inspection will be submitted for quality assurance (QA) inspection, as applicable. As per the QASP nonconformance will be documented on a Corrective Action Request (CAR). Each CAR will be annotated as a Critical nonconformance, Major nonconformance, or Minor nonconformance. CARs will be provided to the USACE Contracting Officer for distribution to the contractor. The contractor will correct explosives safety issues immediately and provide written responses to all CARs

QA will be monitored by the government representative who will evaluate field activities to verify that the approved Work Plan is being followed. QA audits and inspections will be performed in accordance with established guidelines

7 DISPOSITION TECHNIQUES

7.1 DEMOLITION OPERATIONS

All explosive operations will follow the procedure outlined in TM 60A-1-1-31. Demolition operations will be performed daily or MEC items will be properly guarded in accordance with EM 385-1-97 until demolition operations can be conducted.

7.2 EXPLOSIVE STORAGE, TRANSPORTATION, AND ACCOUNTABILITY

Explosives will not be stored onsite. Explosives will be delivered on an "on call" basis. Total control of explosives will be maintained while the explosives are on site. All vehicles transporting explosives will be properly inspected, equipped, and placarded in accordance with all local, state and federal regulations prior to the loading of explosives onto the vehicle, and DD Form 626 "Motor Vehicle Inspection" completed.

7.3 ENGINEERING CONTROLS

Sandbag or water mitigation may be used as engineering controls for explosive items 155mm and smaller to reduce the intentional detonation MSD. The sandbag controls will be used IAW HNC-ED-CS-98-7, Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions, August 1998, its Amendment 1, February 2011 and its Amendment 2, Nov 2014; CEHNCEMM Memorandum, Safety Advisory: Use of Jet Perforator During Intentional Detonation While Using Sandbag Mitigation for Engineering Controls, 7 November 2011; and DDESB-PD memorandum of 22 May 2014, Subject: Revision of DDESB Approval for Use of Sandbags for Mitigation of Fragmentation and Blast Effects Resulting From Intentional Detonation of Munitions.

Tamping (single or multiple items) may be used in accordance with DDESB Technical Paper (TP) 16 and the BEM version 6.3.3 or later, if released. These reports will be available on site for all mitigation methods used.

7.4 MPPEH PROCEDURES

7.4.1 Inspection and Certification

MPPEH procedures will be in accordance with DoDI 4140.62 and EM 385-1-97.

All MPPEH will be assessed and its explosives safety status determined and documented prior to transfer within the DoD or release from DoD control. Prior to release to the public, MPPEH will be inspected by authorized and technically qualified personnel and, if appropriate, documented as Material Documented as Safe (MDAS) after a 100% inspection and an independent 100% re-inspection to determine that it is safe from an explosive safety perspective.

MD will be stored in a metal storage container and secured with a lock by the SUXOS. The inspected MD containers will be affixed with a tamper evident seal and shipped to a recycler for final processing.

7.5 ALTERNATIVE DISPOSAL TECHNIQUES

No techniques other than detonation will be used to dispose of MEC.

8 ENVIRONMENTAL, ECOLOGICAL, OR CULTURAL CONSIDERATIONS

No environmental or ecological resources have been identified within the Firing-In Buttress (SR002).

9 TECHNICAL SUPPORT

9.1 MILITARY SUPPORT

No chemical warfare material (CWM) is suspected at this site. However, if a munition with unknown filler is found, or if a MEC item cannot be positively identified, the on-site USACE project team will notify the local point of contact (POC) as designated in the work plan. The local POC will contact and facilitate Explosive Ordnance Disposal (EOD) response. If the local POC is not the local law enforcement agent, he/she will notify the local enforcement agency of the discovery, which will contact EOD. If item is RCWM or has unknown liquid filler, the on-site USACE project team will notify the Chemical Warfare Design Center (CWM-DC) at USAESCH by calling (256) 895-1598. This call number provides 24-hour response.

9.2 CONTRACTOR

Contractor personnel used to conduct the NTCRA will meet minimum DoD training and experience requirements in accordance with DDESB Technical Paper 18.

10 RESIDUAL RISK MANAGEMENT

This ESS has been prepared to support the NTCRA at the Firing-In Buttress (SR002), which potentially contains MEC based on historical records review, the Phase I and Phase II CSEs. No land use controls are proposed as part of NTCRA efforts described herein. However, in the event of a change of land use it is recommended that notification of known prior land use be made to the user and that subsequent users refer to the Site-Specific After Action Report for this project.

11 SAFETY EDUCATION PROGRAM

No public safety and education is proposed for this project. Prior to beginning work on this RA, all employees will receive MEC hazard awareness training on munitions known to exist in this MRS.

12 STAKEHOLDER INVOLVEMENT

Meetings will be held, as needed, with USACE Omaha District, ANG, Hancock Field ANGB, and New York State Department of Environmental Conservation (if invited by ANG), for the Firing-In Buttress NTCRA as part of project planning and work plan development through preparation of the final report.

13 CONTINGENCIES

No contingencies have been identified for this ESS.

Appendix A

Maps

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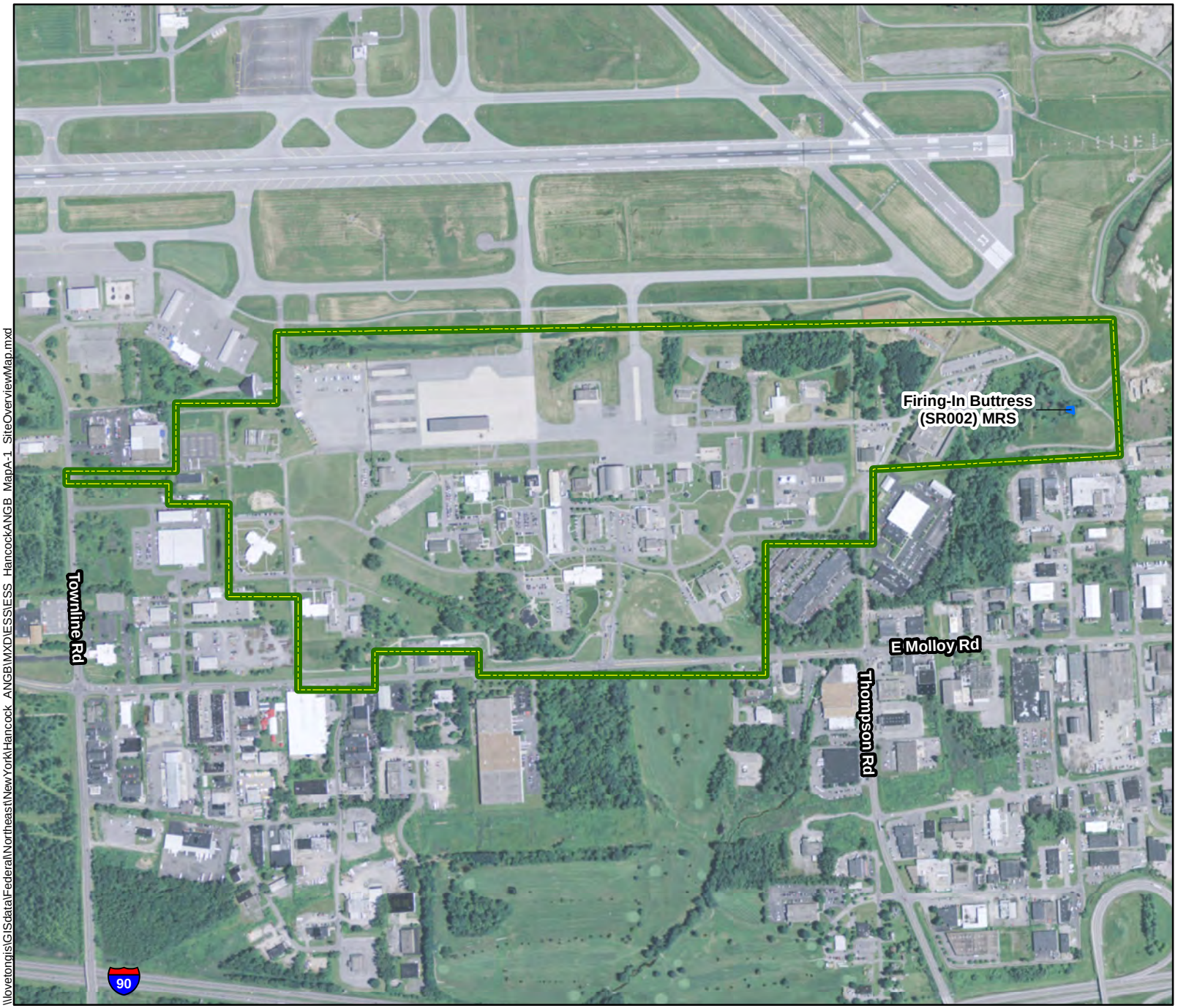

VICINITY MAP

Legend

- Installation Boundary
- Firing-In Buttress (SR002) MRS

Notes:
MRS = Munitions Response Site

Data Sources:
ESRI 2013

Map Date: 12/15/2015

0 500 1,000
Feet

N

EA Engineering, Science, and Technology, Inc., PBC

Map A-1
Site Overview Map
Hancock ANGB
Syracuse, New York

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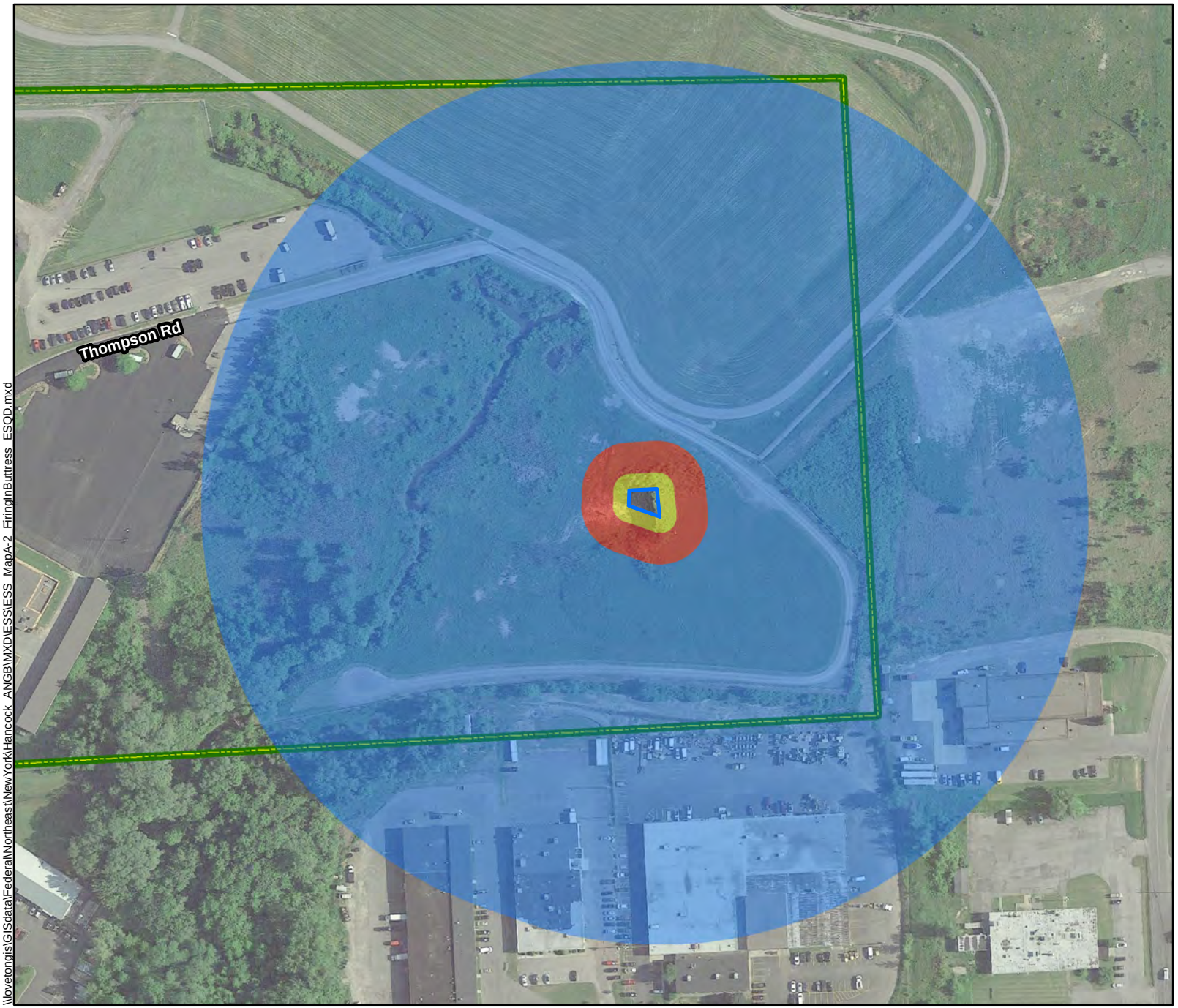
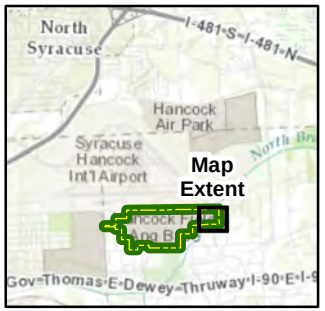


VICINITY MAP



Legend

- Installation Boundary
- Firing-In Buttress (SR002) MRS
- 25 ft Single Sandbag Mitigation
- HFD - 73 ft, MSD for Unintentional Detonation
- MFD-H - 651 ft, MSD for Intentional Detonation

Notes:
MRS = Munitions Response Site
HFD = Hazardous Fragmentation Distance
MFD-H = Maximum Fragment Distance-Horizontal

The Maximum Fragment Distance-Vertical (MFD-V) is 491 ft.

Data Sources:
Google Earth 2015

Map Date: 10/23/2015

0 100 200
Feet

N

EA Engineering, Science, and Technology, Inc., PBC

Map A-2
Firing-In Buttress (SR002) MRS Explosive Safety Quantity Distance (ESQD) Map

Hancock ANGB
Syracuse, New York

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Appendix B

Fragmentation Data Sheets

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Fragmentation Data Review Form

Database Revision Date 9/22/2015

Category:	Surface-Launched HE Rounds
Munition:	20 mm M97 HEI
Case Material:	Steel, Mild
Fragmentation Method:	Naturally Fragmenting
Secondary Database Category:	Projectile
Munition Case Classification:	Extremely Heavy Case

DODIC:	A775
Date Record Created:	6/10/2010
Record Created By:	SDH
Last Date Record Updated:	1/12/2012
Individual Last Updated Record:	SDH
Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	Tetryl and Incenciary Mix
Explosive Weight (lb):	0.017
Diameter (in):	0.7934
Cylindrical Case Weight (lb):	0.19632
Maximum Fragment Weight (Intentional) (lb):	0.0115
Design Fragment Weight (95%) (Unintentional) (lb):	0.0050
Critical Fragment Velocity (fps):	1874

Sandbag and Water Mitigation Options

TNT Equivalent (Impulse):	1.07
TNT Equivalent Weight - Impulse (lbs):	0.018
Kinetic Energy 10^6 (lb-ft²/s²):	0.0251

Single Sandbag Mitigation

Required Wall & Roof Thickness (in)	12
Expected Max. Throw Distance (ft):	25
Minimum Separation Distance (ft):	25

Double Sandbag Mitigation

Required Wall & Roof Thickness (in)	24
Expected Max. Throw Distance (ft):	10
Minimum Separation Distance (ft):	12.5

Water Mitigation

Minimum Separation Distance (ft):	200/200
Water Containment System:	5 gal carboys/ inflatable pool

Note: Use Sandbag and Water Mitigation in accordance with all applicable documents and guidance. If a donor charge larger than 32 grams is utilized, the above mitigation options are no longer applicable. Subject matter experts may be contacted to develop site specific mitigation options.

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	66
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	651
MFD-V [Maximum Fragment Distance, Vertical] (ft):	476

Overpressure Distances

TNT Equivalent (Pressure):	1.07
TNT Equivalent Weight - Pressure (lbs):	0.018
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	5
Public Traffic Route Distance (2.3 psi); K24 Distance:	6
Inhabited Building Distance (1.2 psi), K40 Distance:	11
Intentional MSD (0.0655 psi), K328 Distance:	86

Note: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328 distance may be no smaller than 200 ft.

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	1.55	1.12
Mild Steel:	0.29	0.19
Hard Steel:	0.24	0.16
Aluminum:	0.64	0.43
LEXAN:	2.82	2.19
Plexi-glass:	1.61	1.15
Bullet Resist Glass:	1.22	0.83

Item Notes

Fragmentation Data Review Form

Database Revision Date 9/22/2015

Category:	Surface-Launched HE Rounds
Munition:	20 mm Mk I HEI
Case Material:	Steel, Mild
Fragmentation Method:	Naturally Fragmenting
Secondary Database Category:	Projectile
Munition Case Classification:	Robust

DODIC:	
Date Record Created:	6/10/2010
Record Created By:	SDH
Last Date Record Updated:	1/12/2012
Individual Last Updated Record:	SDH
Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	Tetryl and Incenciary Mix
Explosive Weight (lb):	0.025
Diameter (in):	0.7934
Cylindrical Case Weight (lb):	0.19546
Maximum Fragment Weight (Intentional) (lb):	0.0076
Design Fragment Weight (95%) (Unintentional) (lb):	0.0027
Critical Fragment Velocity (fps):	2644

Sandbag and Water Mitigation Options

TNT Equivalent (Impulse):	1.07
TNT Equivalent Weight - Impulse (lbs):	0.027
Kinetic Energy 10^6 (lb-ft²/s²):	0.0298

Single Sandbag Mitigation

Required Wall & Roof Thickness (in)	12
Expected Max. Throw Distance (ft):	25
Minimum Separation Distance (ft):	25

Double Sandbag Mitigation

Required Wall & Roof Thickness (in)	24
Expected Max. Throw Distance (ft):	10
Minimum Separation Distance (ft):	12.5

Water Mitigation

Minimum Separation Distance (ft):	200/200
Water Containment System:	5 gal carboys/ inflatable pool

Note: Use Sandbag and Water Mitigation in accordance with all applicable documents and guidance. If a donor charge larger than 32 grams is utilized, the above mitigation options are no longer applicable. Subject matter experts may be contacted to develop site specific mitigation options.

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	73
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	645
MFD-V [Maximum Fragment Distance, Vertical] (ft):	491

Overpressure Distances

TNT Equivalent (Pressure):	1.07
TNT Equivalent Weight - Pressure (lbs):	0.027
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	5
Public Traffic Route Distance (2.3 psi); K24 Distance:	7
Inhabited Building Distance (1.2 psi), K40 Distance:	12
Intentional MSD (0.0655 psi), K328 Distance:	98

Note: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328 distance may be no smaller than 200 ft.

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	1.69	1.08
Mild Steel:	0.33	0.20
Hard Steel:	0.27	0.16
Aluminum:	0.72	0.44
LEXAN:	2.96	2.21
Plexi-glass:	1.72	1.16
Bullet Resist Glass:	1.30	0.85

Item Notes

Fragmentation Data Review Form

Database Revision Date 9/22/2015

Category:	Surface-Launched HE Rounds
Munition:	20 mm M56A4
Case Material:	Steel, Mild
Fragmentation Method:	Naturally Fragmenting
Secondary Database Category:	Projectile
Munition Case Classification:	Robust

DODIC:	A890
Date Record Created:	11/9/2006
Record Created By:	MC
Last Date Record Updated:	9/14/2011
Individual Last Updated Record:	SDH
Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	H-764 (RDX)
Explosive Weight (lb):	0.0264
Diameter (in):	0.7874
Cylindrical Case Weight (lb):	0.10516
Maximum Fragment Weight (Intentional) (lb):	0.0034
Design Fragment Weight (95%) (Unintentional) (lb):	0.0017
Critical Fragment Velocity (fps):	3064

Sandbag and Water Mitigation Options

TNT Equivalent (Impulse):	1.3
TNT Equivalent Weight - Impulse (lbs):	0.034
Kinetic Energy 10^6 (lb-ft²/s²):	0.0307

Single Sandbag Mitigation

Required Wall & Roof Thickness (in)	12
Expected Max. Throw Distance (ft):	25
Minimum Separation Distance (ft):	25

Double Sandbag Mitigation

Required Wall & Roof Thickness (in)	24
Expected Max. Throw Distance (ft):	10
Minimum Separation Distance (ft):	12.5

Water Mitigation

Minimum Separation Distance (ft):	200/200
Water Containment System:	5 gal carboys/ inflatable pool

Note: Use Sandbag and Water Mitigation in accordance with all applicable documents and guidance. If a donor charge larger than 32 grams is utilized, the above mitigation options are no longer applicable. Subject matter experts may be contacted to develop site specific mitigation options.

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	65
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	535
MFD-V [Maximum Fragment Distance, Vertical] (ft):	427

Overpressure Distances

TNT Equivalent (Pressure):	1.46
TNT Equivalent Weight - Pressure (lbs):	0.039
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	6
Public Traffic Route Distance (2.3 psi); K24 Distance:	8
Inhabited Building Distance (1.2 psi), K40 Distance:	14
Intentional MSD (0.0655 psi), K328 Distance:	111

Note: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328 distance may be no smaller than 200 ft.

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	1.86	1.00
Mild Steel:	0.36	0.20
Hard Steel:	0.30	0.16
Aluminum:	0.80	0.45
LEXAN:	3.04	2.11
Plexi-glass:	1.77	1.10
Bullet Resist Glass:	1.33	0.80

Item Notes

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Appendix C

Project Points-of-Contact

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Appendix C – Points-of-Contact

Name	Organization	Phone	Cellular Phone	Email
James Bouvier	USACE–Omaha Project Manger	(402) 995-2730	--	james.bouvier@usace.army.mil
John Kochefko	USACE–Omaha Lead OESS	(402) 995-2281	--	john.a.kochefko@usace.army.mil
Jody Murata	ANG – Environmental Restoration Program Manager	(301) 836-8120	--	jody.murata@ang.af.mil
Captain Bruce King	Hancock ANGB – Environmental Manager	315) 233-2692	--	bruce.a.king42.mil@mail.mil
Brian Jankauskas, P.E.	NYSDEC – Division of Environmental Remediation	(518) 402-9658	--	rkcorcor@gw.dec.state.ny.us
H. Lee Becker	EA-Program Manager	(410) 584-7000	--	lbecker@eaest.com
Joseph Von Uderitz	EA-Project Manager	(315) 565-6567	(315) 382-9534	jvonuderitz@eaest.com
Peter Garger	EA-Health and Safety Manager	(410) 584-7000	(410) 790-6338	pgarger@eaest.com
JD Marlowe	EA–Site Supervisor/SUXOS	--	(443) 752-1775	jmarlowe@eaest.com
John Monk	EA–UXOQCS/UXOSO/ SSHO	(410) 584-7000	(717) 887-5582	jmonk@eaest.com
Richard Hanoski	EA–Munitions Response Services Technical Advisor	(410) 584-7000	(443) 632-4887	rhanoski@eaest.com

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Appendix D

Accident Prevention Plan

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ACCIDENT PREVENTION PLAN AND SITE SAFETY AND HEALTH PLAN ACKNOWLEDGEMENT

APP and SSHP Acknowledgment			
I have read, understand, and agree to abide by the provisions as detailed in this Accident Prevention Plan and Site Safety and Health Plan prepared by EA Engineering, P.C. Failure to comply with these provisions may lead to disciplinary action and/or my dismissal from the work site.			
Printed Name	**Company**	**Signature**	**Date**

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ATTACHMENTS

LIST OF FIGURES

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LIST OF ACRONYMS AND ABBREVIATIONS

AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CPR	Cardiopulmonary Resuscitation
CSP	Certified Safety Professional
dB (A)	A-weighted decibels
DDESB	Department of Defense Explosives Safety Board
EA	EA Engineering, P.C.
FIB	Firing-In Buttress
Ft	Foot (feet)
GFCI	Ground fault current interrupter
Hancock Field	Hancock Field Air National Guard Base, Syracuse, New York
in.	Inch(es)
lb	Pound(s)
MD	Munitions debris
MDAS	Material documented as safe
MEC	Munitions and explosives of concern
mg/m^3	Milligram(s) per cubic meter
MMRP	Military Munitions Response Program
mph	Mile(s) per hour
MPPEH	Material potentially presenting an explosive hazard
MRS	Munitions Response Site
NIOSH	National Institute for Occupational Safety and Health
NTCRA	Non-Time Critical Removal Action
OESS	Ordnance and Explosives Safety Specialist
OSHA	Occupational Safety and Health Administration
PFAS	Personal fall arrest system
PM	Project Manager
PPE	Personal protective equipment

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

QD	Quantity distance
SAA	Small arms ammunition
SDS	Safety data sheet
SOO	Statement of Objectives
SOP	Standard operating procedure
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SUXOS	Senior Unexploded Ordnance Supervisor
USACE	United States Army Corps of Engineers
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
UXO	Unexploded Ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
UXOSO	Unexploded Ordnance Safety Officer

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SIGNATURE SHEET

ACCIDENT PREVENTION PLAN FOR THE MILITARY MUNITIONS RESPONSE PROGRAM NON-TIME CRITICAL REMOVAL ACTION HANCOCK FIELD AIR NATIONAL GUARD BASE, NEW YORK

13 March 2019

Joseph Von Uderitz, P.G. — Date
Project Manager

13 March 2019

Peter Garger, CIH, CSP — Date
Health and Safety Manager
ABIH No. 3118, BCSP No. 20560

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1. BACKGROUND INFORMATION

This Accident Prevention Plan (APP) has been prepared for the Non-Time Critical Removal Action (NTCRA) for the following Munitions Response Site (MRS) located at Hancock Field Air National Guard Base, Syracuse, New York (Hancock Field):

- Former Firing-in-Buttress (MRS SR002).

This APP establishes the site-specific safety and health procedures, practices, and equipment to protect personnel from the potential hazards associated with field activities performed at the site. The APP assigns responsibilities, establishes standard operating procedures (SOPs), and provides for contingencies that may arise during the Military Munitions Response Program (MMRP) Removal Action process.

1.1 CONTRACTOR

EA Engineering, P.C.
and Its Affiliate EA Science and Technology[1]
269 W. Jefferson Street
Syracuse, New York 13202
315-431-4610

1.2 CONTRACT NUMBER

EA Engineering, P.C.[1] (EA) is the prime contractor for performing NTCRA activities under United States Army Corps of Engineers (USACE) – Omaha District Contract W9128F-13-D-0006, Delivery Order No. 0002.

1.3 PROJECT NAME AND LOCATION

Project Name: Non-Time Critical Removal Action (NTCRA) for Munitions Response Site (MRS) SR002, Hancock Air National Guard Base (Hancock Field), Syracuse, New York.

Hancock Field is located approximately 5 miles north of the city of Syracuse in Onondaga County, New York, at the Syracuse Hancock International Airport (Figure 1-1 of the Work Plan). Hancock Field covers approximately 357 acres and is composed several buildings and operational facilities. The installation is divided into two tracts of land: Tract II and Tract III. Tract III encompasses approximately 260 acres and includes MRS SR002. Hancock Field is owned by the United States Air Force with a license to New York State for Air National Guard use. The city of Syracuse owns the land bordering Tract II and the land north of Tract III (ANG 2015).

[1] EA Engineering, P.C. is affiliated with EA Engineering, Science, and Technology, Inc., PBC who does business as EA Science and Technology in the State of New York.

The project site for the Firing-In Buttress (FIB) (MRS SR002) is located at Hancock Field and encompasses approximately 0.1 acre of land, including the FIB structure and the soil contained within the structure. The structure is comprised of concrete with an interior and front face covered in wood timbers. The wooden structure of the FIB contains the soil impact berm. The exterior of the FIB is covered with grass sod and vegetation. The opening of the structure is approximately 15 feet (ft) high and 80 ft wide (ANG 2015).

1.4 PROJECT DESCRIPTION AND DESCRIPTION OF WORK

The scope of this NTCRA is to remove all debris associated with the FIB (MRS SR002). To complete the NTCRA at the identified MRS, the following general work tasks will be completed:

- Surface inspection and subsequent surface debris/vegetation/soil removal from the top and sides of the FIB structure exterior
- Excavation and removal of soil from within the FIB via earth-moving machinery (i.e., excavator)
- Processing of soil through sifter and stockpiling of sifted soil for reuse to regrade the site
- Inspection and dismantlement of wooden timbers covering the interior and exterior of the FIB
- Segregation of wooden timbers suspected or confirmed to contain projectiles or other metallic debris for manual removal of debris
- Disposal offsite of wooden debris
- Inspected and certified munitions debris (MD) stored in a central location would ultimately be shipped offsite as material documented as safe (MDAS) to a recycling facility
- Subsurface inspection utilizing lanes to “mag and dig” detected anomalies which will cover 100 percent of the FIB interior floor
- Removal of concrete FIB structure via an excavator; crushing of concrete and removal any reinforcing steel onsite
- Disposal offsite of crushed concrete and steel
- Ste restoration and grading of sifted/screened soil within the former FIB area to blend with the surrounding elevations.

Based upon findings from previous investigations, MRS SR0002 is classified as a low probability site to encounter munitions and explosives of concern (MEC). While it is not

anticipated that MEC will be encountered, if MEC are identified, they will be disposed of through open detonation onsite.

All work at Hancock Field will be conducted in accordance with the Defense Environmental Restoration Program. EA and its subcontractors will provide all labor, equipment, and materials to complete the NTCRA at Hancock Field, under the MMRP category. Project objective includes:

- Conducting an NTCRA at MRS 0002 to support future land use.

1.5 CONTRACTOR ACCIDENT EXPERIENCE

EA's Experience Modification Rate for the last 5 years is shown in **Table D-1**. Copies of the latest Occupational Safety and Health Administration (OSHA) Form 300 and OSHA Form 300A are provided in **Attachment 1**.

Table D-1: Experience Modification Rate

Year	Rate
2015	0.78
2014	0.84
2013	0.89
2012	0.84
2011	0.78

1.6 PHASES OF WORK AND ASSOCIATED HAZARDOUS ACTIVITIES REQUIRING ACTIVITY HAZARD ANALYSES

The work phases listed below will be required to achieve the desired NTCRA results for this project. Under each phase of work, there are inherently hazardous activities that have been analyzed to identify controls that will protect the safety and health of all personnel entering the project site. The field activities associated with the MMRP NTCRA will include surface and subsurface clearance, soil excavation and sifting, wooden timber inspection and removal, concrete structure removal, and site restoration and backfill. Activity Hazard Analyses (AHAs) for the project scope of work are presented in **Attachment 2**. AHAs in **Attachment 2** include the following:

1. Mobilization/Demobilization
2. Vegetation Clearing
3. Detector-Aided Surface Clearance
4. Intrusive Investigation of Anomalies
5. Material Potentially Presenting an Explosive Hazard (MPPEH) Inspection and Disposition
6. Soil Sifting
7. Wooden Timber Inspection
8. FIB Structure Removal

9. Hot Work
10. Excavation and Backfill
11. Soil Sampling
12. X-Ray Fluorescence (XRF).

1.6.1 Surface and Subsurface Clearance

Field activities associated with the surface and subsurface clearance include:

- Mobilization
- MPPEH inspection, certification, and disposal
- Surface MEC/unexploded ordnance (UXO) clearance (if needed)
- Subsurface MEC/UXO clearance (if needed)
- MEC, MD and small arms ammunition (SAA) disposal (if needed)
- Demobilization.

Hazardous activities requiring AHA for the surface and subsurface clearance include:

- Encountering surface or subsurface MEC; these items, if moved, could detonate, either killing or seriously injuring personnel at the work site
- Investigation or disposal of MEC
- Inspection of non-munitions-related debris and quality control inspections
- Biological hazards, such as insects, ticks, mosquitoes, spiders, snakes, or other wildlife.

1.6.2 Soil Excavation and Sifting

Field activities associated with soil excavation and sifting include:

- Mobilization
- Sediment and erosion control
- Vegetation clearing
- Delineation of excavation area
- Excavation of surface and subsurface
- Sifting of excavated soil
- MPPEH inspection, certification, and disposal
- MEC, MD, and SAA disposal (if needed)
- Soil sampling and stabilization with offsite disposal (if necessary)
- Demobilization.

Hazardous activities requiring AHA for the soil excavation and sifting include:

- Use of brush clearing equipment
- Use of heavy earth-moving equipment
- Inspection of MPPEH and quality control inspections

- Encountering surface or subsurface MEC; these items, if moved, could detonate, either killing or seriously injuring personnel at the work site
- Investigation or disposal of MEC
- Use of the x-ray tube-based x-ray fluorescence (XRF) analyzer for soil analysis
- Biological hazards, such as insects, ticks, mosquitoes, spiders, snakes, or other wildlife.

1.6.3 Wooden Timber Inspection and Removal

Field activities associated with wooden timber removal, inspection, and disposal include:

- Mobilization
- Inspection of wooden timbers via man-lift
- Removal of wooden timbers
- Transportation of wooden timbers to staging area
- Removal of any identified metallic debris
- Disposal of wooden timber
- Recycling of metallic debris
- Demobilization.

Hazardous activities requiring AHA for the wooden timber inspection, removal, and disposal include:

- Use of heavy earth-moving equipment
- Encountering surface or subsurface MEC; these items, if moved, could detonate, either killing or seriously injuring personnel at the work site
- Investigation or disposal of MEC
- Inspection of MPPEH and quality control inspections
- Fall protection
- Biological hazards, such as insects, ticks, mosquitoes, spiders, snakes, or other wildlife.

1.6.4 Concrete Structure Removal

Field activities associated with FIB structure removal and disposal include:

- Mobilization
- Demolition of the concrete FIB structure
- Crushing of concrete from the FIB structure
- Removal of any contained reinforcing steel
- Offsite disposal of crushed concrete
- Recycling of any reinforcing steel
- Demobilization.

Hazardous activities requiring AHA for the FIB structure removal and disposal include:

- Use of heavy earth-moving equipment

- Use of gas-powered torches (hot work)
- Material handling and lifting
- Biological hazards, such as insects, ticks, mosquitoes, spiders, snakes, or other wildlife.

1.6.5 Backfill and Site Restoration

Field activities associated with site restoration and backfill include:

- Mobilization
- Transportation of soil for backfill
- Grading and reseeding
- Demobilization.

Hazardous activities requiring AHA for the site restoration and backfill include:

- Use of heavy earth-moving equipment
- Material handling and lifting
- Biological hazards, such as insects, ticks, mosquitoes, spiders, snakes, or other wildlife.

2. STATEMENT OF SAFETY AND HEALTH POLICY

EA considers the safety and health of its employees, clients, and visitors and the prevention of work-related accidents and illnesses, property loss, and detrimental impact to the environment to be of the highest priority. Proactively implemented, a comprehensive and systematic safety and health program will result in more efficient and profitable operations by improving employee health and morale, and by reducing Worker's Compensation costs, lost time, fire and liability insurance premiums, and property damage.

EA's Safety and Health Program ensures:

- Sound safety and health practices and conditions necessary for the protection of the health and welfare of employees, clients, and visitors.
- Compliance with federal, state, USACE, Hancock Field, and Syracuse Hancock International Airport safety and health regulations and standards.
- Effective safety, fire prevention, and work practices necessary for protection of property.

This APP and supplemental plans (Site Safety and Health Plan [SSHP], **Attachment 5**) have been developed to meet these objectives.

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3. RESPONSIBILITIES AND LINES OF AUTHORITY

3.1 IDENTIFICATION AND ACCOUNTABILITY OF PERSONNEL RESPONSIBLE FOR SAFETY

All personnel are responsible for continuous adherence to this APP and safety and health procedures during the performance of their work. No person may work in a manner that conflicts with the intent of or the inherent safety and environmental precautions expressed in these procedures. All onsite personnel will be trained in accordance with this document.

3.1.1 Project Manager

Mr. Joseph Von Uderitz, P.G., is the Project Manager (PM). He will be the primary point-of-contact for the project and will communicate directly with Hancock Field as well as the subcontractors. Mr. Von Uderitz is responsible for execution of the Statement of Objectives (SOO), including the safety program. Additionally, Mr. Von Uderitz will:

- Ensure that safety and health measures and the APP have been prepared and properly reviewed prior to the beginning of a new project or program.
- Ensure the implementation of any job- or site-specific safety or health requirements specified by clients.
- Ensure that personnel assigned to field operations have received the required safety and health training, medical examinations, and are fit for duty.
- Periodically monitor field operations to ensure that safety and health requirements are appropriate for the work and are being effectively implemented.

3.1.2 Director of Safety and Health/Corporate Safety and Health Manager

Mr. Peter Garger, Certified Industrial Hygienist (CIH), Certified Safety Professional (CSP), is the Health and Safety Manager. Mr. Garger will:

- Establish and administer a company-wide Safety and Health Program designed to ensure compliance with OSHA regulations, federal and state regulations, client-specific requirements, and safe work practices.
- Review Safety and Health Program progress and periodically report significant problems and accomplishments to management.
- Conduct an annual evaluation of the effectiveness of the Safety and Health Program, submitting any recommended changes to the EA President for review and comment.
- Establish procedures to ensure that periodic safety and health inspections are conducted at EA locations and for company vehicles.

- Assist the PMs, Safety and Health Coordinators, and Business Unit Directors in training, safety promotion, and project audits.

- Review proposed facility, process, and procedure changes, and major equipment requests to determine any safety or health implications.

- Meet with PMs or designate Regional Safety and Health Coordinators to discuss the safety and health requirements of their projects and to develop SSHPs.

- Ensure that procedures are established that provide for the availability of essential medical and first aid personnel and emergency medical equipment.

- Evaluate any reported hazardous conditions and direct the necessary corrective action as appropriate.

- Review and/or investigate work-related injuries and illnesses, ensuring that appropriate corrective action is taken.

- Ensure Safety and Health Coordinators, Profit Center Managers, Business Unit Directors, and other Corporate Managers are kept up-to-date on safety and health issues by implementing training and disseminating information.

3.1.3 Site Safety and Health Officers

Safety requirements will be performed by qualified UXO technicians. When work is being performed, Mr. John Monk will be the UXO Safety Officer (UXOSO). The UXOSO will also serve as the Site Safety and Health Officer (SSHO) and is the Competent Person for safety. The UXOSO reports to the EA Director of Safety and Health. Responsibilities of the UXOSO include:

- Ensure that assigned safety and monitoring equipment (if appropriate) is properly used, calibrated, and maintained.

- Assist supervisors with investigation of accidents and near misses while providing copies to the Regional Safety and Health Coordinators, Health and Safety Manager, and Profit Center Manager.

- Ensure that air sampling or air monitoring is properly conducted for all appropriate field operations.

- Write or review site-specific safety, health, and emergency response plans.

- Investigate and report accidents, injuries, and occupational illnesses as required.

- Investigate employee reports of hazardous conditions, taking actions as appropriate.

- Implement all MEC-related safety procedures and operations onsite.

- Recognize MEC and MEC-related items onsite.
- Update equipment or procedures specific to MEC based upon new information gathered during the site inspection.
- Notify (as required) local public emergency officers (i.e., police and fire departments) of the nature of the team's operations in reference to MEC activities and make emergency telephone numbers specific to MEC activities available to all team members.
- Have the ultimate responsibility to stop any operation that threatens the safety or health of the team or surrounding populace or causes significant adverse impact to the environment.

3.1.4 Radiation Protection Plan Personnel

3.1.4.1 Radiation Safety Officer (Ms. Amy Sponaugle)

Ms. Amy Sponaugle is the qualified person (QP) as a Radiation Safety Officer (RSO). Ms. Sponaugle has been the Corporate RSO since 2003 and has completed the training presented in Section 6. Additionally, The responsibilities of the RSO include following the protocols of EA's Corporate Radiation Protection Plan; ensuring that only authorized EA personnel use regulated radiological materials and x-ray generating equipment; providing dosimetry to authorized users of the regulated radiological materials and x-ray generating equipment and track personnel exposure; ensuring permission from other state or federal agencies[2] is obtained (either through reciprocity agreements, licensing, or registration) to use regulated radiological materials and x-ray generating equipment; and coordinating with the SHM regarding plan implementation and any radiological health and safety issues.

3.1.4.2 Site Radiation Safety Lead (Ms. Caron Mierczak)

Site Radiation Safety Leads (SRSLs) are EA personnel that have met the training requirements and authorization to use specific regulated radioactive materials and x-ray generating equipment onsite without direct supervision by the RSO. The SRSL is the QP responsible for following the protocols of EA's Corporate Radiation Protection Plan, following appropriate regulatory and safety steps; controlling access to the regulated radiological materials and x-ray equipment; ensuring that only authorized EA personnel use regulated radiological materials and x-ray generating equipment onsite; identifying unsafe practices, applying stop-work authority, and obtaining a resolution of the condition with the RSO and SHM. Ms. Mierczak has 7 years of experience operating XRF equipment.

[2] EA is licensed/registered in the State of Maryland and has obtained the license/agreement with the State of New York.

3.1.5 Employees, Team Members, and Onsite Subcontractors

These members of the project team will:

- Follow safety and health rules, regulations, and procedures and use necessary controls and safety devices, including personal protective equipment (PPE).
- Notify the supervisor and the UXOSO of safety or health hazards.
- Report accidents, injuries, occupational illnesses, and near misses to the supervisor and UXOSO.

3.1.6 Senior Unexploded Ordnance Supervisor

The Senior UXO Supervisor (SUXOS) for this project will be Mr. J.D. Marlowe. The SUXOS will also serve as the Site Supervisor and is responsible for all field work site operations and serves as a Competent Person. Responsibilities of the SUXOS include:

- Supervise all field work efforts, including subcontractor efforts.
- Implement all plans.
- Record daily field activities.
- Plan, coordinate, and supervise all MEC operations.
- Correct or stop work if safety and health violations exist.
- Provide daily work briefing during the tailgate meeting.

3.1.7 Munitions Response Services Technical Advisor

The MRS Technical Advisor of MEC Operations, Mr. Rick Hanoski, provides senior technical input on issues related to MRS. The MRS Technical Advisor for MRS Operations also reviews projects for MEC safety concerns.

3.1.8 Lines of Authority

Table D-2 and **Figure D-1** contain the project personnel, their involvement on the project, the organization these individuals represent, and several ways to contact these individuals.

Table D-2: Safety Contact Information

Name	Organization/Role	Telephone	Cell Number	E-mail
--	Ambulance	315-437-0939	--	--
--	Fire	315-455-2511	--	--
--	Security	911	--	--
--	Poison Control Center	1-800-222-1222	--	--
James Bouvier	USACE–Omaha PM	402-995-2730	--	james.bouvier@usace.army.mil
John Kochefko	USACE–Omaha Lead OESS	402-995-2281	402-881-9471	john.a.kochefko@usace.army.mil
Jody Murata	ANG – Environmental Restoration Program Manager	301-836-8120	--	jody.murata@ang.af.mil
Captain Bruce King	Base Environmental Manager	315-233-2692	--	bruce.a.king42.mil@mail.mil
H. Lee Becker	EA Program Manager	410-584-7000	--	hbecker@eaest.com
Joseph Von Uderitz	EA PM	315-565-65	315-382-9534-244-7103	jvonuderitz@eaest.com
Peter Garger	EA Health and Safety Manager	410-584-7000	410-790-6338	pgarger@eaest.com
Amy Sponaugle	EA (RSO)	410-329-5103	443-695-3129	asponagle@eaest.com
Caron Mierczak	EA (SRSL; QP)	410-584-7000	443-414-2066	cmierczak@eaest.com
JD Marlowe	EA Site Supervisor / SUXOS / Competent Person	--	443-752-1775	jmarlowe@eaest.com
John Monk	EA UXOSO / UXOQCS / SSHO / Competent Person	410-584-7000	717-887-5582	jmonk@gmail.com
Richard Hanoski	EA Munitions Response Services Technical Advisor	410-584-7000	443-632-4887	rhanoski@eaest.com

NOTES:
EA = EA Engineering, P.C.
MEC = Munitions and explosives of concern.
OESS = Ordnance and Explosives Safety Specialist.
PM = Project Manager.
SSHO = Site Safety and Health Officer.
SUXOS = Senior Unexploded Ordnance Supervisor.
USACE = United States Army Corps of Engineers.
UXOSO = Unexploded Ordnance Safety Officer.
UXOQCS = Unexploded Ordnance Quality Control Specialist.

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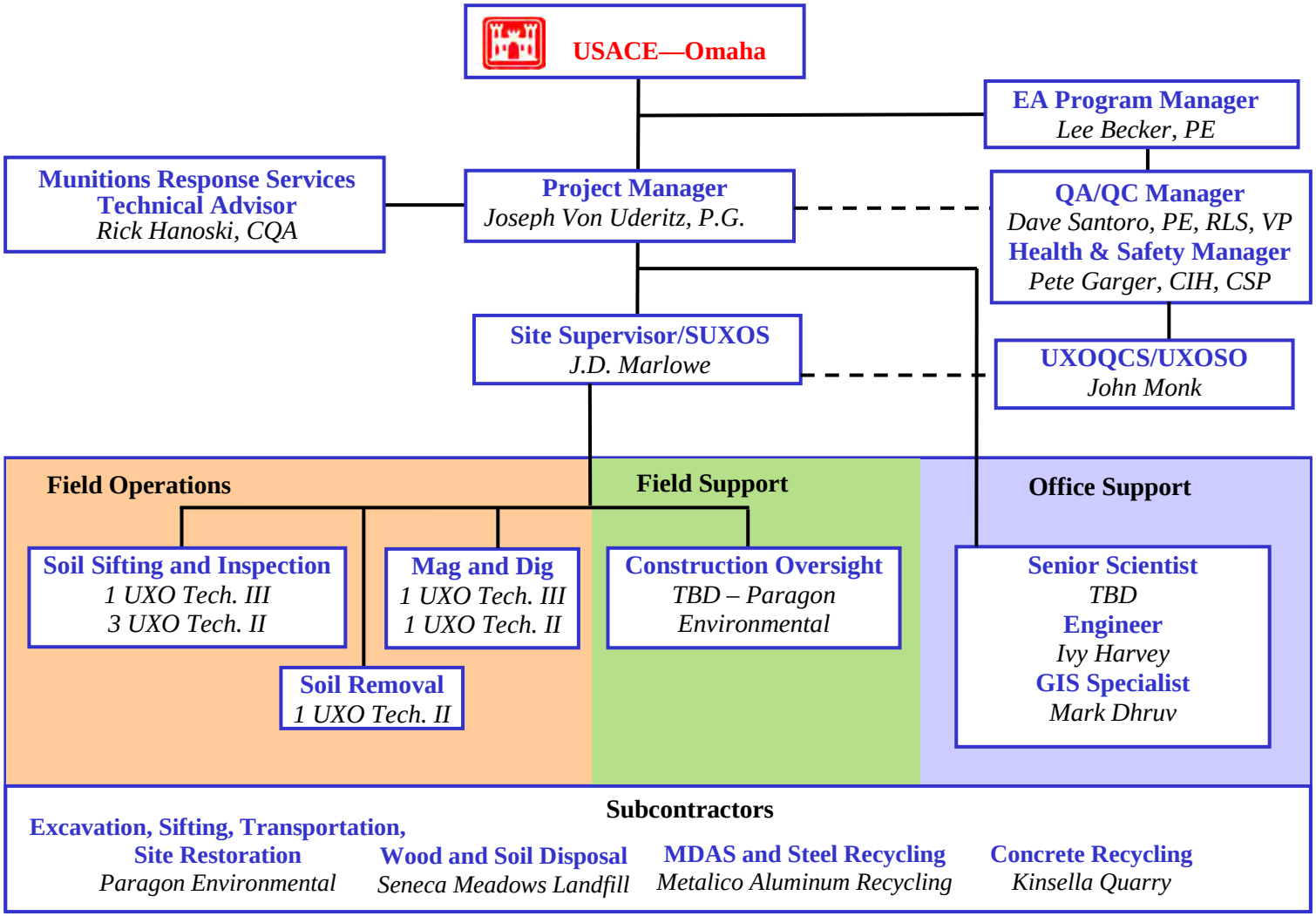
Figure D-1: Lines of Authority for Site Activities



Note: UXO Technicians will be qualified in accordance with DDESB Technical Paper 18, Minimum Qualifications for UXO Technicians and Personnel and OSHA 1910.120 OSHA Hazardous Waste Operations and Hazardous Waste Operations Supervisory Training.

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4. SUBCONTRACTORS AND SUPPLIERS

4.1 IDENTIFICATION OF SUBCONTRACTORS

Subcontractors, other than those comprising the EA team, currently identified to assist in implementation of the project include:

- Paragon Environmental
- Seneca Meadows Landfill
- Metalico Aluminum Recycling
- Kinsella Quarry

4.2 MEASURES OF CONTROLLING AND COORDINATING SUBCONTRACTORS

EA's PM, Mr. Joseph Von Uderitz, P.G., is responsible for overseeing the contract, including overseeing work performed by this identified subcontractor, as well as other subcontractors required during execution of the SOO. Day-to-day management of subcontractors working on the project is performed by the lowest appropriate level of management—whether this is Mr. Von Uderitz as the PM, or the Site Supervisor.

All subcontractors will perform to the USACE-Omaha District and EA standards. Subcontract agreements will contain appropriate "flow-downs" from EA's contract with USACE-Omaha District. Identified subcontractors and other subcontractors will be required to have quality control and safety programs that meet or exceed the requirements of the project. Subcontractors who do not produce quality technical products or do not comply with safety and health, budgetary, or schedule requirements will be required to promptly develop, submit, and adhere to a corrective action plan. EA will monitor and aid the subcontractor in getting back on track but will not jeopardize the project's success with non-performing or adversarial subcontractors. EA has resources to step in to keep the job on track and/or to remove a non-performing subcontractor and will impose liquidated damages on subcontracted elements when it is beneficial.

4.3 SAFETY RESPONSIBILITIES OF SUBCONTRACTORS

Subcontractors providing onsite services will be required to review and abide by this APP and applicable supplemental plans. Subcontractors providing offsite support, such as laboratory services, will abide by their corporate safety program.

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5. TRAINING

Prior to commencement of site activities, the UXOSO will ensure that all EA and subcontractor employees engaged in MRS operations are informed of the nature and degree of exposure to chemical and physical hazards that are likely to result from participation in site operations. EA will accomplish this by ensuring that all personnel entering the site have received the appropriate OSHA and site-specific training, prior to participation in site activities. OSHA-required training will be conducted prior to site mobilization. Site-specific training will be held at the time of site mobilization and will be reinforced during the daily safety briefings, which site workers will be required to attend.

5.1 LIST OF SUBJECTS TO BE DISCUSSED IN THE SAFETY INDOCTRINATIONIS

The UXOSO will conduct necessary on-the-job training for assigned personnel. This training will include onsite-type instruction covering the topics specified for site-specific training, and onsite participation in the following:

- Scope of work
- Details of APP/SSHP
- Employee rights and responsibilities
- Sequence of work events
- Outline of safe use of field equipment
- Vegetation removal
- Identification of safety issues for the site
- Identification of safety staff and lines of authority
- Safe work practices
- Use, care, and limitations of required PPE
- Proper lifting techniques
- Fall protection
- Recognition of potential MEC and hazards
- Known contaminants
- Site communication
- Chemical, physical, and biological hazards that may be encountered
- Measures and procedures for controlling site hazards
- Handling, transportation, and storage of hazardous materials
- Radiological safety
- Emergency response and contingency plan
- Emergency procedures for cleanup of chemical spills
- Evacuation routes
- Rules and regulations for vehicle use
- Hazard Communication per 29 CFR 1910.1200
- Emergency notifications
- Directions to the hospital.

5.2 LIST OF MANDATORY TRAINING AND CERTIFICATION APPLICABLE TO THIS PROJECT

- 40-hour Hazardous Waste Operations Emergency Response training in accordance with 29 CFR 1910.120 (e)
- 8-hour annual refresher training in accordance with 29 CFR 1910.120 (e)
- 3 days of field experience under the direct supervision of a trained experienced supervisor in accordance with 29 CFR 1910.120 (e) (completed after the initial 40-hour training course)
- First aid/cardiopulmonary resuscitation (CPR) (minimum of two personnel onsite)
- 8-hour Supervisory Personnel Training (all supervisors and UXOSO) in accordance with 29 CFR 1910.120 (e)
- Physicals with medical clearance in accordance with 29 CFR 1910.120 (f)
- 30-hour OSHA training in Construction Safety and Health: 29 CFS 1926 (UXOSO).

All current certifications and training tables for EA personnel will be maintained by EA at the corporate office for the duration of the project. Individuals without proper training records will not be permitted to work onsite.

5.2.1 Munitions and Explosives of Concern Training

All UXO personnel will be qualified for their role in accordance with Department of Defense Explosives Safety Board (DDESB) Technical Paper-18 (DDESB 2016) for their respective positions.

Site-specific MEC awareness training will be given by the SUXOS or the UXOSO to inform the UXO team members and/or the field project team of the site-specific hazards and hazardous activities. Daily safety briefings will be provided by the UXOSO prior to site entry each day before work begins.

Specific MEC-related site safety training will be provided to other contractor personnel working on this site. No workers will be permitted to work on any project site until they have received this training.

5.2.2 Radiological Safety Training

No onsite radiological hazards are present except for the use of the XRF. Only personnel trained to use the XRF can operate the device and all uses must comply with the license agreement (e.g., no “point-and-shoot” usage). The RSO will have 24-hour RSO training initially and annual 8-Hour RSO refreshers. The SRSL will have an initial Radiation Safety Training for X-Ray-Tube-

Based Instruments and annual refresher training as well as initial training on use of the Niton XRF (or the specific unit used onsite based on manufacturer recommendations.

5.2.3 Hazard Communication

All EA employees and subcontractors who will be performing work involving the handling of hazardous materials will receive Hazard Communication training. It is important that employees not only have access to the technical information regarding the chemical hazards in their workplace, but they must understand what it says. Training, information, and education are intended to give employees the skills they need to do their jobs in a way that protects their safety, health, and welfare. At a minimum, training material will include information (if relevant) regarding:

- OSHA Hazard Communication requirements
- Any operations in the work area where hazardous chemicals are present
- Location and availability of the written Hazard Communication Program, including the lists of hazardous chemicals and each safety data sheet (SDS)
- Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area
- Physical and health hazards of the chemicals in the work area
- Protection measures such as work practices, emergency procedures, and PPE
- Details of EA's Hazard Communication Program, including an explanation of the labeling system and each SDS, and how employees can obtain and use the appropriate hazard information.

Training sessions will be conducted, and documentation and training materials will be sent to the Health and Safety Manager. Training records will also be maintained by the Regional Safety and Health Coordinators (office locations) and by the SUXOS (field operations). Other persons may conduct the training as specified by the Health and Safety Manager.

5.3 REQUIREMENTS FOR EMERGENCY RESPONSE PLANNING

Prior to commencement of the project field activities, EA site personnel will review and discuss the posted emergency telephone numbers, location of spill kit materials as applicable, directions to the nearest hospital, location of all site fire extinguishers, and proper use of fire extinguishers; identify the location of first aid kits and blood borne pathogens kits; identify the persons certified in first aid and CPR; and review the emergency procedures.

5.4 SAFETY MEETINGS AND TRAINING

5.4.1 Requirements for Supervisory and Employee Safety Meetings

The SUXOS and UXO Technician III (team leader) will conduct a general tailgate safety meeting at the beginning of each workday and fill out the Daily Safety Meeting Form (**Attachment 3**). Corporate Safety Management will review the Safety and Health Program and other issues as required.

5.4.2 Daily Tailgate Safety Meetings

Tailgate safety briefings consist of providing short training sessions in various subjects that give the site worker knowledge and confidence in performing duties in a potentially hazardous environment. These briefings will be used as an opportunity to address site-specific safety issues, to remind workers of specific procedures, and to address new hazards and controls. The tailgate safety briefing will be given prior to commencing work each day and will include such items as:

- Expected weather conditions
- Changes to existing procedures or tasks
- Safety and health considerations for the day's/week's activities
- General site hazards
- Environmental conditions encountered
- New operations or activities
- Ingress and egress to the work site
- Exclusion and Support zones
- Biological hazards onsite
- MEC/UXO hazards and precautions
- Blow-in-place procedures and precautions
- Consolidated event procedures and precautions
- PPE required at each site
- Emergency evacuation procedures
- Emergency notification and response procedures
- AHA for site operations
- Extreme temperature precautions
- Buddy system procedures
- A review of any safety violations from the previous day
- Any other significant events involving safety.

Additional briefings will be provided as needed concerning the use of safety equipment, emergency medical procedures, emergency assistance notification procedures, accident prevention, work plan, and site orientation to ensure that accomplishment of the project can be carried out in a safe and effective manner. All site workers are required to attend the tailgate safety briefing daily or get an individual daily safety briefing by the SUXOS or UXOSO (if doing intrusive work) prior to commencing work.

Attendance records and meeting notes will be maintained with the project files.

5.4.3 Daily Debriefing

At the conclusion of each workday, a debriefing for all employees will be held, if appropriate, and the day's work will be discussed to determine if changes are warranted before commencing activities the following day.

5.4.4 Site-Specific Training and Pre-Entry Briefing

All EA employees and visitors at the site who may be exposed to safety or health hazards will receive site-specific training before they are permitted to engage in site operations. Personnel will not be permitted to participate in or supervise site activities until they have been trained to the level required by their specific job function and responsibility. Signatures of those attending and the type of briefing will be entered in the APP acknowledgement form (front page of this APP) or a briefing form before site access will be granted. Two versions of this training will be used:

- The site worker version will contain full information onsite hazards, hazard controls, and emergency procedures.
- An abbreviated version will be used for visitors who will be onsite for short times and who will not do hands-on work (observers) and are under safety escort at all times.

5.4.5 Site Worker's Basic Safety Briefing

The UXOSO and SUXOS will conduct a site worker's basic safety briefing at the beginning of the project or whenever new employees arrive at the project site once the job has commenced. The following is a general list of what will be discussed:

- The provisions of this APP
- Names and titles of key personnel responsible for site safety and health
- Components of the Site Safety and Health Program
- General site safety
- Hazards and symptoms of contaminant exposure (chemical) as applicable
- Routes of exposure from onsite contaminants (as applicable)
- Physical hazards (fall protection, noise, heat stress, cold stress)
- Biological hazards
- Location and availability of written hazard communication program

- Site and activity PPE (including purpose, donning, doffing, and proper use)
- Work practices by which employees can minimize risks for hazards
- Safe use of engineering controls and equipment use
- Site control measures
- Types of MEC suspected onsite
- MEC hazards and precautions
- Reporting requirements for MEC, spills, and emergencies
- Personnel decontamination procedures (as applicable)
- Contingency plans (communications, phone numbers, emergency exits, assembly points, etc.)
- Worker right-to-know/hazard communication
- Emergency equipment locations and use (fire extinguishers, spill kits, first aid kits, etc.)
- Equipment safety.

Attendance records and meeting notes will be maintained with the project files.

5.4.6 Visitors

All visitors or non-essential personnel to the site will be escorted and must receive, at a minimum, a briefing of onsite conditions, hazards, and emergency response procedures. The SUXOS will generally be the one providing the visitor briefing. All visitors or non-essential personnel to the Exclusion Zone (also referred to as the quantity distance [QD] arc) will be escorted at all times. Before visitors or non-essential personnel enter the Exclusion Zone, all MEC operations will cease, and will resume again after the visitor has left the Exclusion Zone. All visitors or non-essential personnel will sign the Visitor's Log prior to entering the site.

5.5 TRAINING DOCUMENTATION

Certificates of completion of offsite training courses and daily safety briefing logs will be maintained onsite for the duration of the project. Individuals without proper documentation of required training will not be permitted to enter the MRS Exclusion Zone.

6. SAFETY AND HEALTH INSPECTIONS

The purpose of systematically conducting safety and health inspections is to:

- Identify potentially hazardous conditions
- Provide management with a summary of these conditions
- Aid management in the establishment of abatement priorities based on potential risk.

The UXOSO will conduct an initial site inspection and daily inspections. Deficiencies will be recorded along with corrective measures taken. The Safety Inspection Field Forms (**Attachment 3**) will be used to record, track, and provide follow-up to ensure that safety deficiencies are corrected after they have been identified. The safety inspection checklist will be maintained in the project file. Deficiencies will be identified, posted, and dated when the deficiencies are rectified.

Inspections associated with the use of the XRF will include daily use of the XRF following manufacturer recommendations only by qualified users. If the XRF does not pass inspections, then the device will be demarcated "Out of Service" and sent for repair or replacement.

As part of a safety and health program, unscheduled, periodic monitoring of project sites is conducted by the Regional Safety and Health Coordinator. Although the MRSs included in this SOO are not specifically identified for a site audit, the inspections are random and may be performed at these sites. Findings will be immediately reported to the SUXOS, UXOSO, Unexploded Ordnance Quality Control Specialist (UXOQCS), and PM for correction, if necessary.

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7. SAFETY AND HEALTH EXPECTATIONS, INCENTIVE PROGRAMS, AND COMPLIANCE

All personnel are responsible for using safe work practices; for following all directives, policies, and procedures; and for assisting in maintaining a healthful and safe work environment. EA recognizes that open, two-way communication between management and all team members on safety and health issues is essential to an injury-free, productive workplace.

To facilitate a continuous flow of safety and health information between all team members, the following will be accomplished:

- Training all new team members during the site-specific training on the site safety and health policies and procedures; this will include this APP and attached SSHP (**Attachment 5**)
- Training all new team members on the hazards associated with the job site
- Conducting a daily tailgate safety meeting for all team members
- Conducting quarterly refresher training
- Posting and, if applicable, distributing safety information
- Encouraging open communications.

EA's Corporate Safety Program is designed to provide the safety training and tools required to ensure that EA is providing the safest work environment for its employees, other project personnel, and the general population in areas adjacent to our project sites.

The EA Health and Safety Manager has reviewed the scope of the project and, based on this review, has developed this APP designed to protect safety and health during the project. As part of the job requirements, employees are required to:

- Read and follow the APP
- Attend safety and health courses and seminars to make them more informed and aware of potential hazards that exist at the site.

7.1 EA SAFETY INCENTIVE PROGRAM

EA builds an information database for each project it undertakes, which includes the rate/occurrence of accidents and injuries. Safety data, including injury and accident occurrence, are noted and incentives are provided as rewards for superior employee performance for compliance with the project APP, SSHP, and Corporate safety and health policies.

7.2 SAFETY PROGRAM NON-COMPLIANCE POLICIES AND PROCEDURES

EA management takes employee non-compliance with safety requirements seriously. Personnel not following procedures are warned and counseled in the proper safety procedures and, if the problem persists, are again counseled with notations made in their permanent records. Continued non-compliance will lead to termination. On EA job sites, visitors are briefed about site safety requirements and are provided with the appropriate level of PPE. If visitors refuse to follow these procedures, they will not be allowed onsite.

7.3 EA'S WRITTEN PROCEDURES FOR HOLDING MANAGERS AND SUPERVISORS ACCOUNTABLE FOR SAFETY

EA's commitment to safety and health is documented and requirements are addressed from the time an offer of employment is made to a job applicant. Managers and supervisors are made responsible for enforcing safety and health as part of their job descriptions. They are ultimately responsible for protecting the health and welfare of the employees as well as minimizing the potential liability associated with on-the-job or work-related accidents.

8. ACCIDENT REPORTING

An internal accident investigation will be conducted for the following:

- Job-related injuries and illnesses
- Accidents involving vehicles and/or vessels, whether or not they result in damage to property or personnel
- Accidents in which there may have been no injury or property damage, but which have a high probability of recurring with at least a moderate risk to personnel or property ("Near Miss").

For the above type of incidents, the EA Accident/Loss Report (**Attachment 3**) will be completed by the UXOSO as soon as possible and no later than 24 hours after the accident has occurred and will be immediately submitted internally to the Director of Human Resources. The Project Manager and Corporate Safety and Health Manager will also be notified. No supervisor will decline to accept a report of injury from a subordinate. The UXOSO will coordinate preparation of the respective forms to ensure accuracy and consistency. All accidents/incidents must be investigated by the UXOSO or corporate assigned individual. The purpose of the investigation is to determine the causal factors that lead to the accident/incident and to establish corrective actions to prevent a recurrence.

In the event of an accident that results in a lost workday, medical treatment, $5,000 or more in property damage, or an OSHA recordable incident, the Project Manager, the Corporate Safety and Health Manager, and USACE will be notified immediately and an ENG Form 3394 will be completed and submitted within 48 hours.

OSHA recordable injuries and/or illnesses will be entered on the OSHA Form 300 by the UXOSO. This form, included in **Attachment 1**, will be maintained onsite for the duration of the project then returned to the corporate office for inclusion in reports and required filing.

Accidents that result in a fatality, the hospitalization of one or more employees, the loss of an eye, or an amputation, will be reported immediately to the Project Manager, the Corporate Safety and Health Manager, and USACE. Accidents that result in a fatality will be reported within 8 hours to the Department of Labor. Hospitalization of one or more employees, the loss of an eye, or an amputation will be reported within 24 hours to the Department of Labor. Each company or subcontractor is responsible for reporting accidents involving their employees to the Department of Labor, as appropriate.

8.1 EXPOSURE DATA

All work-related incidents occurring to EA employees will be reported for statistical purposes. All recordable incidents count against EA's recordable incident experience whenever they occur, either to an employee or a subcontractor working under the direct supervision of EA's SUXOS. Personnel man-hours will be defined as hours worked by all persons assigned to the project,

including subcontractor employees under direct supervision of EA's SUXOS. These man-hours will be annotated on the Site Supervisor's Daily Report form located in Appendix G of the Work Plan and transmitted to the Project Manager. The EA SUXOS will document and review, with the Health and Safety Manager, the potential exposure data versus the man-hours worked per day to evaluate the association to site accidents or injury. The most current OSHA 300 Form will be posted onsite and is presented in **Attachment 1**. A monthly man-hour and incident report will be provided by the Health and Safety Manager to the USACE-Omaha District, for all onsite work hours for EA and its subcontractors during the course of this project.

8.2 ACCIDENT INVESTIGATION PROCEDURES

A systematic approach to accident investigation, identification of causal factors, and implementation of corrective actions is essential to an effective safety and health program and management system.

Accident investigation procedures include the following:

- Identify, without placing blame, the basic causal factors that contribute directly or indirectly to accidents.
- Suggest corrective action alternatives for a given accident.
- Identify deficiencies in the APP or the SSHP.
- Provide information needed to identify trends and problem areas.
- Satisfy Workers' Compensation and OSHA requirements for recordkeeping and reporting.

8.3 ACCIDENT REPORTING PROCEDURES

Employees will immediately report accidents to their supervisor or, if on the project site, to the SUXOS and UXOSO.

The SUXOS and UXOSO will:

- Render assistance and attempt to limit further injury and damage.
- Arrange for appropriate medical treatment.
- Report the accident to his or her supervisor.
- Establish a sequence of events leading to the accident.

- Observe the accident scene and all involved property. Sketches or photographs will be used, if necessary, to clearly present the sequence of events and possible contributing factors.

- Complete an accident/loss report as soon as possible, no later than 24 hours after the accident occurs.

- Forward the report through his or her supervisor to the Regional Safety and Health Coordinator, then to the Health and Safety Manager.

- Analyze the collected information and develop a corrective action/plan to eliminate future accidents, if possible.

If chemical warfare materiel or MEC that could contain chemical warfare material are encountered during site operations, work will cease, and workers will evacuate to an upwind location. The site will be secured by the UXOSO, and the EA PM and the onsite USACE Ordnance and Explosives Safety Specialist (OESS) will be notified. The USACE OESS will subsequently notify the USACE-Omaha District and Hancock Field security.

The Regional Safety and Health Coordinator and/or Health and Safety Manager will:

- Review the reports for accuracy and thoroughness.

- If necessary, return the report to the Supervisor for further investigation or corrective action.

- After appropriate review and comment, forward Accident Investigation Reports to Program Management.

- Follow up to see that corrective action has been implemented.

- Prepare an annual summary of accidents to be distributed project-wide; the purpose of this summary is to identify accident trends and evaluate the effectiveness of the APP.

- Maintain the Company OSHA 300 Log.

Notification and reporting will be in accordance with Accident Report 385-40, Accident Reporting and Records, and USACE Supplement 1 to Accident Report 385-40 or appropriate government reporting form.

The SUXOS and UXOSO are responsible for accident reporting, including the following:

- If chemical warfare materiel is encountered during site activities, work will cease, workers will evacuate upwind, the site will be secured, and the proper authorities will be notified. Chemical event reporting will begin based on the time of release confirmation and must not wait until location and isolation of the leaking munitions is accomplished.

- On Hancock Field, the military police will be notified, and the Base Environmental Manager will be contacted. The Base Environmental Manager will notify the USACE-Omaha District Project Manager and the Hancock Field Environmental Restoration Manager.

9. MEDICAL SUPPORT

A minimum of two onsite personnel will be trained in administering first aid and CPR. Furthermore, those personnel with first aid and CPR training will be introduced during a pre-entry briefing held prior to initiating site work.

Basic supplies for administering first aid will be maintained onsite during activities. These supplies shall include:

- First aid kits that conform to American Red Cross standards and the requirements of 29 CFR 1910.151, and consist of a weatherproof container with individually sealed packages for each type of item
- Eye wash solution
- Potable water
- Antibiotic ointment.

Furthermore, written directions, approximate driving time, and a map to, as well as contact phone numbers for the nearest medical facility will be maintained onsite (see **Attachment 4**). This information will be presented in the SSHP and daily safety briefing.

9.1 ROUTE TO HOSPITAL AND OCCUPATIONAL CLINIC AND EMERGENCY TELEPHONE NUMBERS

Maps showing the route from the project site to St. Joseph's Hospital and St. Joseph's Physicians along with emergency telephone numbers are presented in **Attachment 4**.

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10. PERSONAL PROTECTIVE EQUIPMENT

While the elimination of potential on-the-job hazards through engineering controls must be the goal of any safety and health program, it is neither practical nor feasible to do so in all operations. PPE must, therefore, sometimes be worn to prevent injury and illness of personnel from chemical, physical, and biological hazards. If the equipment is to be effective, i.e., protect the individual from harm, it must be properly selected, fitted, used, and maintained.

Workplace hazard assessments are to be conducted to determine whether the use of head, eye, face, hand, foot, or respiratory protection is required. Hazard assessments are to be conducted by the Regional Safety and Health Coordinators or designated UXOSO with support from the local managers and supervisors. It is anticipated that site personnel will be in Level D.

10.1 SELECTION

If PPE is needed, the selection of the appropriate PPE will be performed by the UXOSO, with the advice of the Regional Safety and Health Coordinator. Equipment selected must meet the requirements of 29 CFR 1910, Subpart I. Selection will be based on an evaluation of the:

- Performance characteristics of the PPE relative to the requirements and limitations of the site
- Task-specific condition and duration
- Hazards and potential hazards identified at the site.

Selection of the appropriate protective ensemble will conform to the levels of protection as described in the National Institute for Occupational Safety and Health (NIOSH)/OSHA/United States Coast Guard/United States Environmental Protection Agency (USEPA) *Occupational Safety and Health Guidance Manual Hazardous Waste Site Activities*, October 1985, NIOSH Publication 85-115. However, the ensemble must be tailored to the specific work conditions in order to provide the appropriate level of protection. Required PPE is site-specific and will be included in the SSHP.

The type of equipment and level of protection must be reevaluated periodically by the SSHO, in light of any new information about the site. The PPE will be upgraded or downgraded accordingly.

10.2 USE

PPE must be used properly, or it will not provide the protection for which it was intended. Use limitations include:

- ***Material*** — PPE material must be selected based upon expected site contaminants. Infiltration/degradation rates of PPE material vary depending upon type and duration of chemical exposure.

- ***Size*** — PPE must be sized appropriately for the personnel wearing the PPE. Tight PPE will experience faster permeation and degradation rates. Loose PPE may present trip or snag hazards.

- ***Work Duration*** — May affect material permeability or air supply (for jobs requiring supplied air).

- ***Facial Hair*** — Will not be permitted between the face and the sealing surface of the respirator.

- ***Eyeglasses with Earpiece Bars*** – Must not be worn with full-face piece respirators. A spectacle kit must be installed in the face piece of workers requiring glasses.

10.2.1 Training and Proper Fitting

PPE users will be properly trained in the following:

- OSHA requirements (29 CFR 1910, Subparts I and Z)
- Proper use and maintenance of PPE, including capabilities and limitations
- Nature of the hazards and consequence of not using the PPE
- Human factors influencing PPE performance
- Instruction in inspecting, donning, checking, fitting, and using PPE
- User's responsibility for decontamination, cleaning, maintenance, and repair of PPE
- Emergency procedures in the event of PPE failure
- Requirement for use of the buddy system
- Specific procedures in the SSHP.

Proper fit of PPE is essential if it is to provide adequate protection. If the clothing is too small, it will restrict movement and be subject to tearing. If it is too large, the excess fabric may become snagged on equipment and site obstructions.

10.2.2 Donning and Doffing Procedures

A donning and doffing procedure should be established and practiced periodically. In general, the donning procedure will include:

- Inspect the PPE
- Adjust specific equipment to fit user, e.g., hard hat
- Step into protective coveralls (if required)
- Put on boots and tape leg to boot top (if required)
- Don respirator and perform positive/negative fit test (if required)
- Put on gloves and tape to sleeve (if required)
- Put on hard hat (if required)
- Raise hood overhead and adjust
- Have assistant check all closures.

Doffing procedures must be established to prevent contaminants from the work area from being transferred to the wearer's body. Direct contact with the outside surfaces of the PPE should be avoided.

10.2.3 Inspection and In-Use Monitoring

Inspection of PPE (if needed) will be performed prior to use. During equipment use, employees must be alert to conditions that may indicate that the effectiveness of the PPE has been diminished, including:

- Degradation of the PPE
- Perception of odors
- Skin irritation
- Unusual residues on PPE
- Discomfort
- Resistance to breathing
- Fatigue due to respirator use
- Interference with vision or communication
- Restriction of movement
- Personal responses such as rapid pulse, nausea, dizziness, headaches, and chest pain
- Heat stress.

10.3 MAINTENANCE AND STORAGE

Since most PPE is disposable, maintenance of PPE is primarily limited to respirators. However, the need for respiratory protection is not anticipated for completion of the SOO. If PPE upgrades to levels requiring respiratory protection become necessary, the SSHP will address requirements for a respiratory protection program.

Non-disposable PPE, including but not limited to hard hats, safety glasses, and safety boots, will be inspected prior to use to ensure the PPE is in working order. Hard hats will be stored away from direct sunlight to reduce photo-degradation of the hard hat material. Glasses will be stored in such a manner as to reduce scratching.

10.4 DECONTAMINATION

Decontamination procedures will be determined based on the identified contaminants; however, no contaminants are anticipated onsite. Wash tubs containing a detergent-water solution, or another appropriate decontaminant solution and soft bristle brush will normally be used to decontaminate reusable personal protective clothing and boots.

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11. PLANS AND PROGRAMS AND GENERAL SAFETY PRECAUTIONS

11.1 LAYOUT PLANS

Layout plans are not required for completion of the SOO.

11.2 EMERGENCY RESPONSE PLAN

Prior to work startup, personnel will be familiar with this Emergency Response Plan. The SUXOS and/or the UXOSO will make this plan available for review and photocopying.

Onsite emergencies will ultimately be handled by onsite emergency support personnel such as the Hancock Field/City of Syracuse fire department, ambulance squad, or Hancock Field police/security, dependent on the nature of the emergency (**Attachment 4**). Initial response and first aid treatment, however, will be available through trained onsite personnel. If exposed, workers will be decontaminated prior to removal to a hospital to avoid refusal of treatment. If a neck or back injury is suspected, the victim should not be moved without medical personnel stabilizing the neck and back in accordance with first aid procedures. Workers trained in first aid and wearing PPE should then move the injured worker to the Contaminant Reduction Zone for decontamination so that it is safe for emergency personnel to administer medical help to the injured worker. As the situation allows, emergency personnel should not be allowed to enter the Exclusion Zone without the proper PPE.

In case of a hazardous materials emergency, the senior onsite supervisor will assume control and direction of the emergency until arrival of the emergency response Incident Commander. The Incident Commander will work with the Manager, Safety and Health, or the UXOSO to identify and evaluate hazards. Emergency responders and communications will be coordinated and controlled through the Incident Commander.

11.2.1 Emergency Recognition

An emergency is defined as a situation that requires calling outside help onto a job site (or potentially onsite, e.g. an active military installation). Field personnel will immediately stop work and report to the SUXOS and UXOSO under the following situations:

- Medical emergency
- Fire emergency
- Discovery of unanticipated hazards (e.g., drums, heavily contaminated materials, etc.)
- Heavy equipment accident
- Overexposure of personnel to onsite contaminants requiring Emergency Medical Services support

- Heat/cold-related injury or heat/cold stress requiring Emergency Medical Services support.

11.2.2 Procedures for Handling Emergency Incidents

In the event of an emergency, the information available at that time will be properly evaluated and the appropriate steps will be taken to implement the Emergency Response Procedures. The SUXOS (or UXOSO if the SUXOS is part of the emergency) will assume command of the situation. He or she will call the appropriate emergency services, evacuate personnel to the pre-designated evacuation location as needed, and take other steps necessary to gain control over the emergency. If a hazardous materials emergency takes place, the SUXOS will assume control of the situation until the emergency response Incident Commander arrives.

Give the following information when reporting an emergency:

- Name and location of person reporting
- Location of accident/incident
- Name and affiliation of injured party
- Description of injuries, fire, spill, or explosion
- Status of medical aid and/or other emergency control efforts
- Details of chemicals involved
- Summary of accident, including suspected cause and time it occurred
- Temporary control measures taken to minimize further risk.

This information is not to be released to parties other than those listed in this section and emergency response team members. Once emergency response agencies have been notified, the PM will be immediately notified.

11.3 HAZARD COMMUNICATION PROGRAM

The purpose of this Hazard Communication Program is to ensure that important information regarding hazardous chemicals used, handled, or stored during the conduct of business is transmitted to employees and other affected persons as appropriate.

It is each individual's "right-to-know" the chemical identities and chemical hazards with which they are working. When employees have information about the chemicals being used, they can take steps to reduce exposures, substitute less hazardous materials, and establish proper work practices. Through these efforts and the implementation of this plan, the prevalence of chemically related occupational illnesses and injuries will be minimized. Access to chemical hazard information as outlined in this program is fundamental to protecting the safety, health, and welfare of our employees and other affected persons.

A hazardous chemical as defined by OSHA means any chemical that is either a physical hazard or health hazard and includes hazardous chemicals generated during work operations (e.g., welding fumes). Chemical hazard information will be made available to employees and other

affected persons, as appropriate, through the implementation of this comprehensive program which includes container labeling and other forms of warning, the collection and compilation of SDSs, and training. A summary of the hazard communication program, as it pertains to this SOO, is presented below.

11.3.1 Chemicals Included in the Hazard Communication Program

The program applies to hazardous chemicals that are known to be present in the workplace and used or stored in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.

It is the responsibility of the Regional Safety and Health Coordinator or SUXOS and/or Safety Manager to ensure that chemical materials meet the provisions of this Hazard Communication Program. If there are any questions regarding the applicability of these program requirements to a particular material or situation, the Health and Safety Manager will be consulted.

11.3.2 Chemicals and Materials Exempt from the Hazard Communication Program

The following materials are exempt from requirements of the program:

- Hazardous waste as defined by the Resource Conservation and Recovery Act when subject to regulations issued by USEPA
- Hazardous substances as defined by CERCLA when subject to regulations issued under CERCLA by USEPA
- Tobacco or tobacco products
- Wood or wood products that will not be processed; wood treated with a hazardous chemical and wood that may be sawed or cut, generating dust, are covered
- Articles that are a manufactured item other than a fluid or particle; that are formed to a specific shape or design during manufacture; that have end use functions dependent in whole or in part upon its shape or design during end use; and that, under normal conditions or use, do not release more than minute or trace amounts of a hazardous chemical and do not pose a physical hazard or health risk to employees
- Any drug when it is in solid, final form for direct administration such as over-the-counter drugs and first aid supplies
- Cosmetics
- Any consumer product or hazardous substance where it can be demonstrated that it is used in the workplace for the purpose intended by the chemical manufacturer or importer of the product, and the use results in a duration and frequency of exposure that is not

greater than the range of exposures that could reasonably be experienced by consumers when used for the purpose intended

- Nuisance particulates where the chemical manufacturer or importer can establish that they do not pose any physical or health hazard
- Ionizing and non-ionizing radiation
- Biological hazards.

11.3.3 Lists of Hazardous Chemicals

OSHA requires that lists of hazardous chemicals known to be present be compiled for the workplace as a whole or for individual work areas. The UXOSO will conduct an inventory as needed but no less than annually in order to develop and maintain an accurate list of all covered hazardous chemicals. As per this requirement, a summary of the hazardous chemicals planned to be present in the work area is provided below.

The hazardous chemicals anticipated to be onsite while conducting the NTCRA at Hancock Field include unleaded gasoline and diesel fuel, which will be used to operate field vehicles, generators, and screening equipment. Unleaded gasoline and diesel fuel will not be stored onsite, but will be present in field vehicles, operating equipment, and field vehicle transfer tanks. The SDSs for unleaded gasoline and diesel fuel are provided in **Attachment 6**. If this changes and additional hazardous chemicals become present onsite, the UXOSO will update the above list in the project files.

11.3.4 Labels and Other Forms of Warning

It is expected that some chemicals (e.g., detergent) will be used during the field investigation. Site personnel will rely upon the original product labels to the extent practical. When labels must be applied to a temporary container, they will be printed in English and contain the following information:

- Identity of the hazardous chemical(s)
- Appropriate hazard warnings, i.e., any words, pictures, symbols, or combination thereof, which provide employees with specific information regarding the physical or health hazard(s) including primary target organ effect(s)
- Name of the chemical manufacturer, importer, or other responsible party, if appropriate.

Labels and other forms of warning will be legible, in English, and prominently displayed on the container, or readily available in the work area throughout each work shift.

If existing labels already contain the required information, new labels are not required.

11.3.5 Alternatives to Labeling, Tagging, or Marking Requirements

Alternatives to the above-referenced labeling, tagging, or marking requirements are described below:

- Signs, placards, process sheets, batch tickets, operating procedures, or other such written materials may be used in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the containers to which it is applicable and conveys the marking information required above. The written materials will be readily accessible to employees in their work area throughout each work shift. If this alternative system is utilized, it will be done only with approval of the Regional Safety and Health Coordinator or the SUXOS and/or UXOSO.

- Portable containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the immediate use of the employee who performs the transfer, are not required to be labeled.

11.3.6 Shipping Hazardous Chemicals

OSHA requires that chemical manufacturers, importers, and distributors ensure that each container of hazardous chemicals leaving their workplace is labeled, tagged, or marked with specific information, including:

- Identity of the hazardous chemical(s) (i.e., chemical name or common name as listed on the SDS)

- Appropriate hazard warnings (i.e., any words, pictures, symbols, or combination thereof that provide employees with specific information regarding the specific physical or health hazard[s], including primary target organ effect[s])

- Name and address of the chemical manufacturer, importer, or other responsible party, if appropriate.

In addition to the above, the Regional Safety and Health Coordinator (fixed locations) or the Site Supervisor (field operations) will ensure that containers of hazardous chemicals being shipped are marked in a manner which does not conflict with the requirements of the United States Department of Transportation (USDOT).

For the shipment of samples, labeling and SDS requirements outlined herein are not required under this Hazard Communication Program. Personnel should follow proper packaging and shipping requirements as established by the USDOT and/or International Air Transport Association/International Civil Aviation Organization.

If the hazardous chemical being shipped is regulated by OSHA in a substance-specific health standard, the Regional Safety and Health Coordinator (office locations) or the SUXOS (field

operations) will ensure that the labels or other forms of warning used are in accordance with the requirements of that standard.

11.3.7 Safety Data Sheets

Chemical manufacturers and importers are required to obtain or develop an SDS for each hazardous chemical they produce or import.

The SUXOS and/or UXOSO will maintain a copy of the SDS for each hazardous chemical brought onsite and will ensure that they are readily accessible during each work shift to employees when they are in their work area(s). SDSs for chemicals expected to be used to complete the project are included in **Attachment 6**.

During the conduct of site-specific field operations, the list of hazardous chemicals and the SDS must be readily available onsite. Their location will be accessible and made known, by the UXOSO, to all affected persons on a per project basis.

11.3.8 Employee Information and Training

Training and education are ongoing essential parts of this Hazard Communication Program. It is important that employees not only have access to the technical information regarding the chemical hazards in their workplace, but they must understand what it says. Training, information, and education are intended to give employees the skills they need to do their jobs in a way that protects their safety, health, and welfare. Training requirements are described in Chapter 5 of this APP.

11.4 RESPIRATORY PROTECTION PLAN

A respiratory protection plan is not required for completion of the SOO. However, if respiratory protection becomes necessary, a respiratory protection program will be presented as part of the SSHP.

11.5 HEALTH HAZARD CONTROL PROGRAM

Health hazards are controlled through limiting exposure (using engineering controls and PPE) and through medical monitoring of personnel possibly contacting hazardous materials. The required medical surveillance is presented in Section 7.1 of the SSHP (**Attachment 5**).

11.6 LEAD-BASED PAINT ABATEMENT PLAN

A lead-based paint abatement plan is not required for completion of the SOO.

11.7 ASBESTOS ABATEMENT PLAN

An asbestos abatement plan is not required for completion of the SOO.

11.8 ABRASIVE BLASTING PLAN

An abrasive blasting plan is not required for completion of the SOO.

11.9 CONFINED SPACE PLAN

A confined space plan is not required for completion of the SOO.

11.10 HAZARDOUS EMERGENCY CONTROL PLAN

Components of a hazardous emergency control program are included in the Emergency Response Plan (Section 11.2).

11.11 CRITICAL LIFT PROCEDURES

Critical lifting is not required for completion of the SOO.

11.12 CONTINGENCY PLAN FOR SEVERE WEATHER

Weather conditions will be taken into consideration during field activities. Heavy rains or snowfall, electrical storms, high winds, and extreme temperatures, for example, may create extremely dangerous situations for employees. Inclement weather may also impair equipment performance. Whenever unfavorable conditions arise, the Site Supervisor and UXOSO will evaluate both the safety hazards and the ability of the employees to effectively perform given tasks under such conditions. Activities will be halted at the discretion of the UXOSO and initiated by the Site Supervisor.

When site activities involve the operation of heavy equipment, site activities will cease when lightning has been observed in an approaching storm. The danger of electrocution exists if a piece of machinery (i.e., earth-moving machinery) is struck by lightning.

Wind direction will be considered when positioning for conducting excavations/intrusive work, and for sifting operations, as applicable. If exposure to contaminated emissions is anticipated, workers will locate upwind. Wind direction often changes abruptly and without warning, so personnel will be prepared to reposition, if necessary.

Adverse Weather

Adverse weather can take many forms, such as flash floods, high winds, hurricanes, severe thunderstorms, tornados, tropical storms, and winter storms (e.g., snow, freezing rain, and sleet). Sudden changes in the weather, extreme weather conditions, and natural disasters can create several hazards. Generally, adverse weather can create hazards due to slips, trips, and falls; generation of airborne debris; electrical shock, etc. Natural disasters can create many secondary hazards such as release of hazardous materials into the environment, structure failure, and fires.

In the event of impending adverse weather, continuous monitoring of weather broadcasts (e.g., radio, internet, television, etc.) will provide current information regarding both the impending adverse weather and current weather conditions. Some of the more prevalent weather condition terminology includes:

Advisory – Highlights special weather conditions that are less serious than a warning. They are for events that may cause significant inconvenience, and if caution is not exercised, it could lead to situations that may threaten life and/or property.

Watch – A watch is used when the risk of a hazardous weather or hydrologic event has increased significantly, but its occurrence, location, and/or timing is still uncertain. It is intended to provide enough lead time so that those who need to set their plans in motion can do so.

Warning – A warning is issued when a hazardous weather or hydrologic event is occurring, is imminent, or has a very high probability of occurring. A warning is used for conditions posing a threat to life or property.

Flash Flood Watch – Issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain or imminent.

Flash Flood Warning – Issued to inform the public, emergency management, and other cooperating agencies that flash flooding is in progress, imminent, or highly likely.

High Winds – Sustained wind speeds of 40 miles per hour (mph) or greater lasting for 1 hour or longer, or winds of 58 mph or greater for any duration.

Lightning – A visible electrical discharge produced by a thunderstorm. The discharge may occur within or between clouds, between the cloud and air, between a cloud and the ground, or between the ground and a cloud.

Severe Thunderstorm Watch – Issued when conditions are favorable for the development of severe thunderstorms in and close to the watch area. A severe thunderstorm is a thunderstorm that produces 3/4-inch (in.) hail or larger in diameter and/or winds equal or exceed 58 mph. The size of the watch can vary depending on the weather situation. Severe Thunderstorm Watches are usually issued for a duration of 4 to 8 hours and are normally issued well in advance of the actual occurrence of severe weather.

Severe Thunderstorm Warning – Issued when either a severe thunderstorm is indicated by radar or a spotter reports a thunderstorm producing hail 3/4 in. or larger in diameter and/or winds equal or exceed 58 mph. Severe thunderstorms can produce tornadoes with little or no warning. Severe Thunderstorm Warnings are usually issued for a duration of 1 hour and can be issued without a Severe Thunderstorm Watch being already in effect.

Tornado Watch – Issued when conditions are favorable for the development of tornadoes in and close to the watch area. Their size can vary depending on the weather situation.

Tornado Watches are usually issued for a duration of 4 to 8 hours, and normally are issued well in advance of the actual occurrence of severe weather.

Tornado Warning – Issued when a tornado is indicated by radar or sighted by spotters. Tornado Warnings can be issued without a Tornado Watch being already in effect and are usually issued for a duration of about 30 minutes.

Information provided by emergency and weather broadcasts will be used to determine what actions need to be taken by project personnel. If an area is experiencing severe weather, the Site Supervisor and/or UXOSO will decide what operations, if any, are safe to perform based on existing and anticipated weather conditions and shall notify personnel when to suspend operations and seek shelter. The best protection against most severe weather episodes and natural disasters is to seek shelter before the storm hits. When notification is given that severe weather is approaching, the site should be secured (if time permits) and personnel should immediately take appropriate action for personal safety.

These precautions should be taken under the following conditions:

- **Flash Flood –** Seek higher ground.

- **High Wind –** Secure materials and equipment and seek shelter.

- **Lightning –** Alert all personnel if lightning appears to be imminent. Activate lightning detector, or use "flash to bang" rule (i.e., lightning to thunder) where a count of 5 seconds equals 1 mile, to determine distance of lightning strikes from site. Suspend outdoor work and seek shelter in substantial buildings, enclosed vehicles, or other predetermined location, when lightning is within 10 miles of the work site. Work will not resume until at least 30 minutes from the last observed lighting (EM 385-1-1).
- **Severe Thunderstorm** – Seek shelter in substantial buildings, enclosed vehicles or other predetermined location. If no shelter is available, seek cover in clumps of bushes or within groups of trees. Avoid metal objects, towers, fences, and creek beds.

- **Tornado –** Vacate trailers/automobiles and seek building/shelter below ground level (e.g., basement, ditch, or culvert).

11.13 ACCESS AND HAUL ROAD PLAN

Before the start of excavation activities, transportation or haul routes will be established in consultation between the PM and SUXOS with Hancock Field personnel. In addition, coordination of field activities and traffic control measures will be confirmed each day at the safety meeting.

Vehicle owners will have and maintain liability insurance and have on their person a current valid state driver's license if they are operating a vehicle. Vehicle and equipment traffic control procedures are required due to the presence of aircraft, concurrent vehicle, equipment, and/or pedestrian traffic. The following traffic control procedures will be implemented:

- Workers will be cautioned to look carefully where they walk to avoid vehicles and moving equipment. Additionally, workers will be reminded to maintain eye contact with equipment operators.

- Traffic signs, barricades, flashers, delineators, traffic cones, caution tape, and/or flagmen (as needed) will be used around work areas with vehicle or equipment traffic.

- Traffic haul routes around the site will be identified prior to implementation. Delivery personnel will not be permitted to exit their vehicles in the active construction area.

- Contractor owned and/or operated vehicles, which of necessity must enter posted limited areas, will be permitted to do so if they are clearly and conspicuously marked with the name of the contractor operating the vehicle.

11.14 DEMOLITION PLAN

The concrete FIB structure will be demolished using an excavator. All demolition work will occur from areas adjacent to the structure and no demolition will occur from inside the FIB. The top and sides of the FIB will be collapsed into the center. Concrete will then be crushed onsite and any reinforcing steel will be removed for recycling. The crushed concrete will be stockpiled and later loaded into trucks for transportation and recycling offsite. The FIB has no utilities located within or along the exterior; however, all utilities in the general area will be marked before the commencement of demolition activities.

1) During demolition activities, the structure will be checked to ensure that no personnel are located within or near the structure. The FIB is located within the Hancock International Airport, which restricts general site access via fencing, locked gates, and security checkpoints.

    - The FIB area will be restricted by physical barriers and warning signs prior to and during demolition activities.

    - All employees engaged in demolition activities shall be instructed in the demolition plan so that they can conduct their work in a safe manner.

    - Any non-essential personnel will be evacuated from the demolition area and only those persons necessary for the operations will be permitted in this area at any other time.

    - Upon initiation of demolition activities, no personnel shall make entrance into the FIB for any reason to eliminate the risk of injury/death from falling and unstable debris.

    - Personnel will not be permitted to work on the top of a wall when weather constitutes a hazard.

2) Demolition of the FIB will be accomplished using an excavator via the bucket, breaker bit, hydraulic shears, or other processor attachment. All concrete will be further crushed onsite to manageable sizes so that the concrete can be loaded in dump trucks and transported offsite for recycling and disposal. Any steel reinforcing materials located within the concrete will be separated using cutting tools including powered saws and gas torches. Before any "hot work" is commenced, the proper "hot work" permits will be obtained from the Syracuse Fire Department located at Hancock International Airport. Any steel removed from the concrete will be disposed of offsite at a recycling facility.

11.15 EMERGENCY RESCUE PLAN

Components of emergency rescue are described in the Emergency Response Plan, Section 12.2 of the SSHP (**Attachment 5**).

11.16 UNDERGROUND CONSTRUCTION

Underground construction is not required for completion of the SOO.

11.17 COMPRESSED AIR PLAN

Compressed air will not be required for completion of the SOO.

11.18 FORM WORK AND SHORING PLANS

Form work or shoring will not be required for completion of the SOO.

11.19 JACKING PLAN

Jacking will not be required for completion of the SOO.

11.20 SAFETY AND HEALTH PLAN

An SSHP has been developed to describe safety and health procedures to be followed when working onsite. The SSHP has been added as an attachment to this APP (**Attachment 5**).

11.21 BLASTING PLAN

A blasting plan for rock excavation is not required for completion of the SOO.

11.22 PLAN FOR PREVENTION OF ALCOHOL AND DRUG ABUSE

A Corporate Program for prevention of alcohol and drug abuse will be provided upon request.

11.23 FALL PROTECTION AND PREVENTION PLAN

The following outlines the requirements to protect and prevent workers from falls during the NTCRA at Hancock Field. The program applies to all elevated work conducted by EA and any

subcontractors. An aerial lift (manlift) will be used during the inspection of the wooden timbers located at MRS SR002.

Duties, Responsibilities, and Description of Task

The competent and qualified persons for fall protection on this project are identified in Section 3.1 of this APP. The Competent Person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions, which are unsanitary, hazardous, or dangerous to employees; and who has authorization to take prompt corrective measures to eliminate them.

The Competent Person will ensure the following:

1) Appropriate fall protection systems (personal fall protection) are used.

2) A fall protection training program is implemented for all fall protection systems.

3) Training documentation is maintained.

4) Fall protection equipment is worn when required by the job activity.

5) Personnel are trained in the proper use, limitations, and maintenance of the required fall protection system.

The Health and Safety Manager has the following responsibilities:

1) Assists the PM and SSHO by identifying job activities, which require a fall protection system.

2) Assists the PM and SSHO by identifying the proper equipment.

3) Provides technical assistance to the PM and SSHO to fully comply with OSHA fall protection requirements.

General Policies

Fall prevention or protection measures will be implemented whenever employees are exposed to falls greater than 6 ft. The Competent Person has been designated to oversee the inspection of all manlifts and fall protection PPE. Additionally, the Competent Person shall be knowledgeable about the manlift system to be used. All manlifts will be used in compliance with OSHA standards, manufacturer's instructions, and requirements in EM 385-1-1. Fall hazards will be assessed on an ongoing basis. Additional fall hazards and/or controls that are identified during field activities will be addressed by completion of the Site-Specific Fall Protection Plan Form (included in **Attachment 3**).

Fall Protection

A moveable work platform, manlift, will be used to facilitate access to the work location and to aid in protecting workers from falling when performing work at high locations. Fall protection will be maintained 100 percent of the time when working at heights exceeding 6 ft. Work platforms will be inspected daily by the designated Competent Person, and the Daily Inspection Forms shall be completed before each use (included in **Attachment 3**). Personal fall protection equipment shall also be inspected by the end user prior to each use to determine that it is in a safe working condition. In addition, the Competent Person (i.e., UXOSO) for fall protection shall inspect the equipment daily and complete the Daily Inspection Form (included in **Attachment 3**). If the fall protection equipment is subjected to a fall or impact, the Competent Person shall inspect the equipment prior to its return to use. Defective or damaged equipment shall be immediately removed from service and replaced. General equipment information, inspection, and storage procedures are identified below.

Personal Fall Protection System (Personal Fall Arrest System) Components

1) The personal fall arrest system (PFAS) will consist of a full-body harness, lanyard with shock absorber or retractable lifeline, and the anchorage point to which the lanyard is secured. The PFAS will limit the maximum arresting force on the body of the wearer to 1,800 pounds (lb). The lanyard, including lanyards with built-in shock absorbers, will be sufficiently short enough to prohibit workers from climbing out of, or being ejected from the platform. Any personal fall protection component involved in a fall will be removed from service and destroyed.

    - The harness will consist of a Class III safety full body harness which meets all requirements as stated in ANSI/ASSE Z359. No other type of harness is approved, including body belts. The fall arrest attachment point on the harness will be integrally attached and located at the wearer's upper back between the shoulder blades.

    - All harness connectors shall be drop-forged, pressed or formed steel, or made of equivalent materials. Additionally, all connectors shall have a corrosion-resistant finish, and all surfaces/edges shall be smooth to prevent damage to interfacing parts.

    - D-rings, carabiners, and snap hooks will have a minimum tensile strength of 5,000 lb and be proof-load tested by the manufacturer to a minimum tensile strength of 3,600 lb without cracking, breaking, or taking permanent deformation.

    - All snap hooks and carabiners shall be self-closing and self-locking, capable of being opened only by at least two consecutive deliberate actions.

    - Lanyards will be made of ropes, straps, or webbing made from synthetic materials. Lanyards will be replaced at the first sign of wear/tear. Self-retracting devices will not be acceptable.

- The lanyard will be secured at all times to the anchorage point located within the manlift equipment which will be certified to sustain a minimum static load of 5,000 lb per user. Workers will be anchored in accordance with manufacturer's specifications.

- Lanyards will not be looped or wrapped around themselves, beams, girders pipes, etc. as the lanyards must be protected from cuts, wear, and abrasions.

Harness and Lanyard Inspection and Storage

1) Harnesses and lanyards/shock absorbing lanyards will be inspected daily and before each use. The daily inspections will be recorded on the Daily Inspection Form (included in **Attachment 3**):

   - Harnesses must be less than 5 years old from the date of manufacture (unless in-service date is documented, in which case equipment must be less than 5 years old from the in-service date). In addition, harnesses must have been certified within the past year.

   - The harness will be meticulously inspected to ensure there are no torn, frayed, broken fibers, burn marks, pulled stitches, or frayed edges anywhere on the harness.

   - The lanyard material will be checked for cuts, burns, abrasions, knots, broken stitches, and excessive wear.

   - D-rings and carabiners will be examined to identify any excessive wear, pits, deterioration, or cracks.

   - All buckles, carabiners, and any other latching features will be verified to be operating correctly and not deformed or cracked. Once locked, all locking/latching features should remain latched closed to prevent any disconnections.

   - All grommets (if present) will be checked to ensure they are secure and not deformed from abuse or a fall. Additionally, the harness will be examined to identify any additional, post-manufacture punch holes which could deteriorate the overall quality of the harness.

   - The tongue/straps will be checked for excessive wear from repeated buckling.

   - The shock absorber and the area where the shock absorber attaches to the lanyard will be thoroughly inspected for defects.

2) Storage of all harnesses and lanyards/shock absorbing lanyards will consist of hanging in an enclosed area to protect from damage.

Snaphooks Inspection and Storage

1) Snaphooks will be inspected daily and before each use. The daily inspections will be recorded on the Daily Inspection Form (included in **Attachment 3**):

   - Snaphooks will be examined for any hook and eye distortions, cracks, and pitted surfaces.
   - The keeper latch will be inspected to ensure it is not bent, distorted, or obstructed.
   - It will be verified that the keeper latch seats into the nose without binding and that the keeper spring securely closes the keeper latch.
   - The locking mechanism will be verified to properly lock the keeper latch.

Rescue Plan

1) In the unlikely event a fall arrest occurs, all employees will be rescued by onsite personnel with the use of ladders or by local emergency services. At all times, a worker using fall protection equipment will have an assigned safety person, who will be within visual/verbal range to initiate a rescue of the fallen worker if required.

   - In the event of a fall, the City of Syracuse Fire Department located at Hancock International Airport will be notified to assist in the rescue.
   - Additionally, the following personnel will be notified in the event of a fall:

     — SSHO/Site Manager
     — Project Manager.

   - Emergency contact information is provided in **Table D-2**. The Project Manager shall immediately coordinate with the Director of Safety and Health and USACE/Hancock Field representatives.

2) At the beginning of any work activity where fall protection is an issue, rescue plans shall be identified by the Competent Person and discussed with all employees in case of a fall. All employees involved in a fall arrest or fall will be sent for a medical evaluation to determine extent of injuries, if any.

Aerial Lift Usage

1) An aerial lift, or manlift, will be used to elevate workers to a height of no more than 15 ft. Any manlift used for this project will designed and constructed per ANSI/SAI A92.2. The Competent Person will inspect the manlift daily prior to use and the inspection will be recorded on the daily inspection form (included in **Attachment 3**). Fall protection will be used at all times while utilizing the manlift.

- The manlift will be operated, inspected, tested, and maintained as specified in the operating manual for that piece of equipment. The operating manual will be readily available in or on the manlift.

- All required safety decals, labels, and signs will be in place and readable.

2) Only personnel trained in the use of the manlift shall be authorized to use the equipment. Training will consist of:

   - Reading and understanding the manufacture's operating manual and any associated rules and instructions (including pre-start inspection of the lift), or training by a Qualified Person on the contents on these documents

   - Reading and understanding all decals, warnings, and instructions on the manlift.

3) The manlift will only be operated based on the manufacture's specifications

   - The manlift will not be moved when the work platform is elevated.

   - Wheel chocks shall be installed if the manlift is to be used on an incline.

   - The lift controls will be tested daily prior to use to ensure safe working conditions.

   - The users of the manlift will never override hydraulic, mechanical, or electrical safety devices.

   - The overall lift capacity as stated by the manufacturer will not be exceeded. The total capacity includes the combined weight of the worker, tools, and any materials.

   - Occupants of the manlift will always stand firmly on the floor of the manlift and will not sit or climb on the edge or use planks, ladders, and other devices for a work position.

   - No powerlines or other overhead utilities are present within the work area; however, if the situation changes, a minimum clearance of at least 10 ft will be maintained from the nearest overhead line. All power lines, wires, and other conductors will be treated as energized, even if they are down or appear to be insulated.

   - The user of the manlift will not position themselves between any overhead hazards such as concrete or wooden timbers and the rails of the basket. Movement of the lift could crush the worker.

11.24 STEEL ERECTION PLAN

Steel superstructures will not be required for completion of the SOO.

11.25 NIGHT OPERATIONS LIGHTING PLAN

Work is not expected to be completed at night. Therefore, a lighting plan is not required for completion of the SOO.

11.26 SITE SANITATION PLAN

Onsite work is expected to be completed within a short time interval, and personnel will utilize existing or nearby sanitation services, or a portable bathroom will be mobilized to the site. Restrooms are within 10 minutes of all site workers at all times.

11.27 FIRE PREVENTION PLAN

These procedures establish the basic requirements for fire prevention and protection equipment and provide for the development of an emergency action plan.

11.27.1Fire Prevention

The following guidelines should be practiced to prevent fires:

- Practice good housekeeping, including minimization of combustible materials.
- Smoking will only be allowed in designated areas.
- Flammable liquids, including gasoline and diesel fuel, will not be stored onsite.
- Site equipment will be refueled via field vehicle transfer tanks.
- Wheeled/tracked field equipment will be serviced/fueled outside of the MRS Exclusion Zone.
- No operations will be performed in an MRS Exclusion Zone during service/refueling of static equipment (sifters).
- Minimize the volume of flammables on hand and store them properly.
- Inspect heat-producing equipment frequently.
- Report potential fire hazards.

11.27.2Fire Protection Equipment

Portable fire extinguishers will be provided for employee use, where needed. They will be selected and distributed based on the classes of anticipated workplace fires and on the size and degree of hazard that would require their use.

Two portable 10-lb B:C-rated fire extinguishers will be in vehicles transporting flammable materials. This equipment will not be removed except for inspection and/or use in an emergency.

Where fire extinguishers are provided for use by employees, the employee will be trained in the general principles of fire extinguisher use and the hazards involved with incipient-stage firefighting. This training will be repeated annually. Every fire extinguisher will be visually inspected monthly. In addition, extinguishers will undergo an annual maintenance check. These inspections and maintenance checks will be recorded on tags affixed to the extinguishers.

11.28 RADIATION SAFETY PLAN/RADIATION PROTECTION PLAN

EA has a corporate Radiation Protection Program to support this site-specific Radiation Protection Plan and will follow SOP 17 located in Appendix F of the Work Plan during use. EA will use an x-ray tube XRF (Niton, Model XL3t, SN 92147) to conduct soils analysis during onsite activities. A copy of the Radiation Machine Facility Registration will be onsite at all times. Prior to use, a draft letter will be submitted to the installation to provide notification for radiation machine usage. A final notification letter will be submitted to the installation prior to site mobilization once usage dates are finalized.

Roles and responsibilities under this Radiation Protection Plan are presented under Chapter 3, Training Requirements and required licenses and certifications are presented under Chapter 5, Inspection Requirements are presented in Chapter 6. The RSO has assigned dosimetry (badge and ring) to the SRSL to measure the potential radiation dose during XRF-use activities. EA uses dosimetry provided by Landauer, Inc. (NVLAP Lab Code 100518-0) which is exchanged every 3 months, cannot be shared, and provides records to the RSO, who maintains the records indefinitely. As Low as Reasonably Achievable limits are set below annual occupational doses and are defined for the whole body (0.1 rem), individual organs (0.5 rem), lens of the eye (0.15 rem), and the skin/extremity (0.5 rem). Any exposure greater than those listed above will require investigation by the RSO.

The XRF shall be operated in an enclosed room inside the onsite trailer with appropriate signage to ensure that only certified personnel may enter the room while the XRF is in use. The SRSL will wear appropriate dosimetry and PPE while operating the XRF. The XRF is equipped with a test stand that incorporates x-ray shielding and protects the operator from exposure. The instrument has a red light near the shutter that will flash when the instrument is emitting x-rays. Once the test stand shield is opened, a dead man's switch is triggered which will stop the emission of x-rays immediately. The SRSL will maintain control of the equipment onsite at all times. When not in use, the XRF will be stored in a locked Pelican case, inside the locked office and the SRSL must notify the RSO and SHM immediate if the device is stolen. In the event of accidental damage to the instrument or a potential exposure the SRSL will notify the SSHO, the SSHO will notify the Site Superintendent and the RSO, the RSO will notify the New York Bureau of Environmental Radiation Protection. The SRSL will not leave the site unless external medical treatment is required. The AHAs are presented in **Attachment 2** and both the corporate Radiation Protection Plan and SOP 56 are presented in **Attachment 7**.

12. CONTRACTOR INFORMATION

EA is the prime contractor on this project. This APP and attached SSHP are based on EA procedures. Subcontractors will be required to comply with site requirements and will attend the initial mobilization training, which will describe the work to be performed and the safety and health requirements regarding that work. They will also be required to attend the daily tailgate safety briefings, which will go over the operations expected to take place that day. Subcontractors will also attend any special safety meetings that are taking place for the duration of their operations on the site. They will abide by the safety and health requirements of this APP/SSHP during work on these project sites.

This chapter presents the general safety rules that apply to all operations performed by EA personnel. These requirements are generic in the sense that they apply to all projects. Therefore, there may be portions of this chapter that do not apply to this specific project. The following procedures are mandatory for all EA employees. All site visitors must follow these procedures. Personnel not following procedures will be warned. Refusal to follow these procedures and dismissing the warning will result in being issued a safety or non-compliance violation and being escorted from the site.

12.1 SITE RULES

The following rules apply to all site activities:

- Department of Labor/OSHA poster will be prominently displayed onsite.
- Daily safety briefings will be conducted by the SUXOS and UXOSO (as applicable) to inform personnel of new hazards or procedures.
- The SUXOS (as applicable) and project personnel are responsible for suspending/stopping work and requiring all personnel to evacuate the affected area if any of the following situations occur:
  - Inadequate safety and/or health precautions on the part of any onsite personnel
  - Potential significant environmental impact as a result of planned activities.
- Personnel will perform only those tasks they believe they can do safely and have been trained to do.
- Personnel will notify the SUXOS and UXOSO of any medical conditions that require special consideration.
- Personnel will maintain proper workplace housekeeping to minimize the potential for accidents.
- Contact with potentially contaminated substances will be avoided.

- Spills will be prevented to the greatest extent possible.

- All injuries and accidents requiring first aid will be reported (as appropriate) to the SUXOS and UXOSO.

- All onsite workers will abide by the buddy system; members of a buddy team will maintain verbal and visual contact.

- All personnel entering the site will be thoroughly briefed on the hazards, equipment requirements, safety practices, emergency procedures, and communication methods.

- All persons entering the site will review and sign the APP/SSHP.

- Personnel will be prohibited from being transported by any other means than those prescribed for movement of personnel.

- Any employee not willing to comply with this or any other safety and health procedure will be subject to disciplinary action.

- All onsite personnel must wear safety toe work boots, hard hats (as needed), and safety glasses (as needed); long pants or trousers, and shirts covering the upper body and upper arms, or coveralls can also be worn.

- All static ignition sources will be identified and eliminated by the use of bonding and grounding techniques, as appropriate.

- All personnel will employ hearing protection for noise exceeding 85 dB(A) in accordance with the Hearing Protection Standard Operating Procedure.

- All operators of vehicles used onsite will be familiar with the requirements for inspection and operation of such vehicle. Unfamiliar operations will be discussed with affected employees before beginning work. The SUXOS will be responsible for checking the proficiency of the operator.

SDSs will be obtained for chemical products used onsite. This information will be made readily available to all employees upon request and stored in a central location. All containers of chemical products will be properly labeled to comply with the Federal OSHA Hazard Communication Standard (29 CFR 1910.1200).

All information regarding work to be performed, emergency procedures, and safety and health hazards will be reviewed before the work begins during a Daily Safety Briefing. No work will be performed before this meeting has taken place. At least one copy of this plan will be available at the job work site. Only authorized personnel will be permitted in the work area. All personnel will be knowledgeable of the contents of this APP/SSHP. All visitors will check in with the SUXOS or UXOSO for briefings and escort requirements.

12.2 WORK PERMIT REQUIREMENTS

No work permits are anticipated as part of this project. EA will provide Federal Aviation Administration notification due to the proximity of the site to the Syracuse International Airport. EA will coordinate work activities with personnel from Hancock Field.

12.3 MATERIAL HANDLING

Proper lifting procedures will be implemented for all lifting and carrying of materials and equipment.

12.4 DRUM/CONTAINER HANDLING

Drums and containers will be handled as follows:

- Waste, scrap, debris, and bags will be stored in approved containers and disposed of in an appropriate manner and location.
- Lockable drums or lockable dumpsters/containers will be used during this project for storage of MDAS.
- All drums and containers will contain appropriate labeling/marking indicating their contents be added in accordance with 29 CFR 1926.65(j)(1)(iv).

12.5 CONFINED SPACE ENTRY

No field activities will be conducted requiring confined space entry.

12.6 EARTHMOVING SAFETY

Earth-moving equipment will be required during field activities, and the operating procedures of this equipment will follow this APP and applicable AHAs for the use of the earth-moving equipment. The use of earth-moving equipment is dangerous, and extreme care will be exercised in its use and when working near equipment. Only trained and authorized personnel will operate earth-moving equipment. EA personnel providing construction support will coordinate with the construction contractor and will abide by his/her safety rules for the site in addition to the EA safety requirements.

- Earth-moving equipment will be inspected and documented using the Safety Inspection Form (Provided in **Attachment 3**).
- Operators will be qualified and licensed to operate the equipment. In addition, operators will inspect equipment before it is placed in use to ensure it is in safe operating condition.
- Earth-moving equipment will not be operated at speeds or loads which exceed the manufacturer-stated limits or that are unsafe.

- Operators will maintain three-point contact while mounting or dismounting equipment. Operators will not get off or on any equipment while it is in motion.

- Determinations of road conditions and structures will be made in advance to ensure clearances and load capabilities are safe for passage of equipment.

- Equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being completed.

- Buckets, blades, dump bodies, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. All controls will be in a neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.

- Mechanized equipment will be shut down prior to and during fueling operations. Closed systems, with automatic shut off that prevent spillage if connections are broken, may be used to fuel diesel-powered equipment left running.

- Each piece of heavy equipment and other similar equipment shall be equipped with at least one dry chemical or carbon dioxide fire extinguisher with a minimum rating of 10 lb B:C.

- Backup alarms will be used on equipment. Construction equipment with an obstructed rear view must have an audible alarm that sounds when the equipment is moving in reverse.

- Personnel will not work, pass under, or ride in the buckets or booms of loaders or backhoes in operation.

- Only chains, hoists, straps, and other equipment that safely aids transport of heavy materials will be used. These items shall have a tag indicating the rated capacity for the item.

- Seat belt use is required while operating equipment.

- Personnel near moving equipment will be alerted by the operator prior to the actuation of the equipment. Clothing and other potential snag hazards will be secured as to prevent entanglement. Loose-fitting clothing and loose, long hair will be prohibited around moving machinery.

- Spotters for tight areas, overhead and underground utilities, excavation, etc. will be the only personnel allowed near heavy equipment. These personnel will stay out of the boom radius. Personnel needing to approach heavy equipment while it is in operation will observe the following protocols:

— Never walk directly behind or to the side of heavy equipment without the operator's knowledge.

— Make eye contact with the operator (and spotter) and signal the operator to cease heavy equipment activity.

— Approach the equipment only after the operator has given a signal to do so.

- Falling objects become a potential hazard during activities utilizing earth-moving equipment. Personnel should always be aware of overhead hazards and will be required to wear hard hats during all activities utilizing earth-moving equipment. Hard hats will be required to meet the ANSI 89.1-1996 standard.

12.7 GUARDING OF MACHINERY AND EQUIPMENT

All equipment will be operated with all guards provided by the manufacturer and in compliance with 29 CFR 1910, Subpart O and EM 385-1-1 Section 16B. If any guarding must be removed for servicing, the equipment will be disabled to preclude movement or release of energy.

- The SUXOS will inspect all vehicles and equipment for compliance before they are brought onto the project site.

- Mounting and dismounting vehicles while in motion is prohibited. Vehicles will not be permitted to run unattended.

- Vehicles and equipment will not be operated in a manner that will endanger persons or property, nor will the safe operating speeds or loads be exceeded.

- Machinery will not be operated without proper training.

- All machinery containing liquid systems (e.g., fuel, hydraulic, lubrication) will be inspected daily to ensure that liquid-containing systems (e.g., hoses, tubing, lines) are in good operating condition and that plugs, stoppers, calves, etc., are properly seated.

- Loose or frayed clothing, dangling ties, rings, etc., will not be worn around moving machinery or other mechanical sources of entanglement.

- All hand tools will be kept in good repair and used only for the purpose for which they were designed. The SUXOS will remove from service any tools having defects that will impair their strength or render them unsafe for use.

- Electric power tools to be used will be properly grounded by using three-wire receptacles and extension cords rated for the amperage required. Ground fault circuit interrupters (GFCIs) will be used with temporary systems or another proper grounding system.

- Portable electric tools will not be lifted or lowered via the power cord and electrical cords will be kept coiled when not in use. When electrical equipment is in use, cords will be protected and positioned to avoid being run over by vehicles or equipment.

- Machinery will not be repaired or adjusted while in operation. Only equipment which is designed or fitted with safeguards will be oiled while in operation.

- Any mechanical tool which is not functioning properly will be tagged with "Do Not Use" tags until repaired or otherwise made acceptable. Defective and/or unsafe equipment will be removed to a secure place to prevent inadvertent use until repaired. Repaired items will be re-inspected by the SUXOS prior to being placed back into service.

- Personnel using hand and mechanical tools will position themselves properly and consider the events which would happen if a tool slips or suddenly moves.

12.8 LOCKOUT/TAGOUT

The lockout/tagout procedures presented in this section shall be followed when equipment with hazards associated with moving parts, drive belts, or fans (i.e., sifting equipment) must be serviced or repaired onsite during field activities.

Prior to Lockout

Personnel required to lockout equipment shall be trained in the specific equipment's lockout/tagout procedures and shall be certain as to which switch, valve, or other energy-isolating devices apply to the equipment being locked out.

Lockout Procedures

1. Notify all affected personnel of the lockout.

2. If the equipment is operating, shut it down by the normal stopping procedure.

3. Operate the switch, valve, or other energy isolating devices so that the energy source(s) (electrical, mechanical, hydraulic, etc.) is disconnected or isolated from the equipment.

4. If applicable, verify all lines/hoppers feeding the equipment are closed or emptied.

5. All personnel that will be working directly with the equipment that may potentially be exposed to the hazards of the equipment must place their assigned individual lock on the energy isolating device.

6. Stored energy must be dissipated or restrained by methods such as grounding, repositioning, blocking, and bleeding down.

7. After ensuring that no personnel are exposed and as a check on having disconnected the energy sources, operate the push button or other normal operating controls to verify the equipment will not operate.

8. Return operating controls to neutral position after the test.

9. Proceed with servicing or repairs.

Restoring Equipment to Service

1. Verify that the equipment is clean and clear of all debris and all guards are secured in place.

2. Notify affected personnel that the equipment is operation and that locks will be removed.

3. Remove all locks.

4. Restore energy to equipment.

5. Verify that all personnel are safely positioned prior to starting up equipment.

6. Start equipment to verify it is operating correctly.

7. Normal operations may resume.

12.9 FALL PROTECTION

Safe access and fall protection will be provided in accordance with the requirements of EM 385-1-1, Section 21, as applicable. The site-specific fall protection plan is provided in Section 11.23 of this APP. The walking and working surfaces may become wet and slippery during these tasks. Personnel will be instructed to use extra caution when working on these surfaces. In addition, visible barriers will be erected around any open trenches, pits, or open cliff faces (in accordance with EM 385-1-1, Section 25) to prevent personnel from falling into these areas. Steep slopes may be encountered during field activities. Personnel will be instructed to use extra caution when working in areas with steep slopes. The UXOSO will evaluate these surfaces prior to commencement of field activities. If these areas are determined to be unsafe to work, the UXOSO/UXOQC will deem the area inaccessible, field activities will cease in the inaccessible area, and the SUXOS/Site Supervisor, Project Manager, and OESS will be notified.

12.10 HAZARD COMMUNICATION

All personnel will be informed of any/all chemicals used onsite. All potential chemical exposures are presented on the SDS provided in **Attachment 6**.

12.11 ILLUMINATION

Field work will be conducted during daylight hours and natural illumination will be used. Field work will not be conducted during non-daylight hours.

12.12 SANITATION

EA employees will keep the work and support areas neat and orderly and free of trash and debris. An area will be established where personnel can take breaks. The area will be clearly marked or identified as follows: Crew Break Area.

- If the facility does not have a potable water supply available, then potable water will be carried to the site for equipment and employee cleanup.

- All refuse will be deposited into designated containers while onsite. It is the responsibility of the Site Supervisor to ensure that the area is kept clean.

13. SITE-SPECIFIC HAZARD CONTROLS

A list of tasks to be performed during this project is provided below:

- Mobilization/Demobilization
- Vegetation Clearing
- Detector-Aided Surface Clearance
- Intrusive Investigation of Anomalies
- MPPEH Inspection and Disposition
- Soil Sifting
- Wooden Timber Inspection
- FIB Structure Removal
- Hot Work
- Excavation and Backfill
- Soil Sampling
- X-Ray Fluorescence (XRF)

Each task has been analyzed to assess the potential safety, chemical, physical, biological, and ionizing radiation hazards that may be encountered by site personnel and to prescribe the proper engineering and/or administrative controls and/or PPE. These controls will ensure that the risks to site personnel safety and health are reduced or eliminated while performing the project.

An AHA has been developed for each task associated with this project. The AHAs are provided in **Attachment 2**.

13.1 GENERAL

The primary hazards of concern associated with this project are as follows:

- **Safety Hazards—**Associated with equipment operation, possible falls working on uneven terrain, and activities requiring manual labor.

- **Chemical Hazards**—Are minimal and are basically associated with the fuels and lubricants brought onto the site for use of equipment.

- **Physical Hazards**—Cold stress during the winter and heat stress during summer/fall, tripping or falling on debris or range residue, and noise hazards from tree, brush, and vegetation removal equipment and heavy equipment operations.

- **Biological Hazards—**Include contact with plants, insects, spiders, and other wildlife in the wooded areas and underbrush.

- **Explosive Ordnance and Explosives**—MEC/MPPEH may be encountered. Avoidance procedures and techniques will be employed on tasks not related to excavation, identification, and disposal of MEC encountered. Personnel performing tasks related to

MEC removal and disposal will follow the approved practices and procedures identified in the approved Work Plan.

13.2 SAFETY HAZARDS

The following safety hazards may be encountered during this project:

- Slips, trips, and falls
- Back strain or sprains due to lifting and moving field equipment (personnel will seek assistance when lifting items greater than 50 lb)
- Lacerations and skin punctures
- Physical injury or death resulting from vehicle accidents
- Explosion from presence of MEC/MPPEH.

13.3 CHEMICAL CONTAMINANTS

The primary chemical hazards associated with work at Hancock Field are associated with the fuels and lubricants brought onto the site for use of equipment

13.4 PHYSICAL HAZARDS

The following physical hazards may be encountered during this project:

- Naturally steep slopes
- Vegetation
- Cuts and scrapes from visible or buried debris
- Stress endured from excessive heat or cold
- Noise from MEC blown-in-place.

Physical hazards are addressed in more detail in **Attachment 2**.

13.5 BIOLOGICAL HAZARDS

Biological hazards that may be found onsite include insects, arachnids (i.e., spiders), and plants. Several varieties of snakes and other wildlife are also common hazards in this area. Employee awareness and the safe work practices outlined in the following paragraphs should reduce the risk associated with these hazards to acceptable levels.

13.5.1 Biting and Stinging Insects

Many types of biting and stinging insects such as mosquitoes, bees, wasps, ticks, mites, and spiders may be encountered onsite. The SUXOS will encourage the use of insect repellents, if

deemed necessary. The biting insects of greatest concern are spiders, especially the black widow spider. These spiders are of special concern due to the significant adverse health effects that can be caused by their bite.

13.5.1.1 Mosquitoes

The Centers for Disease Control has noted the increase of West Nile Virus that is transmitted by bites from an infected mosquito (**Figure D-2**). Mosquitoes live in nearly all environments, including urban, wooded, grassy, brushy, arid, or other areas that contain standing pools of water (seeps, drainage, watering holes, etc.).

West Nile Virus has been documented in at least 46 states. West Nile Virus was first detected in the western hemisphere in 1999. The virus is transmitted by certain types of mosquitoes to birds and some mammals, including humans. West Nile Virus is not spread from person to person. In areas where the virus exists, usually less than 1 percent of the mosquito population is likely to be infected with the virus.

Most people who become infected with the West Nile Virus do not show symptoms or may show only mild ones. The symptoms of West Nile Virus include: fever, headache, body aches, occasional skin rash, and swollen lymph nodes. At its most serious, it can cause encephalitis or meningitis. Less than 1 percent of people who are bitten by an infected mosquito will develop severe illness. These symptoms include a rapid onset of severe headache, high fever, stiff neck, confusion, loss of consciousness (coma), or muscle weakness, and may be fatal.

Figure D-2: Mosquito

Treatment for West Nile Virus includes supportive measures such as rest, observation, intravenous fluids, and respiratory support as needed.

If you believe you are showing any of the symptoms noted above, contact the SUXOS, who will authorize you to visit a physician for an examination and possible treatment.

Protective Measures—Standard field gear (work boots, hats, socks, trousers, and work shirts) provide good protection against mosquito bites; exposed skin is particularly susceptible to bites. However, even when wearing field gear, the following precautions will be taken when working in areas that might be infested with mosquitoes:

- Spray outer clothing **BUT NOT YOUR SKIN**, with an insect repellant that contains permethrin or permanone.
- When working in infested areas apply an insect repellant containing 33 percent DEET to exposed skin and avoid standing water areas as much as possible.

- Look for the symptoms of the onset of West Nile Virus, which occur within 3–15 days after being bitten by an infected mosquito.

13.5.1.2 Bees, Hornets, and Wasps

Contact with stinging insects like bees, hornets, and wasps may result in site personnel experiencing adverse health effects that range from mild discomfort to life threatening reactions. Therefore, stinging insects present a serious hazard to site personnel, and extreme caution must be exercised whenever site and weather conditions increase the risk of encountering stinging insects. Some of the factors that are related to stinging insects that increase the degree of risk associated with accidental contact are:

- The nests for these insects are frequently found in remote wooded, grassy areas where many waste sites are located.

- The nests can be situated in trees, rocks, and bushes, or in the ground, and are usually difficult to see.

- Accidental contact with these insects is highly probable, especially during warm weather conditions when the insects are most active.

- If a site worker accidentally disturbs a nest, the worker may be inflicted with multiple stings, causing extreme pain and swelling which can leave the worker incapacitated and in need of medical attention.

- Some people are hypersensitive to the toxins injected by a sting, and when stung, experience a violent and immediate allergic reaction resulting in a life-threatening condition known as anaphylactic shock. Anaphylactic shock manifests itself very rapidly and is characterized by extreme swelling of the body, eyes, face, mouth, and respiratory passages.

The hypersensitivity needed to cause anaphylactic shock can, in some people, accumulate over time and exposure; therefore, even if someone has been stung previously, and has not experienced an allergic reaction, there is no guarantee that they will not have an allergic reaction upon receipt of another sting.

Protective Measures—With these things in mind and with the high probability of contact with stinging insects, all site personnel will comply with the following safe work practices:

- If a worker knows that he/she is hypersensitive to bee, wasp, or hornet stings, he/she must inform the SUXOS of this condition prior to participation in site activities.

- All site personnel will be watchful for the presence of stinging insects and their nests and will advise the SUXOS that a stinging insect nest or a swarm of bees is located or suspected in the area.

- Any nests located onsite will be flagged and site personnel will be notified of their presence.

- If stung, site personnel will immediately report to the SUXOS to obtain treatment and to allow the SUXOS to observe them for signs of allergic reaction.

- Site personnel with a known hypersensitivity to stinging insects will keep required emergency medication on or near their person always and will inform their supervisor of the medication and of how to administer it in an emergency.

13.5.1.3 Mites (Chiggers)

Chiggers are small mites that are usually a yellowish to bright red color. Chiggers may live year-round but are especially active during spring and summer. The larval chigger is the active stage that bites animals and humans, attaching themselves tightly. After secreting digestive enzymes that break down the skin cells, the mite feeds on the liquefied cells. The rash and intense itching associated with chiggers is an allergic reaction to the mite's salivary secretions. Preventive measures used against mosquitoes are effective against chiggers.

Treatments to ease itching include ointments such as calamine lotion, hydrocortisone, and benzocaine.

13.5.1.4 Northern Black Widow Spider

The Northern Black Widow Spider (**Figure D-3**) is not aggressive unless agitated when guarding her egg sac. They live in a variety of natural and domestic habitats such as under rocks and wooden boards, and in dense plant growth. The female spider is glossy black and marked with a characteristic red hourglass on the underside of the abdomen. The female has a body length of about ½ in. with a total length of about 1½ in.

Figure D-3: Black Widow Spider

The male, which is rarely seen, is smaller and has four pairs of red marks along the sides of the abdomen. Young black widow spiders are tan-to-gray in color and have orange and white "racing stripes" on their abdomens. Black widow spider venom affects the nervous system. The venom causes pain in the lymph nodes. Other symptoms of a severe bite include nausea, elevated blood pressure, sweating, tremors, and increased white blood cell count. The wound may appear as a bluish red spot, surrounded by a whitish area. Victims of a black widow bite may exhibit the following signs or symptoms:

- Sensation of pinprick or minor burning at the time of the bite
- Appearance of small punctures (but sometimes none are visible).

After 15 to 60 minutes, intense pain is felt at the site of the bite which spreads quickly, and is followed by profuse sweating, rigid abdominal muscles, muscle spasms, breathing difficulty,

slurred speech, poor coordination, dilated pupils, and generalized swelling of the face and extremities.

13.5.1.5 Brown Recluse Spider

The brown recluse spider (**Figure D-4**) is brownish to tan in color, rather flat, 5/8 to 2 in. long with a dark brown "violin" shape on the underside. It may be found in trees, or in dark locations. Victims of a brown recluse bite may exhibit the following signs or symptoms:

- Blistering at the site of the bite, followed by a local burning at the site 30 to 60 minutes after the bite
- Formation of a large, red, swollen, pustulating lesion with a bull's-eye appearance
- Systemic affects may include a generalized rash, joint pain, chills, fever, nausea, and vomiting; and pain may become severe after eight hours, with the onset of tissue necrosis.

Treatment for Spider Bites: There is no effective first aid treatment for any of these bites. Except for very young, very old, or weak victims, spider bites are not considered to be life threatening; however, medical treatment must be sought to reduce the extent of damage caused by the injected toxins.

Figure D-4: Brown Recluse Spider

If the spider can be retrieved, it should be taken with the patient to medical treatment. If venomous spiders are suspected or known to be onsite, the UXOSO will brief site personnel as to their identification and avoidance. As with stinging insects, site personnel should report to the SUXOS or UXOSO if they locate these spiders onsite or notice any type of bite while involved in site activities.

13.5.1.6 Ticks

The Center for Disease Control has noted the increase of Rocky Mountain Spotted Fever and Lyme disease, which are caused by bites from infected ticks that live in and near wooded areas, grass, and brush (**Figure D-5**). Ticks are small, ranging from the size of a comma up to about 0.25 in. They are sometimes difficult to see. When embedded in the skin, they may look like a freckle. The tick season extends from spring through summer.

Figure D-5: Deer Tick

Rocky Mountain Spotted Fever has occurred in at least 36 states, with the heaviest concentrations in Oklahoma,

North Carolina, South Carolina, and Virginia. It is caused by Rocky Mountain wood ticks and dog ticks that have become infected with rickettsia. Both are black in color.

Lyme disease has occurred in 49 states, with the heaviest concentrations in the Northeast (Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania), the upper Midwest (Minnesota and Wisconsin), and along the northern California coast. It is caused by deer ticks and lone star ticks that become infected with spirochetes. Female deer ticks are about ¼ in. in size and are black and brick red in color. Male deer ticks are smaller, and completely black. Lone star ticks are larger and chestnut brown in color.

The first symptoms of either disease may be flu-like chills, fever, headache, dizziness, fatigue, stiff neck, and bone pain. If immediately treated by a physician, most individuals recover fully in a short period of time. If not treated, more serious symptoms can occur.

If you believe you have been bitten by a tick, or if any of the signs and symptoms noted above appears, contact the SUXOS, who will authorize you to visit a physician for an examination and possible treatment.

13.5.2 Snakes

New York is home to several species of snakes. Two venomous snakes found in the project region are the Timber rattlesnake and the Eastern Massasauga rattlesnake. Depending on the time of year of the field work, snakes could be encountered. Personnel should be aware of their surroundings and take particular care when traversing areas that may be inhabited by snakes, such as near rocks, logs, crevices and in holes or pipes. If a venomous snake is identified while working, the field team should keep a safe distance, use caution, and not disturb the animal allowing it to pass. If the snake refuses to move, back away slowly and come back at a later time.

13.5.2.1 Timber Rattlesnake

Timber rattlesnakes (**Figure D-6**) are large snakes whose bites can be fatal. Timber Rattlesnakes range in size up to 6 ft. The timber rattlesnake's coloration can be yellow, gray, dark brown or black, with dark, V-shaped cross bands across the back. The timber rattlesnake inhabits forest, fields, thickets, and arid or semi-arid areas.

Figure D-6: Timber Rattlesnake

13.5.2.2 Eastern Massasauga Rattlesnake

The Massasauga rattlesnake (**Figure D-7**) is one of the smallest rattlesnakes with the least potent venom. They prefer to avoid confrontation and are not prone to strike; however, they will strike if they feel threatened. Bites should receive prompt medical attention. Massasauga Rattlesnakes range in size between 17 and 48 in. The Massasauga rattlesnake's coloration is typically dark brown semi-rectangular patches on a light gray to brown body. The Massasauga rattlesnake inhabits wetlands during the winter and during the spring and summer, can be found in swamps and marshland.

Figure D-7: Eastern Massasauga Rattlesnake

13.5.3 Plants Causing Skin Reactions

A number and variety of hazardous plants may be encountered. The ailments associated with these plants range from mild hay fever to contact dermatitis to carcinogenic affects. The plants that present the greatest degree of risk to site personnel (i.e., potential for contact versus effect produced) are those that produce skin reactions and skin and tissue injury. The hazardous plants of greatest concern are a variety of poison ivy, poison sumac, poison hemlock, and wild parsnip found in the project area. Contact with the leaves, stems, or roots of these plants may produce redness, blisters, swelling, and intense burning and itching due to transfer of oils or sap.

Figure D-8: Poison Sumac

The victim also may develop an infection should the surface of the skin be broken. The most distinctive features of hazardous plants (**Figures D-8, D-9, and D-10**) are readily visible. These plants may grow in all areas around the project site. Improper treatment of an injury can cause secondary infections to occur. Preventive measures that can prove effective for most site personnel are:

Figure D-9: Poison Hemlock

- Avoid contact with any hazardous plants onsite.
- Remove gloves prior to touching face, neck, or other exposed areas of the body.
- Wash hands, face, or other exposed areas at the beginning of each break period and at the end of each workday.
- Keep the skin covered as much as possible (i.e., long pants and long-sleeved shirts) in areas where these plants are known to exist to limit some of the potential exposure.

Figure D-10: Poison Ivy

13.5.3.1 Plants Causing Skin and Tissue Injury

Contact with sharp leaves, nettles, and thorns are of special concern to site personnel. This concern stems from the fact that punctures, cuts, and even minor scrapes caused by accidental contact may result in non-infectious skin lesions, and the introduction of fungi or bacteria through the skin or eye. This is especially important in light of the fact that the warm moist environment created inside protective clothing is ideal for the propagation of fungal and bacterial infection. Personnel receiving any of the injuries listed above, even minor scrapes, will report it immediately to the SUXOS for initial and continued observation and care of the injury. Keeping the skin covered as much as possible (i.e., long pants and long-sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure. If the rash is scratched, secondary infections can occur. The rash usually disappears in 1–2 weeks in cases of mild exposure and up to 3 weeks when exposure is severe.

Preventative Measures—The hazardous plants of greatest concern are those varieties found in the project area having the ability to cause redness, blisters, swelling, and intense burning and itching due to punctures, scraps, or lacerations. Improper treatment of an injury can cause secondary infections to occur. Preventive measures that can prove effective for most site personnel are:

- Avoid contact with any hazardous plants onsite.

- Remove gloves prior to touching face, neck, or other exposed areas of the body.

- Wash hands, face, or other exposed areas at the beginning of each break period and at the end of each workday.

- Keep the skin covered as much as possible (i.e., long pants and long-sleeved shirts) in areas where these plants are known to exist to limit some of the potential exposure.

13.5.4 Animals

Wildlife may attack if disturbed or threatened. If wildlife is sighted during field work, especially if an animal appears to be disoriented, aggressive, or exhibits other strange behavior, proceed from the area to the site vehicles to avoid the animal. The possibility of encountering wildlife is moderate and will be communicated to all site workers during the initial site-specific safety training. Workers will be warned to avoid wildlife and to report any encounters.

Treatment—If bitten, immediately wash the wound with soap and water and get medical help. Notify the local animal care and control agency. Give them as much information as possible as size, color, and direction in which the animal left the area.

Prevention Measures—Never approach a strange animal. Leave the area if an animal is acting strange or appears threatening.

13.6 RADIOLOGICAL

There are no known radiological hazards associated with the project site, except with use of the XRF equipment. Only trained personnel will be allowed to use the XRF equipment and will do so in accordance with the manufacturer's user guide and EA SOP 17.

13.7 EXPLOSIVE ORDNANCE AND EXPLOSIVES

All personnel should be alert for MEC and MPPEH. All project personnel will adhere to safe work procedures. The following general precautions with regards to MEC will be observed at all times:

- DO NOT touch or move any ordnance item(s) regardless of the markings or apparent condition.

- DO NOT visit an ordnance site if an electrical storm is occurring or approaching. If a storm approaches during a site visit, leave the site immediately and seek shelter.

- DO NOT use radios or cellular phones within 25 ft of suspect MEC/UXO items.

- DO NOT drive vehicles into a suspected MEC area; use clearly marked lanes.

- DO NOT carry matches, lighters, or other flame-producing devices into an MRS.

- DO NOT rely on color code for positive identification of ordnance item(s) or their contents.

- Approach MEC/UXO items from the side; avoid approaching the front or rear areas.

- Always assume MEC/UXO items contain a live charge until it can be ascertained otherwise.

13.7.1 Specific Actions to be Taken Upon Locating Ordnance

- Do not be misled by markings on the ordnance item stating practice or inert. Even practice items may have explosive charges that are used to mark/spot the point of impact; or the item could be incorrectly marked.

- Follow the Safety Precautions set forth in EM 385-1-97 for the type of munitions or MEC encountered.

- Do not roll the item over or scrape the item to identify the markings.

- The location of any ordnance items found during sweep activities should be clearly marked so it can be easily located and avoided. Follow the procedures set forth in the Work Plan.

- Upon locating any MEC or MPPEH, notify the SUXOS so appropriate measures can be taken.

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14. LOGS, REPORTS, AND RECORDKEEPING

14.1 LOGBOOK

The UXOSO will keep a daily log recording the following aspects related to safety at the site:

- Task assignments
- Operational issues or problems encountered
- Instructions issued by the client/customer
- Accidents
- Emergencies.

14.2 SAFETY INSPECTION REPORT

The UXOSO will maintain a daily safety log of all safety related activities (**Attachment 3**). The following information will be maintained in the Safety Log:

- Date and location
- Tailgate safety briefing (time conducted, material discussed, etc.)
- Significant site events relating to safety
- Accidents
- Stop work events related to safety
- Inspections performed
- Signature of the SUXOS/UXOSO at the end of each day.

14.3 TRAINING LOG

The UXOSO will maintain a training log documenting the following information:

- Date and location
- Nature of training (personnel will complete the appropriate documentation of training form)
- Visitor training.

14.4 VISITOR LOG

The UXOSO will document all visitors to the project site on the Visitors Log (**Attachment 3**). Information will include:

- Date and location
- Arrival and departure times
- Nature of visit (i.e., regulatory, client/customer, corporate)
- Visitor training requirement

- Escort assigned.

14.5 AIR MONITORING

An air monitor will be used onsite during earth-moving machinery, soil excavation and sifting activities to confirm that action levels for nuisance dust are not exceeded. A Casella Microdust Pro air monitor or equivalent will be located at the work zone perimeter to measure onsite dust concentrations in the area. If dust concentrations exceed 1 milligram per cubic meter (mg/m^3), additional dust suppression (i.e., applying water) will be employed to reduce levels below 1 mg/m^3.

14.6 RECORDKEEPING

The UXOSO will establish and maintain a filing system onsite for records, reports, and information concerning individual training, medical surveillance, etc. Sections in this filing system will include:

- ***Training Records***—Certificates for training required by 29 CFR1910.120 (40-hour initial Hazardous Waste Operations Emergency Response, 8-hour refresher, and supervisory training) will be maintained at the site. Additionally, documentation of CPR and first aid training will be available at the site.

- ***Medical Monitoring/Surveillance***—Documentation of current enrollment (within last 12 months) in a medical monitoring program will be available for each employee working at the site. Documentation will consist of the employee's Health Status Report that is written and signed by the examining occupational physician.

- ***Exposure Records***—Documentation of exposures is maintained with the employee medical files and retained in accordance with OSHA requirements.

- ***Accident Reports***—Copies of any accident/incident reports.

- ***Plan Acceptance Forms***—Copies of the Plan Acceptance Forms documenting that all employees have read and understand the SSHP will be maintained at the site.

- ***Visitor Log***—Maintained onsite for the duration of the project, transferred, to the corporate office for inclusion in reports, or stored as directed.

14.7 INJURY AND ILLNESS REPORTS

If an injury or illness occurs onsite, the UXOSO is responsible for completing an EA Accident Report form. No supervisor will decline to accept a report of injury from a subordinate. The UXOSO will coordinate preparation of the respective forms to ensure accuracy and consistency. All accidents/incidents must be investigated by the UXOSO or corporate assigned individual. The purpose of the investigation is to determine the causal factors that lead to the accident/incident and to establish corrective actions to prevent a recurrence.

In the event of an accident that results in a lost workday, $5,000 or more in property damage, or an OSHA recordable injury and/or illness, USACE will be notified immediately and an ENG Form 3394 will be completed and submitted within 48 hours. OSHA recordable injuries and/or illnesses will also be entered on the OSHA Form 300 by the UXOSO. This form will be maintained onsite for the duration of the project, then returned to the Corporate office for inclusion in reports and required filing.

14.8 SAFETY AND OCCUPATIONAL HEALTH DEFICIENCY TRACKING SYSTEM

The UXOSO will maintain a tracking system (log) that will list deficiencies identified onsite in a chronological order. This system will contain the following information as a minimum:

- Date deficiency was identified
- Description of deficiency
- Name of individual responsible for correcting deficiency
- Projected resolution date
- Date actually resolved.

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15. REFERENCES

Air National Guard (ANG). 2015. Draft Final Non-Time Critical Removal Action Site-Specific Final Report for Munitions Response Sites SR001 and SR002, Hancock Air National Guard Base, Syracuse, New York. June.

Department of Defense Explosives Safety Board (DDESB). 2016. *Minimum Qualifications for Personnel Conducting Munitions and Explosives of Concern-Related Activities*. DDESB TP 18. Alexandria, Virginia. 1 September.

EA Engineering, Science, and Technology, Inc. 2015. *Corporate Safety and Health Program Manual*. March.

National Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA), United States Coast Guard, and United States Environmental Protection Agency (USEPA). 1985. *Occupational Safety and Health Guidance Manual Hazardous Waste Site Activities*. NIOSH Publication 85-115. October.

United States Army Corps of Engineers (USACE). 2008. *Explosives – Safety and Health Requirements Manual.* Engineering Manual 385-1-97. 15 September. Includes Errata Sheets 1 through 6 dated 1 June, 13 July, and 16 July 2009; 21 July 2010; and 17 May 2013.

———. 2014. *Safety and Health Requirements Manual* (EM-385-1-1). 30 November.

United States Army Corps of Engineers (USACE) – Omaha District. 2016. *Draft Final Engineering Evaluation/Cost Analysis Military Munitions Response Program, Hancock Field Air National Guard Base, Syracuse, New York*. February.

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Attachment 1

OSHA 300 Forms

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OSHA's Form 300 (Rev. 01/2004)

Log of Work-Related Injuries and Illnesses

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for

Year 2017

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

You must record information about every work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work, or medical treatment beyond first aid. You must also record significant work-related injuries and illnesses that are diagnosed by a physician or licensed health care professional. You must also record work-related injuries and illnesses that meet any of the specific recording criteria listed in 29 CFR 1904.8 through 1904.12. Feel free to use two lines for a single case if you need to. You must complete an injury and illness incident report (OSHA Form 301) or equivalent form for each injury or illness recorded on this form. If you're not sure whether a case is recordable, call your local OSHA office for help.

Establishment name EA Engineering, Science, and Technology, Inc., PBC

City Hunt Valley State Maryland

Identify the person				Describe the case		Classify the case CHECK ONLY ONE box for each case based on the most serious outcome for that case:				Enter the number of days the injured or ill worker was:		Check the "injury" column or choose one type of illness:					
(A) Case No.	(B) Employee's Name	(C) Job Title (e.g., Welder)	(D) Date of injury or onset of illness (mo./day)	(E) Where the event occurred (e.g. Loading dock north end)	(F) Describe injury or illness, parts of body affected, and object/substance that directly injured or made person ill (e.g. Second degree burns on right forearm from acetylene torch)	Death (G)	Days away from work (H)	Remained at work: Job transfer or (I)	Remained at work: Other record- able (J)	Away From Work (days) (K)	On job transfer or restriction (days) (L)	(M) Injury (1)	Skin Disorder (2)	Respiratory Condition (3)	Poisoning (4)	Hearing Loss (5)	All other illness (6)
1		geologist 1	5/3	Kirtland AFB project , parking lot north of Bullhead park	broken nose from collision with service dog			x			7	x					
2		scientist 1	6/30	Howard County Recs and Parks, Columbia MD	bee sting with allergic reaction and prescription meds				x			x					
3		technician 2	7/10	on the Missouri River near Brownville, NE	employee wiped eye with formalin solution on hands				x			x					
4		project mgr	8/12	FCC, Louisiana - Camp Clairborne	laceration to right ring finger requiring stitches				x			x					
5		technician 3	8/14	Sprague Road Project, Odessa , Texas	sulfuric acid burn to back from faulty pipe connection				x			x					
6		uxo tech	8/24	Joint Base Cape Cod , old K range	pulled shoulder muscle going through thick vegetation				x			x					
7		geologist	8/14	Waugh Chapel Town Center, Maryland	tick bite with bullseye rash - rash not noted until 8/28				x			x					
				Page totals		*0*	*0*	*1*	*6*	*0*	*7*	*7*	*0*	*0*	*0*	*0*	*0*

Be sure to transfer these totals to the Summary page (Form 300A) before you post it.

Injury (1) | Skin Disorder (2) | Respiratory Condition (3) | Poisoning (4) | Hearing Loss (5) | All other illnesses (6)

Public reporting burden for this collection of information is estimated to average 14 minutes per response, including time to review the instruction, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Ave, NW, Washington, DC 20210. Do not send the completed forms to this office.

OSHA's Form 300A (Rev. 01/2004)

Summary of Work-Related Injuries and Illnesses

Year 2017

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	0	1	6
(G)	(H)	(I)	(J)

Number of Days

Total number of days away from work	Total number of days of job transfer or restriction
0	7
(K)	(L)

Injury and Illness Types

Total number of...	(M)		(M)
(1) Injury	7	(4) Poisoning	0
(2) Skin Disorder	0	(5) Hearing Loss	0
(3) Respiratory Condition	0	(6) All Other Illnesses	0

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

Establishment information

Your establishment name: EA Engineering, Science, and Technology Inc., PBC

Street: 225 Schilling Circle

City: Hunt Valley State: Maryland Zip: 21031

Industry description (e.g., Manufacture of motor truck trailers)
Environmental Remediation and Consulting

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)

OR North American Industrial Classification (NAICS), if known (e.g., 336212)
5 6 2 9 1 0

Employment information

Annual average number of employees: 514

Total hours worked by all employees last year: 1,072,638

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

Company executive

President and CEO
Title

410 584-7000
Phone

8-Jan-18
Date

Attachment 2

Activity Hazard Analyses

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ACTIVITY HAZARD ANALYSES

This attachment contains Activity Hazard Analyses (AHA) forms for the Accident Prevention Plan. Contents of this attachment include:

1. Mobilization/Demobilization
2. Vegetation Clearing
3. Detector-Aided Surface Clearance
4. Intrusive Investigation of Anomalies
5. Material Potentially Presenting an Explosive Hazard (MPPEH) Inspection and Disposition
6. Soil Sifting
7. Wooden Timber Inspection
8. FIB Structure Removal
9. Hot Work
10. Excavation and Backfill
11. Soil Sampling
12. X-Ray Fluorescence (XRF)

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Activity/Work Task:	**Mobilization/Demobilization**	Overall Risk Assessment Code (RAC) (use highest code from all subtasks):	**M (3)**
Project Location:	Hancock Field, New York		
Project Number:	6273502		
Date Prepared:	26 February 2016		
Prepared By:	P. Phillips		
Reviewed By:	P. Garger, CSP, CIH		

Risk Assessment Code (RAC) Matrix

Severity	Probability: Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic I	E (1)	E (1)	H (2)	H (2)	M (3)
Critical II	E (1)	H (2)	H (2)	M (3)	L (4)
Marginal III	H (2)	M (3)	M (3)	L (4)	L (5)
Negligible IV	M (3)	L (4)	L (4)	L (5)	L (5)

Step 1: Review each "hazard" and determine RAC.

Probability = the likelihood to cause an incident, near miss, or accident. Identified as frequent, likely, occasional, seldom, or unlikely.
Severity = the outcome/degree if an incident, near miss, or accident did occur. Identified as catastrophic, critical, marginal, or negligible.

Step 2: Identify the RAC as E, H, M, or L for each hazard on AHA. Select the highest RAC and note at the top of the form.

RAC Chart
E = Extremely High Risk (1)
H = High Risk (2)
M = Moderate Risk (3)
L = Low Risk (4 or 5)

TASK BREAKDOWN, HAZARDS AND CONTROLS:

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
General Mobilization/Demobilization Activities	Physical Hazard: Dust	Minimize generation of dust.	IV/C/L(4)
		Stay out of visible dust clouds.	
		Wet soil if necessary to eliminate visible dust.	
	Physical Hazard: Noise	Wear hearing protection when operating or working near heavy equipment.	IV/D/L(5)
	Physical Hazard: Electrical	Assure electrical work is performed by qualified personnel with verifiable credentials who are familiar with applicable code requirements.	III/C/M(3)
	Physical Hazard: Hand Tools	Inspect tools prior to use; inform supervisors if tools require repair or replacement.	III/C/M(3)
		Use tools for their intended use only.	
		Don't use damaged tools.	
		Push, don't pull wrenches.	
Work Task Steps	**Hazards**	**Controls**	**RAC Severity/ Probability /RAC**

General Mobilization/Demobilization Activities *(continued)*	Physical Hazard: Slips, Trips and Falls	Make sure you have good solid footing and that walking/working surfaces are as clean and dry as possible.	III/C/M(3)
		Inspect areas daily and record findings on daily inspection reports.	
	Physical Hazard: Powered Machine Tools	Use, inspect and maintain power tools according to manufacturer's recommendations.	III/C/M(3)
		Equip power tools with designed guards.	
		Provide electrical power control on each power tool to make it possible for the operator to cut off the power without leaving the point of operation.	III/C/M(3)
		Connect all electrical power tools to an in-line ground fault circuit interrupter (GFCI).	
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	UXOSO/SSHO will walk site and identify potential hazardous areas and these will be identified in the daily tailgate safety briefing.	IV/C/L(4)
		Use repellants and proper clothing for protection against insects including ticks and mosquitoes.	
		Stay alert and safe distance away from biological hazards.	
		Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if high probability of encountering snakes, ticks, poison ivy or oak.	
		Workers with allergies should carry antidote kits, if necessary.	
		Exercise caution when moving obstacles, items that could be home to snakes, spiders, or other animals or insects.	
	Physical Hazard: Manual Lifting	Follow proper lifting techniques.	III/C/M(3)
		Use caution and do not twist the back when carrying a load.	
		Do not attempt to lift bulky items or items assessed at over 50lbs. without assistance.	
		Use mechanical devices to move loads when possible.	
		Wear leather gloves for materials handling.	
	Physical Hazard: Cold Stress	Wear cold weather clothing and provide shelter as needed based on site conditions.	III/C/M(3)
		Conduct temperature monitoring when temperatures fall below 45^{o} F.	
	Physical Hazard: Temporary Haul Roads	Construct haul roads with suitable width for safe operation at the speed anticipated.	III/D/L(4)

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
General Mobilization/Demobilization Activities *(continued)*	Physical Hazard: Weather	Monitor radio for up-to-date severe weather forecasts.	IV/D/L(5)
		Discontinue work during thunderstorms, ice, and severe weather events.	
	Physical Hazard: Heat Stress	Make drinking water available to all workers and encourage workers to drink small amounts of water frequently.	III/C/M(3)
		Adjust work/rest regimens during hot weather.	
		Determine appropriate work schedule; take regular breaks.	
		Have adequate water and electrolyte drinks available.	
		Designate shaded break areas.	
		Be aware of symptoms of heat-related illness.	
	Physical Hazard: Temporary Facilities	Anchor trailers with rods and cables or by steel straps to ground anchors designed to withstand winds and meet applicable standards.	IV/D/L(5)
		Provide one portable toilet with adequate ventilation on site.	
		Provide washing facilities at the portable toilet location to maintain sanitary conditions.	
		Provide type II 16-unit first aid kits and make these kits accessible at the site.	
	Physical Hazard: Driving/Vehicle Movement (including trucks, heavy equipment)	Obey traffic rules.	III/D/M(3)
		15 mph is the maximum speed allowed in the work area.	
		Use caution when entering roadways.	
		Do not operate vehicles in unsafe conditions (e.g., on steep slopes, in deep mud).	
		Do not use cell phones when operating vehicles.	
		Secure all loads, including equipment within the cab, containerize small equipment and secure container.	
		Wear seat belts, including those provided in cabs of heavy equipment.	
		Use caution and wear orange vests if working near active roads or around heavy equipment.	
		Leave enough time to get to your destination without hurrying.	
		Be aware of heavy equipment and do not park or conduct work in the blind spot of the equipment operator; “blind spots” of some equipment can be very large.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
General Mobilization/Demobilization Activities *(continued)*	Physical Hazard: Driving/Vehicle Movement (including trucks, heavy equipment) *(continued)*	Verify back-up alarms are functional for all heavy equipment. Pick-ups or SUVs with obstructed rear-view use a back-up alarm or a spotter when backing-up.	III/D/M(3)
		Rollover protective structures (ROPS) are required on all heavy equipment, with the exception of trucks used for over–the-road hauling.	
		Equipment will be immediately grounded if unauthorized personnel enter the work area.	
Utility Clearance	Physical Hazard: Electrocution or Explosion	If overhead utilities are present in work area, place warning signs at ground level.	II/D/M(3)
		Always check for overhead utilities before using extendable equipment.	
		Maintain at least 20 feet from all power lines.	
		Contact the utilities company if high voltage lines are present.	
		Complete utility clearance prior to intrusive work in areas where utilities have not been cleared through institutional knowledge by calling the local underground service alert center and/or coordinating with site personnel.	
		Observe the area for indications of utilities.	
Handling Flammable Liquid During Fueling	Physical Hazard: Fire	Provide portable fire extinguishers in all equipment and in the field trailer.	III/C/M(3)
		Inspect fire extinguishers monthly.	
		Obtain hot work permits prior to any welding or torch cutting activities.	

REQUIRED EQUIPMENT, INSPECTION AND TRAINING:

Equipment	Inspection Requirements	Training Requirements (including Competent Person and Qualified Personnel, if applicable)
• PPE • Common hand tools • Common power tools (chain saws, brush trimmers) • Excavator – Kobelco Model SK220LC (or equivalent) • Front-end loader – Volvo Model 120 with rubber tires and 3 cubic yard (cy) bucket (or Equivalent) • Haul vehicles for transportation – may be 25- or 30-ton and may be end- or side-dump with tarp coverings • Emergency equipment including first aid kit, eye wash, fire extinguishers • Monitoring Equipment	• Inspect PPE prior to each use • Inspect vehicles daily • Underground hazards require clearance • Inspect emergency equipment/supplies daily (first aid kit, eye wash, fire extinguisher) • Calibrate environmental monitoring equipment daily prior to use.	• Use and limitations of PPE • Valid driver's license • Machinery operator (and any other large equipment operator) will be trained in equipment use and maintenance • Lifting • APP and AHA review • First aid/CPR—at least 2 people on site • Hazardous waste sites require 40 hour HAZWOPER training, annual updates for any intrusive activities. • UXOSO/SSHO will require HAZWOPER Supervisor's Training and 30-hour OSHA Construction Safety Course. • UXO Techs: Qualifications and training per DDESB TP-18 • All non-UXO qualified staff will receive site-specific UXO awareness training. • Use of monitoring equipment

Activity/Work Task:	**Vegetation Clearing**	Overall Risk Assessment Code (RAC) (use highest code from all subtasks):	**H(2)**
Project Location:	Hancock Field, New York		
Project Number:	6273502		
Date Prepared:	26 February 2016		
Prepared By:	P. Phillips		
Reviewed By:	P. Garger, CSP, CIH		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic I	E (1)	E (1)	H (2)	H (2)	M (3)
Critical II	E (1)	H (2)	H (2)	M (3)	L (4)
Marginal III	H (2)	M (3)	M (3)	L (4)	L (5)
Negligible IV	M (3)	L (4)	L (4)	L (5)	L (5)

Step 1: Review each "hazard" and determine RAC.

Probability = the likelihood to cause an incident, near miss, or accident. Identified as frequent, likely, occasional, seldom, or unlikely.
Severity = the outcome/degree if an incident, near miss, or accident did occur. Identified as catastrophic, critical, marginal, or negligible.

Step 2: Identify the RAC as E, H, M, or L for each hazard on AHA. Select the highest RAC and note at the top of the form.

RAC Chart
E = Extremely High Risk (1)
H = High Risk (2)
M = Moderate Risk (3)
L = Low Risk (4 or 5)

TASK BREAKDOWN, HAZARDS AND CONTROLS:

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Brush/Obstacle Removal	Physical Hazard: Driving/Vehicle Movement (including trucks, heavy equipment)	Remain out of the swing radius of excavating equipment, and make sure to have the attention of the equipment operator.	III/C/M(3)
		Verify back-up alarms are functional for all heavy equipment. Pick-ups or SUVs with obstructed rear-view use a back-up alarm or a spotter when backing-up.	
		Equipment will be immediately grounded if unauthorized personnel enter the work zone.	
		If overhead power lines are in the vicinity of the work area, use a spotter to ensure that equipment maintains proper safe distance.	
		Obey traffic rules.	
		15 mph is the maximum speed allowed in the work area.	
		Use caution when entering roadways.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Brush/Obstacle Removal *(continued)*	Physical Hazard: Driving/Vehicle Movement (including trucks, heavy equipment) *(continued)*	Do not operate vehicles in unsafe conditions (e.g., on steep slopes, in deep mud).	III/C/M(3)
		Do not use cell phones when operating vehicles.	
		Secure all loads, including equipment within the cab, containerize small equipment and secure container.	
		Wear seat belts, including those provided in cabs of heavy equipment.	
		Use caution and wear orange vests if working near active roads or around heavy equipment.	
		Leave enough time to get to your destination without hurrying.	
		Be aware of heavy equipment and do not park or conduct work in the blind spot of the equipment operator; "blind spots" of some equipment can be very large.	
		Rollover protective structures (ROPS) are required on all heavy equipment, with the exception of trucks used for over–the-road hauling.	
	Physical Hazard: MEC	Ensure Exclusion Zones (EZs) are established to authorized minimum safe distances (MSDs) for non-project personnel and team separation distances for project personnel.	II/C/H(2)
		Use the minimum number of personnel (not less than two) to conduct the operation and minimize their exposure time to MEC.	
		Ensure all personnel are under the direction of UXO-qualified personnel.	
		Do not conduct operations within site-specific MSDs of other MEC intrusive operations.	
		Observe general MEC hazards and precautions.	
		Ensure compliance with relevant SOPs and the MEC ESS.	
		UXO-qualified personnel (Tech II or above) will escort machinery throughout clearing activities.	
	Physical Hazard: Noise	Wear hearing protection when operating or working near heavy equipment or power machine tools.	IV/C/L(4)
	Physical Hazard: Manual Lifting	Follow proper lifting techniques.	III/C/M(3)
		Use caution and do not twist the back when carrying a load.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Brush/Obstacle Removal *(continued)*	Physical Hazard: Manual Lifting *(continued)*	Do not attempt to lift bulky items or items assessed at over 50lbs. without assistance.	III/C/M(3)
		Use mechanical devices to move loads when possible.	
		Wear leather gloves for materials handling.	
	Physical Hazard: Hand Tools	Inspect tools prior to use; inform supervisors if tools require repair or replacement.	III/C/M(3)
		Use tools for their intended use only.	
		Don't use damaged tools.	
		Push, don't pull wrenches.	
	Physical Hazard: Powered Machine Tools	Use, inspect and maintain power tools according to manufacturer's recommendations.	III/C/M(3)
		Equip power tools with designed guards.	
		Provide electrical power control on each power tool to make it possible for the operator to cut off the power without leaving the point of operation.	
		Connect all electrical power tools to an in-line GFCI.	
		Only people familiar with the proper operation of chain-saws will be allowed to operate chain saws to fall trees.	
		Protective clothing such as chaps or leggings that cover the area from the groin to about 2-inches above the ankle should be worn while using chainsaws.	
		Allow chain-saw to cool before making any repairs to or adjustments.	
		Beware of kickback. This occurs when the upper tip of the guide bar touches an object or when wood closes in and pinches the saw chain in the wood cut.	
	Physical Hazard: Dust	Minimize generation of dust.	IV/C/L(4)
		Stay out of visible dust clouds.	
		Wet soil if necessary to eliminate visible dust.	
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	Use repellants and proper clothing for protection against insects including ticks and mosquitoes.	IV/C/L(4)
		Stay alert and safe distance away from biological hazards.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Brush/Obstacle Removal *(continued)*	Biological Hazards: Insects, Snakes, Wildlife, Vegetation *(continued)*	Workers with allergies should carry antidote kits, if necessary.	IV/C/L(4)
		Exercise caution when moving obstacles, items that could be home to snakes, spiders, or other animals or insects.	
		Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if high probability of encountering snakes, ticks, poison ivy or oak.	
	Physical Hazard: Cold Stress	Wear cold weather clothing and provide shelter as needed based on site conditions.	III/C/M(3)
		Conduct temperature monitoring when temperatures fall below 45°F.	
	Physical Hazard: Heat Stress	Make drinking water available to all workers and encourage workers to drink small amounts of water frequently.	III/C/M(3)
		Adjust work/rest regimens during hot weather.	
		Determine appropriate work schedule; take regular breaks.	
		Have adequate water and electrolyte drinks available.	
		Designate shaded break areas.	
		Be aware of symptoms of heat-related illness.	
	Physical Hazard: Weather	Monitor radio for up-to-date severe weather forecasts.	IV/D/L(5)
		Discontinue work during thunderstorms, ice, and severe weather events.	
	Physical Hazard: Slips, Trips and Falls	Make sure you have good solid footing and that walking/working surfaces are as clean and dry as possible.	III/C/M(3)
		Inspect areas daily and record findings on daily inspection reports.	
Handling Flammable Liquid During Refueling	Physical Hazard: Fire	Gasoline will not be stored on site. Equipment will be fueled using a truck transfer tank with flammable liquids stored in approved flammable liquid containers.	II/D/M(3)
		Fuel vehicles in areas free of combustible debris/vegetation.	
		Turn engines off prior to refueling.	
		Bond and ground containers during transfer of flammable liquids.	
		Have portable fire extinguishers present at all time and inspect monthly.	

REQUIRED EQUIPMENT, INSPECTION AND TRAINING:

Equipment	Inspection Requirements	Training Requirements (including Competent Person and Qualified Personnel, if applicable)
• Support Vehicle • PPE • Hardhat • Hearing Protection • Safety Glasses • Leather Gloves • Chaps or Leggings • Face Shield when using brush trimmers or chain-saw • Power tools/hand tools • Emergency equipment including first aid kit, eye wash, fire extinguishers	• Inspect PPE prior to each use • Inspect vehicle daily • Inspect any power tools prior to and after use and report any damage. • Inspect emergency equipment/supplies daily (first aid kit, eye wash, fire extinguisher)	• Use and limitations of PPE • Valid driver's license • Lifting • Read all Cautions, Warning and Danger signs for any hand held power tools. • Read the O&M manual prior to use. • APP and AHA review • First aid/CPR—at least 2 people on site • Hazardous waste sites require 40 hour HAZWOPER training, annual updates. • UXOSO/SSHO will require HAZWOPER Supervisor's Training and 30-hour OSHA Construction Safety Course. • UXO Techs: Qualifications and training per DDESB TP-18 • All non-UXO qualified staff will receive site-specific UXO awareness training.

Activity/Work Task:	**Detector-Aided Surface Clearance**	Overall Risk Assessment Code (RAC) (use highest code from all subtasks):	**H(2)**
Project Location:	Hancock Field, New York		
Project Number:	6273502		
Date Prepared:	26 February 2016		
Prepared By:	P. Phillips		
Reviewed By:	P. Garger, CIH		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic I	E (1)	E (1)	H (2)	H (2)	M (3)
Critical II	E (1)	H (2)	H (2)	M (3)	L (4)
Marginal III	H (2)	M (3)	M (3)	L (4)	L (5)
Negligible IV	M (3)	L (4)	L (4)	L (5)	L (5)

Step 1: Review each "hazard" and determine RAC.

Probability = the likelihood to cause an incident, near miss, or accident. Identified as frequent, likely, occasional, seldom, or unlikely.
Severity = the outcome/degree if an incident, near miss, or accident did occur. Identified as catastrophic, critical, marginal, or negligible.

Step 2: Identify the RAC as E, H, M, or L for each hazard on AHA. Select the highest RAC and note at the top of the form.

RAC Chart
E = Extremely High Risk (1)
H = High Risk (2)
M = Moderate Risk (3)
L = Low Risk (4 or 5)

TASK BREAKDOWN, HAZARDS AND CONTROLS:

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Surface Clearance	Physical Hazard: MEC	EZs are established to authorize MSDs for non-project personnel and team separation distances for project personnel.	II/C/H(2)
		Use the minimum number of personnel (not less than two) to conduct the operation and minimize their exposure time to MEC.	
		Ensure all personnel are under the direction of UXO-qualified personnel.	
		Do not conduct operations within site-specific MSDs of other MEC intrusive operations.	
		Observe general MEC hazards and precautions.	
		Ensure compliance with relevant SOPs and the MEC ESS.	
	Physical Hazard: Visibility	UXO personnel conducting the visual surveys for MEC must wear a high-visibility traffic vest at all times.	III/C/M(3)
	Physical Hazard: Slips, Trips and Falls	Make sure you have good solid footing and that walking/working surfaces are as clean and dry as possible.	III/C/M(3)
		Inspect areas daily and record findings on daily inspection report.	
Surface Clearance	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	UXOSO/SSHO will walk site and identify potential hazardous areas and these will be identified in the daily tailgate safety briefing.	IV/C/L(4)

Work Task Steps *(continued)*	Hazards	Controls	RAC Severity/ Probability /RAC
		Use repellants and proper clothing for protection against insects including ticks and mosquitoes.	
		Stay alert and safe distance away from biological hazards.	
		Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if high probability of encountering snakes, ticks, poison ivy or oak.	
		Workers with allergies should carry antidote kits, if necessary.	
		Exercise caution when moving obstacles, items that could be home to snakes, spiders, or other animals or insects.	
	Physical Hazard: Cold Stress	Wear cold weather clothing and provide shelter as needed based on site conditions.	III/C/M(3)
		Conduct temperature monitoring when temperatures fall below 45º F.	
	Physical Hazard: Heat Stress	Make drinking water available to all workers and encourage workers to drink small amounts of water frequently.	III/C/M(3)
		Adjust work/rest regimens during hot weather.	
		Determine appropriate work schedule; take regular breaks.	
		Have adequate water and electrolyte drinks available.	
		Designate shaded break areas.	
		Be aware of symptoms of heat-related illness.	
	Physical Hazard: Weather	Monitor radio for up-to-date severe weather forecasts.	IV/D/L(5)
		Discontinue work during thunderstorms, ice, and severe weather events.	
	Physical Hazard: Fire	Provide portable fire extinguishers in all equipment and in the field trailer.	III/C/M(3)
		Inspect fire extinguishers monthly.	
		Obtain hot work permits prior to any welding or torch cutting activities.	
	Physical Hazard: Noise	Reduce the volume of detection equipment before donning a headset.	IV/C/L(4)

REQUIRED EQUIPMENT, INSPECTION AND TRAINING:

Equipment	Inspection Requirements	Training Requirements (including Competent Person and Qualified Personnel, if applicable)
• Support vehicle • Magnetometer • PPE • Emergency equipment including fire extinguishers	• Inspect PPE prior to each use • Inspect vehicle daily • Inspect/test magnetometer • Inspect emergency equipment/supplies	• Use and limitations of PPE • Valid driver's license • APP and AHA review • Hazardous waste sites require 40 hour HAZWOPER training, annual updates for any intrusive activities. • UXOSO/SSHO will require HAZWOPER Supervisor's Training and 30-hour OSHA Construction Safety Course. • First aid/CPR—at least 2 people on site • UXO Techs: Qualifications and training per DDESB TP-18 • All non-UXO qualified staff will receive site-specific UXO awareness training.

Activity/Work Task:	**Intrusive Investigation of Anomalies**	Overall Risk Assessment Code (RAC) (use highest code from all subtasks):	**H (2)**
Project Location:	Hancock Field, New York		
Project Number:	6273502		
Date Prepared:	26 February 2016		
Prepared By:	I. Harvey		
Reviewed By:	P. Garger, CIH, CSP		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic I	E (1)	E (1)	H (2)	H (2)	M (3)
Critical II	E (1)	H (2)	H (2)	M (3)	L (4)
Marginal III	H (2)	M (3)	M (3)	L (4)	L (5)
Negligible IV	M (3)	L (4)	L (4)	L (5)	L (5)

Step 1: Review each "hazard" and determine RAC.

Probability = the likelihood to cause an incident, near miss, or accident. Identified as frequent, likely, occasional, seldom, or unlikely.
Severity = the outcome/degree if an incident, near miss, or accident did occur. Identified as catastrophic, critical, marginal, or negligible.

Step 2: Identify the RAC as E, H, M, or L for each hazard on AHA. Select the highest RAC and note at the top of the form.

RAC Chart

E = Extremely High Risk (1)
H = High Risk (2)
M = Moderate Risk (3)
L = Low Risk (4 or 5)

TASK BREAKDOWN, HAZARDS AND CONTROLS:

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Target Anomaly Reacquisition	Physical Hazard: MEC	Ensure EZs are established for non-project personnel and team separation distances for project personnel.	II/C/H(2)
		Use the minimum number of personnel (not less than two) to conduct the operation and minimize their exposure time to MEC.	
		Ensure all personnel are under the direction of DDESB-qualified UXO Technicians.	
		Do not conduct operations within site-specific MSDs of other MEC intrusive operations.	
		Observe general MEC hazards and precautions.	
		Ensure compliance with relevant SOPs and the ESP.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Target Anomaly Reacquisition *(continued)*	Physical Hazard: Slips, Trips and Falls	Keep work area free of excess material and debris.	III/C/M(3)
		Remove all trip hazards by keeping materials/objects organized and out of walkways.	
		Be aware of uneven surfaces.	
		Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces.	
		Stay aware of footing and do not run.	
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	UXOSO/SSHO will walk site and identify potential hazardous areas and these will be identified in the daily tailgate safety briefing.	IV/C/L(4)
		Use repellants and proper clothing for protection against insects including ticks and mosquitoes.	
		Stay alert and safe distance away from biological hazards.	
		Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if high probability of encountering snakes, ticks, poison ivy or oak.	
		Workers with allergies should carry antidote kits, if necessary.	
		Exercise caution when moving obstacles, items that could be home to snakes, spiders, or other animals or insects.	
	Physical Hazard: Cold Stress	Wear cold weather clothing and provide shelter as needed based on site conditions.	III/C/M(3)
		Conduct temperature monitoring when temperatures fall below 45º F.	
	Physical Hazard: Heat Stress	Make drinking water available to all workers and encourage workers to drink small amounts of water frequently.	III/C/M(3)
		Adjust work/rest regimens during hot weather.	
		Determine appropriate work schedule; take regular breaks.	
		Have adequate water and electrolyte drinks available.	
		Designate shaded break areas.	
		Be aware of symptoms of heat-related illness.	
	Physical Hazard: Weather	Monitor radio for up-to-date severe weather forecasts.	IV/D/L(5)
		Discontinue work during thunderstorms, ice, and severe weather events.	
	Physical Hazard: Hand Tools	Inspect equipment prior to use.	III/C/M(3)
		Use equipment for its intended use only.	
		Don’t use damaged tools and equipment.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Target Anomaly Reacquisition *(continued)*	Physical Hazard: Manual Lifting	Follow proper lifting techniques.	III/C/M(3)
		Use caution and do not twist the back when carrying a load.	
		Do not attempt to lift bulky items or items assessed at over 50lbs. without assistance.	
		Use mechanical devices to move loads when possible.	
		Wear leather gloves for materials handling.	
	Physical Hazard: Noise	Wear hearing protection when operating or working near heavy equipment.	IV/D/L(5)

REQUIRED EQUIPMENT, INSPECTION AND TRAINING:

Equipment	Inspection Requirements	Training Requirements (including Competent Person and Qualified Personnel, if applicable)
• Support vehicle • Magnetometer • PPE • Emergency equipment including fire extinguishers	• Inspect PPE prior to each use • Inspect vehicle daily • Use appropriate PPE • Inspect emergency equipment/supplies	• Use and limitations of PPE • Valid driver's license • APP and AHA review • Hazardous waste sites require 40 hour HAZWOPER training, annual updates for any intrusive activities. • UXOSO/SSHO will require HAZWOPER Supervisor's Training and 30-hour OSHA Construction Safety Course. • First aid/CPR—at least 2 people on site • UXO Techs: Qualifications and training per DDESB TP-18 • All non-UXO qualified staff will receive site-specific UXO awareness training

Activity/Work Task:	**MPPEH Inspection and Disposition**	Overall Risk Assessment Code (RAC) (use highest code from all subtasks):	**H(2)**
Project Location:	Hancock Field, New York		
Project Number:	6273502		
Date Prepared:	26 February 2016		
Prepared By:	P. Phillips		
Reviewed By:	P. Garger, CIH, CSP		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic I	E (1)	E (1)	H (2)	H (2)	M (3)
Critical II	E (1)	H (2)	H (2)	M (3)	L (4)
Marginal III	H (2)	M (3)	M (3)	L (4)	L (5)
Negligible IV	M (3)	L (4)	L (4)	L (5)	L (5)

Step 1: Review each "hazard" and determine RAC.

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Severity = the outcome/degree if an incident, near miss, or accident did occur. Identified as catastrophic, critical, marginal, or negligible.

Step 2: Identify the RAC as E, H, M, or L for each hazard on AHA. Select the highest RAC and note at the top of the form.

RAC Chart
E = Extremely High Risk (1)
H = High Risk (2)
M = Moderate Risk (3)
L = Low Risk (4 or 5)

TASK BREAKDOWN, HAZARDS AND CONTROLS:

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
MPPEH Inspection and Disposition	Physical Hazard: MEC	Specific requirements for MEC disposal are detailed in the WP and the ESS.	II/C/H(2)
		Assess MEC items to determine if they can be safely moved.	
		If the item cannot be safely moved, it will be blown in place.	
		Items that are not fused and are acceptable to be moved will be marked for collection and storage in accordance with the ESS.	
		Demolition operations must be conducted in accordance with the Demolition SOP.	
	Physical Hazard: Hand Tools	Inspect tools prior to use.	III/C/M(3)
		Use tools for their intended use only.	
		Don't use damaged tools.	
		Push, don't pull wrenches.	
MPPEH Inspection and	Physical Hazard: Manual Lifting	Follow proper lifting techniques.	III/C/M(3)
		Use caution and do not twist the back when carrying a load.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Disposition *(continued)*		Do not attempt to lift bulky items or items assessed at over 50lbs. without assistance.	
		Use mechanical devices to move loads when possible.	
		Wear leather gloves for materials handling.	
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	UXOSO/SSHO will walk site and identify potential hazardous areas and these will be identified in the daily tailgate safety briefing.	IV/C/L(4)
		Use repellants and proper clothing for protection against insects including ticks and mosquitoes.	
		Stay alert and safe distance away from biological hazards.	
		Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if high probability of encountering snakes, ticks, poison ivy or oak.	
		Workers with allergies should carry antidote kits, if necessary.	
		Exercise caution when moving obstacles, items that could be home to snakes, spiders, or other animals or insects.	
	Physical Hazard: Noise	Wear hearing protection.	III/C/M(3)
	Chemical Hazards	Review safety data sheets.	III/E/L(5)
		Follow manufacturer's instruction for use, handling and storage.	
		Use recommended protective equipment.	
		Label all containers.	
	Physical Hazard: Cold Stress	Wear cold weather clothing and provide shelter as needed based on site conditions.	III/C/M(3)
		Conduct temperature monitoring when temperatures fall below 45° F.	
	Physical Hazard: Heat Stress	Make drinking water available to all workers and encourage workers to drink small amounts of water frequently.	III/C/M(3)
		Adjust work/rest regimens during hot weather.	
		Determine appropriate work schedule; take regular breaks.	
		Have adequate water and electrolyte drinks available.	
		Designate shaded break areas.	
		Be aware of symptoms of heat-related illness.	
MPPEH Inspection and Disposition *(continued)*	Physical Hazard: Weather	Monitor radio for up-to-date severe weather forecasts.	IV/D/L(5)
		Discontinue work during thunderstorms, ice, and severe weather events.	

REQUIRED EQUIPMENT, INSPECTION AND TRAINING:

Equipment	Inspection Requirements	Training Requirements (including Competent Person and Qualified Personnel, if applicable)
• Support vehicle • Magnetometer • PPE • Emergency equipment including fire extinguishers • Engineering Controls (i.e., sandbags, shovel, etc.) • Explosives	• Inspect PPE prior to each use • Inspect vehicle daily • Inspect/test magnetometer • Inspect emergency equipment/supplies	• Use and limitations of PPE • Valid driver's license • APP and AHA review • Hazardous waste sites require 40 hour HAZWOPER training, annual updates for any intrusive activities. • UXOSO/SSHO will require HAZWOPER Supervisor's Training and 30-hour OSHA Construction Safety Course. • First aid/CPR—at least 2 people on site • UXO Techs: Qualifications and training per DDESB TP-18 • All non-UXO qualified staff will receive site-specific UXO awareness training.

Activity/Work Task:	**Soil Sifting**	Overall Risk Assessment Code (RAC) (use highest code from all subtasks):	**H(2)**
Project Location:	Hancock Field, new York		
Project Number:	6273502		
Date Prepared:	26 February 2016		
Prepared By:	P. Phillips		
Reviewed By:	P. Garger, CIH, CSP		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic I	E (1)	E (1)	H (2)	H (2)	M (3)
Critical II	E (1)	H (2)	H (2)	M (3)	L (4)
Marginal III	H (2)	M (3)	M (3)	L (4)	L (5)
Negligible IV	M (3)	L (4)	L (4)	L (5)	L (5)

Step 1: Review each "hazard" and determine RAC.

Probability = the likelihood to cause an incident, near miss, or accident. Identified as frequent, likely, occasional, seldom, or unlikely.
Severity = the outcome/degree if an incident, near miss, or accident did occur. Identified as catastrophic, critical, marginal, or negligible.

Step 2: Identify the RAC as E, H, M, or L for each hazard on AHA. Select the highest RAC and note at the top of the form.

RAC Chart
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M = Moderate Risk (3)
L = Low Risk (4 or 5)

TASK BREAKDOWN, HAZARDS AND CONTROLS

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Equipment Setup/Operation	Physical Hazard: MEC	EZs are established to authorize MSDs for non-project personnel and team separation distances for project personnel.	II/C/H(2)
		Use the appropriate shielding requirements, as specified in the Explosives Safety Submission (ESS), for all personnel working inside the EZ.	
		Ensure all personnel are under the direction of DDESB-qualified UXO Technicians.	
		Do not conduct operations within site-specific MSDs of other MEC intrusive operations.	
		Observe general MEC hazards and precautions.	
		Ensure compliance with relevant SOPs and the ESS.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Equipment Setup/Operation *(Continued)*	Physical Hazard: Slips, Trips, Falls	Keep work area free of excess material and debris.	III/C/M(3)
		Remove all trip hazards by keeping materials/objects organized and out of walkways.	
		Be aware of uneven surfaces.	
		Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces.	
		Stay aware of footing and do not run.	
		Do not climb on equipment, ensure guardrails are installed and in working condition on equipment stairs/platforms.	
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	UXOSO/SSHO will walk site and identify potential hazardous areas and these will be identified in the daily tailgate safety briefing.	IV/C/L(4)
		Use repellants and proper clothing for protection against insects including ticks and mosquitoes.	
		Stay alert and safe distance away from biological hazards.	
		Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if high probability of encountering snakes, ticks, poison ivy or oak.	
		Workers with allergies should carry antidote kits, if necessary.	
		Exercise caution when moving obstacles, items that could be home to snakes, spiders, or other animals or insects.	
	Physical Hazard: Weather	Monitor radio for up-to-date severe weather forecasts.	IV/D/L(5)
		Discontinue work during thunderstorms, ice, and severe weather events.	
	Physical Hazard: Faulty or Inappropriate Equipment	Qualified operator must inspect equipment prior to use, if faulty or inappropriate, do not proceed until repaired or replaced.	II/D/M(3)
		Inspect all equipment prior to use, if faulty or inappropriate, do not proceed until repaired or replaced.	
	Physical Hazard: Dust	Minimize generation of dust.	IV/C/L(4)
		Stay out of visible dust clouds.	
		Wet soil if necessary to eliminate visible dust.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Equipment Setup/Operation *(Continued)*	Physical Hazard: Moving Equipment	Clear area of obstructions and communicate with all workers involved that operations are beginning (see Physical Hazards: Conveyor).	III/D/L(4)
		Use long-handled shovel to clear away material when equipment has stopped.	III/D/L(4)
		Secure loose clothing.	
		Do not walk under equipment parts containing material.	
		When possible, remove overhead hazards promptly.	
		Wear appropriate PPE including hard hat and steel-toed boots.	
		Use spotters when moving in/out of nominal clearance areas.	
		Wheeled equipment shall be secured to prevent movement/shifting during operation.	
		An emergency "kill switch" will be available remotely to shut down the equipment.	
	Physical Hazard: Injury from heavy equipment (loading)	Be aware of the location of equipment, wear high visibility vest, and establish eye contact with operator(s).	III/D/M(3)
		Be aware of falling soil, pinch points, swinging chains, augers, etc.	
		Wear appropriate PPE (hard hat) when working in proximity to equipment and overhead hazards.	
		Feed hopper shall be guarded to prevent persons from falling in.	
	Physical Hazard: Conveyor	Use airhorn prior to startup of conveyor belt(s).	II/D/M(3)
		Maintain strobe/flashing light to indicate equipment/conveyors are operational.	
		Identify pinch points and remain clear during operation.	
		Shut down conveyors prior to maintenance or removing any jams or clogs.	
		Ensure that equipment has a functional and easily accessible emergency shutdown, and that location is clearly marked.	
		Guard all nip and shear points, post appropriate warnings.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Equipment Setup/Operation *(Continued)*	Physical Hazard: Conveyor *(continued)*	Conveyor booms shall be stabilized to prevent toppling of the equipment under heavy loads.	II/D/M(3)
		Prior to restart of equipment due to a clog/emergency stop, the equipment shall be inspected to ensure it is in working condition and debris has been cleared.	
	Physical Hazard: Falling Material	Be aware of where conveyors discharge materials and falling material from the main conveyor belt/feed bin.	III/D/L(4)
		Be aware of wind direction and fan blowing fine materials.	
		Maintain safe distance from conveyor belts.	
		Wear proper PPE, including hardhats and safety glasses when working near the equipment.	
		Ensure that all backstops and other safe guards are in-place and operational.	
	Physical Hazard: Material Handling, Moving, Lifting	Observe proper lifting techniques.	III/D/L(4)
		Use two or more persons for heavy bulk lifting.	
		Use mechanical lifting equipment (hand carts, trucks, etc.) to move large awkward loads.	
		Obey sensible lifting limits (50 lb maximum per person manual lifting).	
	Physical Hazard: Cold Stress	Wear cold weather clothing and provide shelter as needed based on site conditions.	III/C/M(3)
		Conduct temperature monitoring when temperatures fall below 45°.	
	Physical Hazard: Heat Stress	Make drinking water available to all workers and encourage workers to drink small amounts of water frequently.	III/C/M(3)
		Adjust work/rest regimens during hot weather.	
		Determine appropriate work schedule; take regular breaks.	
		Have adequate water and electrolyte drinks available.	
		Designate shaded break areas.	
		Be aware of symptoms of heat-related illness.	
	Chemical Hazards	Wear appropriate PPE as indicated in APP.	II/D/M(3)
	Physical Hazard: Fire/Explosion	Ensure type ABC, fully charged fire extinguisher on-site.	I/E/M(3)
		Perform utility clearance.	
		Stop work if hazardous conditions are identified.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Equipment Setup/Operation *(Continued)*	Physical Hazard: Electrical	Unplug from outlet or if no outlet cut power at circuit breaker to prevent electrical shock.	II/C/H(2)
		Follow all manufacturer's recommendation during any repairs and follow lockout/tagout procedures.	
	Physical Hazard: Noise	Wear hearing protection when operating or working near heavy equipment or power machine tools.	IV/C/M(3)
	Chemical/Physical Hazard: Elevated Levels of Dust and/or Combustible Gases	Approach and stay upwind of potential sources of dust.	III/C/M(3)
		Ensure personnel using have been trained on instrument use and site specific action levels/upgrades.	
		Calibrate instrument prior to use. Monitor for oxygen deficiency and combustible gas prior to the start of each shift.	

REQUIRED EQUIPMENT, INSPECTION AND TRAINING:

Equipment	Inspection Requirements	Training Requirements (including Competent Person and Qualified Personnel, if applicable)
• Support vehicle • PPE • Sifting equipment (to include a remotely operated "Kill" switch) • Hand tools • Emergency equipment including first aid kit, eye wash, fire extinguishers • Excavating heavy equipment (to include appropriate shielding as specified in the ESS) • Monitoring equipment	• Inspect PPE prior to each use • Inspect equipment prior to start-up and following restart after emergency shutdown/system jam/clog • Inspect vehicle daily • Test remote "Kill" switch daily. • Underground hazards require clearance • Inspect emergency equipment/supplies daily (first aid kit, eye wash, fire extinguisher) • Calibrate environmental monitoring equipment daily prior to use.	• Use and limitations of PPE • Valid driver's license • Heavy equipment operator will be trained in equipment use and maintenance • Lifting • APP and AHA review • First aid/CPR—at least 2 people on site • Hazardous waste sites require 40 hour HAZWOPER training, annual updates for any intrusive activities. • UXOSO/SSHO will require HAZWOPER Supervisor's Training and 30-hour OSHA Construction Safety Course. • UXO Techs: Qualifications and training per DDESB TP-18 • All non-UXO qualified staff will receive site-specific UXO awareness training. • Use of monitoring equipment

Activity/Work Task:	**Wooden Timber Inspection, Removal, and Disposal**	Overall Risk Assessment Code (RAC) (use highest code from all subtasks):	**H(2)**
Project Location:	Hancock Field, New York		
Project Number:	6273502		
Date Prepared:	26 February 2016		
Prepared By:	P. Phillips		
Reviewed By:	P. Garger, CIH, CSP		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic I	E (1)	E (1)	H (2)	H (2)	M (3)
Critical II	E (1)	H (2)	H (2)	M (3)	L (4)
Marginal III	H (2)	M (3)	M (3)	L (4)	L (5)
Negligible IV	M (3)	L (4)	L (4)	L (5)	L (5)

Step 1: Review each "hazard" and determine RAC.

Probability = the likelihood to cause an incident, near miss, or accident. Identified as frequent, likely, occasional, seldom, or unlikely.
Severity = the outcome/degree if an incident, near miss, or accident did occur. Identified as catastrophic, critical, marginal, or negligible.

Step 2: Identify the RAC as E, H, M, or L for each hazard on AHA. Select the highest RAC and note at the top of the form.

RAC Chart

E = Extremely High Risk (1)
H = High Risk (2)
M = Moderate Risk (3)
L = Low Risk (4 or 5)

TASK BREAKDOWN, HAZARDS AND CONTROLS

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Equipment Setup/Operation	Physical Hazard: MEC	EZs are established to authorize MSDs for non-project personnel and team separation distances for project personnel.	II/C/H(2)
		Use the appropriate shielding requirements, as specified in the Explosives Safety Submission (ESS), for all personnel working inside the EZ.	
		Ensure all personnel are under the direction of DDESB-qualified UXO Technicians.	
		Do not conduct operations within site-specific MSDs of other MEC intrusive operations.	
		Observe general MEC hazards and precautions.	
		Ensure compliance with relevant SOPs and the ESS.	
	Physical Hazard: Slips, Trips, Falls	Be aware of uneven surfaces.	IV/C/L(4)
		Keep work area free of excess material and debris.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Equipment Setup/Operation *(continued)*	Physical Hazard: Slips, Trips, Falls *(continued)*	Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces.	IV/C/L(4)
		Stay aware of footing and do not run.	
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	UXOSO/SSHO will walk site and identify potential hazardous areas and these will be identified in the daily tailgate safety briefing.	IV/C/L(4)
		Use repellants and proper clothing for protection against insects including ticks and mosquitoes.	
		Stay alert and safe distances away from biological hazards.	
		Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if high probability of encountering snakes, ticks, spiders, poison ivy or oak.	
		Workers with allergies should carry antidote kits, if necessary.	
		Exercise caution when moving obstacles, items that could be home to snakes, spiders, or other animals or insects.	
	Physical Hazard: Weather	Monitor radio for up-to-date severe weather forecasts.	IV/D/L(5)
		Discontinue work during thunderstorms, ice, severe weather events, and high winds.	
	Physical Hazard: Faulty or Inappropriate Equipment	Qualified operator must inspect equipment prior to use, if faulty or inappropriate, do not proceed until repaired or replaced.	II/D/M(3)
		Inspect all equipment prior to use, if faulty or inappropriate, do not proceed until repaired or replaced.	
	Physical Hazard: Dust	Minimize generation of dust.	IV/C/L(4)
		Stay out of visible dust clouds.	
		Wet soil if necessary to eliminate visible dust.	
	Physical Hazard: Working at Heights Greater than 6 feet	Ensure there is a qualified Competent Person on site.	II/D/M(3)
		Verify operator has sufficient experience and knowledge in the complete operation of selected equipment.	
		Verify operator has a full understanding of the limitations and specifications of the selected equipment and is familiar with all controls and operating parameters.	
		Ensure operator and Competent Person have access to equipment's operating manual.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Equipment Setup/Operation *(continued)*	Physical Hazard: Working at Heights Greater than 6 feet *(continued)*	Ensure the operator and Competent Person are properly trained on all fall protection equipment, the fall protection plan, and the rescue plan.	II/D/M(3)
		Inspect all fall protection equipment before each use for any signs of damage, wear, tears, frayed materials, malfunctioning equipment, and all other signs of defect as identified in the daily inspection forms.	
		Inspect lift equipment for any abnormalities such as leaking oil, missing bolts, tire pressure, rust, non-properly connected terminals and any other signs of defect as identified in the daily inspection form.	
		Defective or damaged equipment will not be used and will be immediately removed from service, and replaced before use of the system.	
		Verify that all controls are properly functioning. Verify that lower operating controls successfully override the upper controls.	
		Ensure that both upper and lower lift controls are plainly marked as to their function.	
		Verify the emergency lowering function operates properly.	
		Verify all personal fall protection equipment is certified and meets ANSI Z359.1.	
		The attachment point for the body harness will be located in the center of the wearer's back near shoulder level. Lanyards will be attached to the designated anchorage points located within the manlift as soon as user enters equipment.	
		Lift will be entered and exited by user who will maintain three points of contact at all times.	
		User will always stand firmly on floor of manlift and will not sit or climb on the edge of the lift or use a ladder or other device for a work position.	
		Lift will be fully lowered as close to the ground surface as possible before moving in order to reduce lift tip hazard while in motion.	
		The route of travel while moving the lift will be pre-planned to reduce the risk of interactions with overhead hazards and surface encumbrances.	
		Lift wheels will be inspected to make sure all wheels/feet have firm/level contact with ground. If equipped, outriggers will be deployed before the lift is extended.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Equipment Setup/Operation *(continued)*	Physical Hazard: Working at Heights Greater than 6 feet *(continued)*	The manlift will be checked to ensure it is level before the manlift is extended vertically.	II/D/M(3)
		The braking system of the manlift will be set before elevating the basket.	
		No personnel will be allowed to stand around or in the area near the lift when they are not needed.	
		The manlift will not be extended within 15 ft of overhead utilities until contact has been made with the electric utility regarding de-energizing of the power line. All overhead lines will be assumed to be live.	
		While raising the lift, the user will watch for overhead pipes/structures that could cause pinch or strike hazards.	
		A spotter will be present at all times when the manlift is in operation including when the lift is extended and when the lift is being moved.	
		When in operation, the lift will be extended to the observation area so no stretching of the body is required. At no time will the user extend their body out of the basket.	
		At no time, will the manlift maximum capacity be exceeded. The maximum capacity includes the weight of the user and any tools or materials located within the lift basket.	
	Physical Hazard: Moving Equipment	Clear area of obstructions and communicate with all workers involved that operations are beginning.	III/D/L(4)
		Secure loose clothing.	
		Do not walk underneath equipment while in use.	
		When possible, remove overhead hazards promptly.	
		Wear appropriate PPE including hard hat, steel-toed boots, and safety vest.	
		Lift will be fully lowered as close to the ground surface as possible before moving in order to reduce lift tip hazard while in motion.	
		The route of travel while moving the lift will be pre-planned to reduce the risk of interactions with overhead hazards and surface encumbrances.	
		Movement of the lift requires a spotter.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Equipment Setup/Operation *(continued)*	Physical Hazard: Injury from heavy equipment	Be aware of location of equipment, wear high visibility vest, and establish eye contact with operator (s).	III/D/L(4)
		Be aware of falling debris, pinch points, etc.	
		Wear appropriate PPE (hard hat, steel toed boots, safety glasses) when working in proximity to equipment and overhead hazards.	
		Be aware of wind strength and direction.	
		Maintain safe distance from equipment.	
	Physical Hazard: Cold Stress	Wear cold weather clothing and provide shelter as needed based on site conditions.	III/C/M(3)
		Conduct temperature monitoring when temperatures fall below 45°F.	
	Physical Hazard: Heat Stress	Make drinking water available to all workers and encourage workers to drink small amounts of water frequently.	III/C/M(3)
		Adjust work/rest regimens during hot weather.	
		Determine appropriate work schedule, take regular breaks.	
		Have adequate water and electrolyte drinks available.	
		Designate shaded break areas.	
		Be aware of symptoms of heat-related illness.	
	Physical Hazard: Fire/Explosion	Ensure type ABC, fully charged fire extinguisher on-site.	I/E/M(3)
		Stop work if hazardous conditions are identified.	
		Maintain minimum clearance distances for overhead energized electrical lines. Use a spotter to confirm clearance of overhead lines and other obstructions.	
	Physical Hazard: Noise	Wear hearing protection when operating or working near heavy equipment or power machine tools.	IV/C/M(3)

REQUIRED EQUIPMENT, INSPECTION AND TRAINING:

Equipment	Inspection Requirements	Training Requirements (including Competent Person and Qualified Personnel, if applicable)
• PPE • Fall Protection Arrest System • Manlift equipment • Hand tools • Emergency equipment including first aid kit, eye wash, fire extinguishers	• Inspect PPE prior to each use • Inspect manlift every day and prior to use • Inspect fall protection equipment every day and prior to each use. • Inspect emergency equipment/supplies daily (first aid kit, eye wash, fire extinguisher)	• Use and limitations of PPE • Valid driver's license • APP and AHA review • First aid/CPR—at least 2 people on site • Hazardous waste sites require 40 hour HAZWOPER training, annual updates for any intrusive activities. • UXOSO/SSHO will require HAZWOPER Supervisor's Training and 30-hour OSHA Construction Safety Course. • Competent Person required during all Fall Protection required work. • Only qualified personnel eligible to operate manlift and must be fully trained in Fall Protection. • Competent Person and all manlift operators must review Fall Protection Plan and Rescue Plan. • Competent Person and user must inspect manlift and personal fall arrest system equipment before use. • UXO Techs: Qualifications and training per DDESB TP-18 • All non-UXO qualified staff will receive site-specific UXO awareness training.

Activity/Work Task:	**Structure Removal**	Overall Risk Assessment Code (RAC) (use highest code from all subtasks):	**H(2)**
Project Location:	Hancock Field, New York		
Project Number:	6273502		
Date Prepared:	26 February 2016		
Prepared By:	P. Phillips		
Reviewed By:	P. Garger, CIH, CSP		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic I	E (1)	E (1)	H (2)	H (2)	M (3)
Critical II	E (1)	H (2)	H (2)	M (3)	L (4)
Marginal III	H (2)	M (3)	M (3)	L (4)	L (5)
Negligible IV	M (3)	L (4)	L (4)	L (5)	L (5)

Step 1: Review each "hazard" and determine RAC.

Probability = the likelihood to cause an incident, near miss, or accident. Identified as frequent, likely, occasional, seldom, or unlikely.
Severity = the outcome/degree if an incident, near miss, or accident did occur. Identified as catastrophic, critical, marginal, or negligible.

Step 2: Identify the RAC as E, H, M, or L for each hazard on AHA. Select the highest RAC and note at the top of the form.

RAC Chart
E = Extremely High Risk (1)
H = High Risk (2)
M = Moderate Risk (3)
L = Low Risk (4 or 5)

TASK BREAKDOWN, HAZARDS AND CONTROLS

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Structure Survey	Physical Hazard: Slips, Trips, Falls	Keep work area free of excess material and debris.	III/C/M(3)
		Remove all trip hazards by keeping materials/objects organized and out of walkways.	
		Be aware of uneven surfaces.	
		Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces.	
		Stay aware of footing and do not run.	
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	UXOSO/SSHO will walk site and identify potential hazardous areas and these will be identified in the daily tailgate safety briefing.	IV/C/L(4)
		Use repellants and proper clothing for protection against insects including ticks and mosquitoes.	
		Stay alert and safe distance away from biological hazards.	
Structure Survey *(Continued)*	Biological Hazards: Insects, Snakes, Wildlife, Vegetation *(Continued)*	Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if high probability of encountering snakes, ticks, poison ivy or oak.	IV/C/L(4)

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
		Workers with allergies should carry antidote kits, if necessary.	
		Exercise caution when moving obstacles, items that could be home to snakes, spiders, or other animals or insects.	
	Physical Hazard: Weather	Monitor radio for up-to-date severe weather forecasts.	IV/D/L(5)
		Discontinue work during thunderstorms, ice, and severe weather events.	
	Physical Hazard: Dust	Minimize generation of dust.	
		Stay out of visible dust clouds.	
		Wet soil if necessary to eliminate visible dust.	
Structure Removal	Physical Hazard: MEC	Ensure Exclusion Zones (EZs) are established to authorized minimum safe distances (MSDs) for non-project personnel and team separation distances for project personnel.	II/C/H(2)
		Use the minimum number of personnel (not less than two) to conduct the operation and minimize their exposure time to MEC.	
		Ensure all personnel are under the direction of UXO-qualified personnel.	
		Do not conduct operations within site-specific MSDs of other MEC intrusive operations.	
		Observe general MEC hazards and precautions.	
		Ensure compliance with relevant SOPs and the MEC ESS.	
		UXO-qualified personnel (Tech II or above) will escort machinery throughout activities.	
	Physical Hazard: Slips, Trips, Falls	Keep work area free of excess material and debris.	III/C/M(3)
		Remove all trip hazards by keeping materials/objects organized and out of walkways.	
		Be aware of uneven surfaces.	
		Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces.	
		Stay aware of footing and do not run.	
Structure Removal *(Continued)*	Physical Hazard: Injury from heavy equipment.	Be aware of the location of equipment, wear high visibility vest, and establish eye contact with operator.	II/D/M(3)
		Be aware of pinch points, swinging chains, augers, etc.	
		Wear appropriate PPE (hard hat) when working in proximity to heavy equipment and overhead hazards.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
		Only qualified personnel shall be permitted to operate equipment.	
		Equipment shall be inspected daily. Equipment found to be unsafe shall not be used.	
		Maintain a safe envelope around all equipment. Personnel are only permitted to approach equipment afar a signal from the operator.	
		Unauthorized personnel will not be allowed in the work area until the area has been secured from hazards. All hand signals must be reviewed and understood by all personnel involved with this task in case communications systems cannot be used.	
		All equipment will be shut down with energies dissipated prior to performing maintenance activities.	
	Physical Hazard: Moving Equipment	Clear area of obstructions and communicate with all workers involved that excavation is beginning.	III/D/L(4)
		Secure loose clothing.	
		Do not walk under suspended loads.	
		When possible, remove overhead hazards promptly.	
		Wear appropriate PPE including hard hat and steel-toed boots.	
		Use spotters when moving in/out of nominal clearance areas.	
	Physical Hazard: Collapse	Anyone that is not directly involved with this task will remain outside of this work area. All nonessential personnel will not be allowed in the work area that will be barricaded off.	III/C/M(3)
	Physical Hazard: Material Handling, Moving, Lifting	Observe proper lifting techniques.	III/C/M(3)
		Use two or more persons for heavy bulk lifting.	
		Use mechanical lifting equipment (hand carts, trucks, etc.) to move large awkward loads.	
		Obey sensible lifting limits (50 lb. maximum per person manual lifting).	
	Physical Hazard: Loading/Hauling	Personnel to stay away from swing radius.	III/C/M(3)
		Personnel shall never stand under a suspended load.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Structure Removal *(Continued)*	Physical Hazard: Loading/Hauling *(continued)*	Personnel shall stay clear of heavy equipment.	III/C/M(3)
		Tag lines shall be used when appropriate.	
	Physical Hazard: Lacerations	Items to be handled shall be inspected for sharp edges prior to being handled.	III/C/M(3)
		Avoid distractions, keep your focus, and concentrate on the job.	
		Check your footing, position, and grip before tool use.	
		Personnel shall wear leather or Kevlar gloves when handling sharp materials. Personnel shall be aware of and avoid pinch point hazards.	
	Physical Hazard: Eye injuries and lacerations	Welders and cutters will have appropriate eye protection that will protect employees and other persons working in the vicinity from the direct rays of the arc, sparks, molten metal, spatter, and chipped slag and no one without the proper eye protection will be allowed in the area.	III/C/M(3)
		Wear appropriate PPE including required respiratory, eye and face, noise, head, foot, and skin protection equipment.	
	Physical Hazard: Compressed gas cylinders	Before connecting regulators to cylinders, carefully open the cylinder valve a crack to blow out any foreign particles. Close the valve. After the regulator is connected, stand to one side of the gauge while the cylinder valve is opened. Open the cylinder valve slowly.	III/C/M(3)
		Be certain that the second stage of the regulator is closed before opening the cylinder valve.	
		Open valves on fuel gas cylinders (propane, acetylene, natural gas) ¼ turn only. Open oxygen cylinder valves wide open. Valve wrench must be kept in place during use. Place cylinders and hoses where they are not exposed to sparks from slag from the cutting operation.	
	Physical Hazard: Gas Leaks	Keep hoses clear of sharp edges and abrasive surfaces or where vehicles can run them over.	III/C/M(3)
		Maintain all equipment and keep in good condition. Regularly check all connections and equipment for faults and leaks.	
		Do not allow hot metal or spatter to fall on hoses.	
		Handle cylinders carefully. Keep them in upright positions and fasten them to prevent them from falling or being knocked over.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Structure Removal *(Continued)*	Physical Hazard: Cold Stress	Wear cold weather clothing and provide shelter as needed based on site conditions.	III/D/L(4)
		Conduct temperature monitoring when temperatures fall below 45°F.	
	Physical Hazard: Heat Stress	Make drinking water available to all workers and encourage workers to drink small amounts of water frequently.	III/D/L(4)
		Adjust work/rest regimens during hot weather.	
		Determine appropriate work schedule; take regular breaks.	
		Have adequate water and electrolyte drinks available.	
		Designate shaded break areas.	
		Be aware of symptoms of heat-related illness.	
	Physical Hazard: Fire/Explosion	Ensure type ABC, fully charged fire extinguisher on-site.	I/E/M(3)
		Perform utility clearance.	
		Stop work if hazardous conditions are identified.	
		Maintain minimum clearance distances for overhead energized electrical lines. Use a spotter to confirm clearance of overhead lines and other obstructions.	
		Only trained personnel will be authorized to use torch. A hot work permit and fire watch will be used during and 30 minutes after cutting/welding operations. No flammable liquids or combustible material will be permitted within 30 ft of cutting/welding areas.	
	Chemical Hazards	Wear appropriate PPE as indicated in APP.	II/D/M(3)
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	UXOSO/SSHO will walk site and identify potential hazardous areas and these will be identified in the daily tailgate safety briefing.	III/C/M(3)
		Use insect repellant as necessary.	
		Stay alert and safe distance away from biological hazards.	
		Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if high probability of encountering snakes, ticks, poison ivy or oak.	
		Workers with allergies should carry antidote kits, if necessary.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Structure Removal *(Continued)*	Physical Hazard: Noise	Wear hearing protection when operating or working near heavy equipment.	III/C/M(3)
	Physical Hazard: Weather	Monitor radio for up-to-date severe weather forecasts. Discontinue work during thunderstorms and severe weather events.	II/D/M(3)

REQUIRED EQUIPMENT, INSPECTION AND TRAINING:

Equipment	Inspection Requirements	Training Requirements (including Competent Person and Qualified Personnel, if applicable)
• Support vehicle • PPE • Heavy equipment • Hand tools • Leather protection gloves • Torches • Emergency equipment including first aid kit, eye wash, fire extinguishers • Excavating heavy equipment • Monitoring equipment	• Inspect PPE prior to each use • Inspect vehicle daily • Mechanized equipment prior to each use • Sharp edges • Hand Tools • Torches • Underground hazards require clearance • Inspect emergency equipment/supplies daily (first aid kit, eye wash, fire extinguisher) • Calibrate environmental monitoring equipment daily prior to use	• Use and limitations of PPE • Valid driver's license • Heavy equipment operator will be trained in equipment use and maintenance • Lifting • APP and AHA review • First aid/CPR—at least 2 people on site • Hazardous waste sites require 40 hour HAZWOPER training, annual updates for any intrusive activities. • UXOSO/SSHO will require HAZWOPER Supervisor's Training and 30-hour OSHA Construction Safety Course. • UXO Techs: Qualifications and training per DDESB TP-18 • All non-UXO qualified staff will receive site-specific UXO awareness training. • Use of monitoring equipment

Activity/Work Task:	**Hot Work**	Overall Risk Assessment Code (RAC) (use highest code from all subtasks):	**M(3)**
Project Location:	Hancock Field, New York		
Project Number:	6273502		
Date Prepared:	26 February 2016		
Prepared By:	P. Phillips		
Reviewed By:	P. Garger, CIH, CSP		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic I	E (1)	E (1)	H (2)	H (2)	M (3)
Critical II	E (1)	H (2)	H (2)	M (3)	L (4)
Marginal III	H (2)	M (3)	M (3)	L (4)	L (5)
Negligible IV	M (3)	L (4)	L (4)	L (5)	L (5)

Step 1: Review each "hazard" and determine RAC.

Probability = the likelihood to cause an incident, near miss, or accident. Identified as frequent, likely, occasional, seldom, or unlikely.
Severity = the outcome/degree if an incident, near miss, or accident did occur. Identified as catastrophic, critical, marginal, or negligible.

Step 2: Identify the RAC as E, H, M, or L for each hazard on AHA. Select the highest RAC and note at the top of the form.

RAC Chart
E = Extremely High Risk (1)
H = High Risk (2)
M = Moderate Risk (3)
L = Low Risk (4 or 5)

TASK BREAKDOWN, HAZARDS AND CONTROLS

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
General Hot Work/Torch Cutting	Physical Hazard: Slips, Trips, Falls	Keep work area free of excess material and debris.	III/C/M(3)
		Remove all trip hazards by keeping materials/objects organized and out of walkways.	
		Be aware of uneven surfaces.	
		Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces.	
		Stay aware of footing and do not run.	
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	UXOSO/SSHO will walk site and identify potential hazardous areas and these will be identified in the daily tailgate safety briefing.	IV/C/L(4)
		Use repellants and proper clothing for protection against insects including ticks and mosquitoes.	
		Stay alert and safe distance away from biological hazards.	
General Hot Work/Torch Cutting *(Continued)*	Biological Hazards: Insects, Snakes, Wildlife, Vegetation *(Continued)*	Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if high probability of encountering snakes, ticks, poison ivy or oak.	IV/C/L(4)

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
		Workers with allergies should carry antidote kits, if necessary.	
		Exercise caution when moving obstacles, items that could be home to snakes, spiders, or other animals or insects.	
	Physical Hazard: Weather	Monitor radio for up-to-date severe weather forecasts.	IV/D/L(5)
		Discontinue work during thunderstorms, ice, and severe weather events.	
	Physical Hazard: Dust	Minimize generation of dust.	IV/C/L(4)
		Stay out of visible dust clouds.	
		Wet soil if necessary to eliminate visible dust.	
	Physical Hazard: Eye Injuries and Lacerations	Welders and cutters will have appropriate eye protection that will protect from arc flash, sparks, molten metal, spatter, and chipped slag. No personnel shall be allowed in the area without proper eye protection.	III/C/M(3)
		Wear appropriate PPE including respiratory, eye and face, noise, head, foot, and skin protection equipment.	
	Physical Hazard: Compressed Gas Cylinders	Before connecting regulators to cylinders, carefully open the cylinder valve a crack to blow out any foreign particles. Close the valve. After the regulator is connected, stand to one side of the gauge while the cylinder valve is opened. Open the cylinder valve slowly.	III/C/M(3)
		Be certain that the second stage of the regulator is closed before opening the cylinder valve.	
		Open valves on fuel gas cylinders (propane, acetylene, natural gas) ¼ turn only. Open oxygen cylinder valves wide open. Valve wrench must be kept in place during use. Place cylinders and hoses where they are not exposed to sparks from slag from the cutting operation.	
	Physical Hazard: Gas Leaks	Keep hoses clear of sharp edges and abrasive surfaces or where vehicles can run them over.	III/C/M(3)
		Maintain all equipment and keep in good condition. Regularly check all connections and equipment for faults and leaks.	
		Do not allow hot metal or spatter to fall on hoses.	
		Handle cylinders carefully. Keep them in upright positions and fasten them to prevent them from falling or being knocked over.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
General Hot Work/Torch Cutting *(Continued)*	Chemical Hazard: Faulty or Inappropriate Equipment	Qualified persons must inspect equipment prior to use, if faulty or inappropriate, do not proceed until repaired or replaced.	III/C/M(3)
		Torches/welding equipment shall be inspected before each use for leaking shutoff valves, hose couplings, and tip connections. Defective torches/welders shall not be used.	
		Hoses shall be purged individually before lighting the torch for the first time each day. Hoses shall not be purged into confined spaces or near ignition sources.	
		Clogged torch/welding tips shall be cleaned with suitable cleaning wires, drills, or other devices designed for such purposes.	
	Physical Hazard: Faulty or Inappropriate Equipment	Torches/welders shall be lit by friction lighters or other approved devices, not by matches or from hot work.	III/C/M(3)
		Torch/welding valves shall be closed and the gas supply shut off whenever work is suspended.	
		The torch/welding hose shall be put away and properly stored whenever work is suspended.	
		Inspect all hand tools prior to use, if faulty or inappropriate, do not proceed until repaired or replaced.	
	Physical Hazard: Slips, Trips, Falls	Keep work area free of excess material and debris.	III/C/M(3)
		Remove all trip hazards by keeping materials/objects organized and out of walkways.	
		Be aware of uneven surfaces.	
		Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces.	
		Stay aware of footing and do not run.	
	Physical Hazard: Moving Equipment	Clear area of obstructions and communicate with all workers involved that excavation is beginning.	III/D/L(4)
		Secure loose clothing.	
		Do not walk under suspended loads.	
		When possible, remove overhead hazards promptly.	
		Wear appropriate PPE including hard hat and steel-toed boots.	
		Use spotters when moving in/out of nominal clearance areas.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
General Hot Work/Torch Cutting *(Continued)*	Physical Hazard: Loading/Hauling	Personnel will stay away from swing radius.	III/D/L(4)
		Personnel shall never stand under a suspended load.	
		Personnel shall stay clear of heavy equipment.	
		Tag lines shall be used when appropriate.	
	Physical Hazard: Material Handling, Moving, Lifting	Observe proper lifting techniques.	III/D/L(4)
		Use two or more persons for heavy bulk lifting.	
		Use mechanical lifting equipment (hand carts, trucks, etc.) to move large awkward loads.	
		Obey sensible lifting limits (50 lb maximum per person manual lifting).	
	Physical Hazard: Cold Stress	Take breaks as needed.	III/D/L(4)
		Be aware of weather conditions and dress appropriately.	
	Physical Hazard: Heat Stress	Make drinking water available to all workers and encourage workers to drink small amounts of water frequently.	III/D/L(4)
		Adjust work/rest regimens during hot weather.	
		Determine appropriate work schedule; take regular breaks.	
		Have adequate water and electrolyte drinks available.	
		Designate shaded break areas.	
		Be aware of symptoms of heat-related illness.	
	Physical Hazard: Fire/Explosion	Ensure type ABC, fully charged fire extinguisher on-site.	I/E/M(3)
		Stop work if hazardous conditions are identified.	
		Only trained personnel will be authorized to use torch. A hot work permit and fire watch will be used during and 30 minutes after cutting/welding operations. No flammable liquids or combustible material will be permitted within 30 ft of cutting/welding areas.	
	Chemical Hazards	Wear appropriate PPE as indicated in APP.	II/D/M(3)
	Physical Hazard: Noise	Wear hearing protection when operating or working near heavy equipment.	III/C/M(3)

REQUIRED EQUIPMENT, INSPECTION AND TRAINING:

Equipment	Inspection Requirements	Training Requirements (including Competent Person and Qualified Personnel, if applicable)
• Support vehicle • PPE (including fire resistant clothing) • Hand tools • Torches • Emergency equipment including first aid kit, eye wash, fire extinguishers • Heavy Equipment • Compressed Gas • Hoses • Face Protection	• Inspect PPE prior to each use • Inspect vehicle daily • Mechanized equipment prior to each use • Hand Tools • Inspect emergency equipment/supplies daily (first aid kit, eye wash, fire extinguisher) • Inspect all hoses, gauges, valves, welding rods, and torches before and after each use.	• Use and limitations of PPE • Valid driver's license • Heavy equipment operator will be trained in equipment use and maintenance • Lifting • APP and AHA review • First aid/CPR—at least 2 people on site • Hazardous waste sites require 40 hour HAZWOPER training, annual updates for any intrusive activities. • UXOSO/SSHO will require HAZWOPER Supervisor's Training and 30-hour OSHA Construction Safety Course. • UXO Techs: Qualifications and training per DDESB TP-18 • All non-UXO qualified staff will receive site-specific UXO awareness training.

Activity/Work Task:	**Excavation/Backfill**	Overall Risk Assessment Code (RAC) (use highest code from all subtasks):	**H(2)**
Project Location:	Hancock Field, New York		
Project Number:	6273502		
Date Prepared:	26 February 2016		
Prepared By:	P. Phillips		
Reviewed By:	P. Garger, CIH, CSP		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic I	E (1)	E (1)	H (2)	H (2)	M (3)
Critical II	E (1)	H (2)	H (2)	M (3)	L (4)
Marginal III	H (2)	M (3)	M (3)	L (4)	L (5)
Negligible IV	M (3)	L (4)	L (4)	L (5)	L (5)

Step 1: Review each "hazard" and determine RAC.

Probability = the likelihood to cause an incident, near miss, or accident. Identified as frequent, likely, occasional, seldom, or unlikely.
Severity = the outcome/degree if an incident, near miss, or accident did occur. Identified as catastrophic, critical, marginal, or negligible.

Step 2: Identify the RAC as E, H, M, or L for each hazard on AHA. Select the highest RAC and note at the top of the form.

RAC Chart
E = Extremely High Risk (1)
H = High Risk (2)
M = Moderate Risk (3)
L = Low Risk (4 or 5)

TASK BREAKDOWN, HAZARDS AND CONTROLS

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Utility Clearance	Physical Hazard: Slips, Trips, Falls	Keep work area free of excess material and debris.	III/C/M(3)
		Remove all trip hazards by keeping materials/objects organized and out of walkways.	
		Be aware of uneven surfaces.	
		Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces.	
		Stay aware of footing and do not run.	
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	UXOSO/SSHO will walk site and identify potential hazardous areas and these will be identified in the daily tailgate safety briefing.	IV/C/L(4)
		Use repellants and proper clothing for protection against insects including ticks and mosquitoes.	
		Stay alert and safe distance away from biological hazards.	
Utility Clearance *(Continued)*	Biological Hazards: Insects, Snakes, Wildlife, Vegetation *(Continued)*	Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if high probability of encountering snakes, ticks, poison ivy or oak.	IV/C/L(4)

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
		Workers with allergies should carry antidote kits, if necessary.	
		Exercise caution when moving obstacles, items that could be home to snakes, spiders, or other animals or insects.	
	Physical Hazard: Weather	Monitor radio for up-to-date severe weather forecasts.	IV/D/L(5)
		Discontinue work during thunderstorms, ice, and severe weather events.	
	Physical Hazard: Dust	Minimize generation of dust.	IV/C/L(4)
		Stay out of visible dust clouds.	
		Wet soil if necessary to eliminate visible dust.	
Excavation	Physical Hazard: MEC	Ensure Exclusion Zones (EZs) are established to authorized minimum safe distances (MSDs) for non-project personnel and team separation distances for project personnel.	II/C/H(2)
		Use the minimum number of personnel (not less than two) to conduct the operation and minimize their exposure time to MEC.	
		Ensure all personnel are under the direction of UXO-qualified personnel.	
		Do not conduct operations within site-specific MSDs of other MEC intrusive operations.	
		Observe general MEC hazards and precautions.	
		Ensure compliance with relevant SOPs and the MEC ESS.	
		UXO-qualified personnel (Tech II or above) will escort machinery throughout activities.	
	Physical Hazard: Slips, Trips, Falls	Keep work area free of excess material and debris.	III/C/M(3)
		Remove all trip hazards by keeping materials/objects organized and out of walkways.	
		Be aware of uneven surfaces.	
		Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces.	
		Stay aware of footing and do not run.	
Excavation *(Continued)*	Physical Hazard: Injury from heavy equipment.	Be aware of the location of equipment, wear high visibility vest, and establish eye contact with operator.	II/D/M(3)
		Be aware of pinch points, swinging chains, augers, etc.	
		Wear appropriate PPE (hard hat) when working in proximity to heavy equipment and overhead hazards.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
		Only qualified personnel shall be permitted to operate equipment.	
		Equipment shall be inspected daily. Equipment found to be unsafe shall not be used.	
		Workers shall not be positioned between equipment and stationary objects.	
		Maintain a safe envelope around equipment. Personnel are only permitted to approach equipment after a signal from the operator.	
		Unauthorized personnel will not be allowed in the work area until the area has been secured from hazards. All hand signals must be reviewed and understood by all personnel involved with this task in case communications systems cannot be used.	
		All equipment shall be shut down with energies dissipated prior to performing maintenance activities.	
	Physical Hazard: Moving Equipment	Clear area of obstructions and communicate with all workers involved that excavation is beginning.	III/D/L(4)
		Secure loose clothing.	
		Do not walk under suspended loads.	
		When possible, remove overhead hazards promptly.	
		Wear appropriate PPE including hard hat and steel-toed boots.	
		Use spotters when moving in/out of nominal clearance areas.	
	Physical Hazard: Loading/Hauling	Personnel will stay away from swing radius.	III/D/L(4)
		Personnel shall never stand under a suspended load.	
		Personnel shall stay clear of heavy equipment.	
		Tag lines shall be used when appropriate.	
	Physical Hazard: Collapse	Do not enter excavation.	II/D/M(3)
		If it is necessary to enter excavation that is more than 5 feet, proper sloping or shoring is to be utilized.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Excavation *(Continued)*	Physical Hazard: Vibrations (Potential Cause of Collapse)	Divert traffic away from the excavation.	II/D/M(3)
	Physical Hazard: Water (Potential Cause of Collapse)	Construct diversion ditches and/or dikes to prevent water from accumulating in an excavation or trench.	III/D/L(4)
		Pumps should be used to keep rain and/or ground water from collecting at the bottom of an excavation or trench.	
	Physical Hazard: Weight (Potential Cause of Collapse)	Locate all equipment as far away from the excavation or trench as possible.	III/D/L(4)
		Spoils piles shall be stored at least two (2) feet or more from the edge of the excavation or trench.	
	Physical Hazard: Temperature (Potential Cause of Collapse)	Be aware in changes of soil cohesiveness due to temperature.	III/D/L(4)
		Thawing can cause seemingly stable soil to become less stable, potentially resulting in mudslides or cave-ins.	
		The amount of time that an excavation or trench is open and exposed to natural weathering will affect the cohesiveness of soil.	
	Physical Hazard: Material Handling, Moving, Lifting	Observe proper lifting techniques.	III/D/L(4)
		Use two or more persons for heavy bulk lifting.	
		Use mechanical lifting equipment (hand carts, trucks, etc.) to move large awkward loads.	
		Obey sensible lifting limits (50 lb maximum per person manual lifting).	
	Physical Hazard: Cold Stress	Wear cold weather clothing and provide shelter as needed based on site conditions.	III/D/L(4)
		Conduct temperature monitoring when temperatures fall below 45°F.	
	Physical Hazard: Heat Stress	Make drinking water available to all workers and encourage workers to drink small amounts of water frequently.	III/D/L(4)
		Adjust work/rest regimens during hot weather.	
		Determine appropriate work schedule; take regular breaks.	
		Have adequate water and electrolyte drinks available.	
		Designate shaded break areas.	
		Be aware of symptoms of heat-related illness.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Excavation *(Continued)*	Physical Hazard: Fire/Explosion	Ensure type ABC, fully charged fire extinguisher on-site.	I/E/M(3)
		Perform utility clearance.	
		Stop work if hazardous conditions are identified.	
		Maintain minimum clearance distances for overhead energized electrical lines. Use a spotter to confirm clearance of overhead lines and other obstructions.	
	Chemical Hazards	Wear appropriate PPE as indicated in APP.	II/D/M(3)
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	UXOSO/SSHO will walk site and identify potential hazardous areas and these will be identified in the daily tailgate safety briefing.	III/C/M(3)
		Use insect repellant as necessary.	
		Stay alert and safe distance away from biological hazards.	
		Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if high probability of encountering snakes, ticks, poison ivy or oak.	
		Workers with allergies should carry antidote kits, if necessary.	
	Physical Hazard: Noise	Wear hearing protection when operating or working near heavy equipment	III/C/M(3)

REQUIRED EQUIPMENT, INSPECTION AND TRAINING:

Equipment	Inspection Requirements	Training Requirements (including Competent Person and Qualified Personnel, if applicable)
• Support vehicle • PPE • Heavy equipment • Hand tools • Emergency equipment including first aid kit, eye wash, fire extinguishers • Excavating heavy equipment • Monitoring equipment	• Inspect PPE prior to each use • Inspect vehicle daily • Underground hazards require clearance • Inspect emergency equipment/supplies daily (first aid kit, eye wash, fire extinguisher) • Calibrate environmental monitoring equipment daily prior to use	• Use and limitations of PPE • Valid driver's license • Heavy equipment operator will be trained in equipment use and maintenance • Lifting • APP and AHA review • First aid/CPR—at least 2 people on site • Hazardous waste sites require 40 hour HAZWOPER training, annual updates for any intrusive activities. • UXOSO/SSHO will require HAZWOPER Supervisor's Training and 30-hour OSHA Construction Safety Course. • UXO Techs: Qualifications and training per DDESB TP-18 • All non-UXO qualified staff will receive site-specific UXO awareness training. • Use of monitoring equipment

Activity/Work Task:	**Soil Sampling**	Overall Risk Assessment Code (RAC) (use highest code from all subtasks):	**M(3)**
Project Location:	Hancock Field, New York		
Project Number:	6273502		
Date Prepared:	12 April 2018		
Prepared By:	I. Harvey		
Reviewed By:	P. Garger, CIH		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic I	E (1)	E (1)	H (2)	H (2)	M (3)
Critical II	E (1)	H (2)	H (2)	M (3)	L (4)
Marginal III	H (2)	M (3)	M (3)	L (4)	L (5)
Negligible IV	M (3)	L (4)	L (4)	L (5)	L (5)

Step 1: Review each "hazard" and determine RAC.

Probability = the likelihood to cause an incident, near miss, or accident. Identified as frequent, likely, occasional, seldom, or unlikely.
Severity = the outcome/degree if an incident, near miss, or accident did occur. Identified as catastrophic, critical, marginal, or negligible.

Step 2: Identify the RAC as E, H, M, or L for each hazard on AHA. Select the highest RAC and note at the top of the form.

RAC Chart
E = Extremely High Risk (1)
H = High Risk (2)
M = Moderate Risk (3)
L = Low Risk (4 or 5)

TASK BREAKDOWN, HAZARDS AND CONTROLS

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Collect MC Samples	Physical Hazard: Manual Lifting	Follow proper lifting techniques.	III/E/L/(5)
		Use caution and do not twist the back when carrying a load.	
		Do not attempt to lift bulky items or items assessed at over 50lbs. without assistance.	
		Use mechanical devices to move loads when possible.	
		Wear leather gloves for materials handling.	
	Physical/Chemical Hazard: Contact with Contaminated Soil	Don proper PPE in accordance with the PPE matrix listed in the SSHP.	IV/C/L/(4)
Collect MC Samples (continued)	Physical Hazard: Slips, Trips, Falls	Keep work area free of excess material and debris.	III/D/L/(4)
		Remove all trip hazards by keeping materials/objects organized and out of walkways.	
		Be aware of uneven surfaces.	

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
		Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces.	
		Stay aware of footing and do not run.	
	Physical Hazard: Cold Stress	Take breaks as needed.	III/C/M(3)
		Be aware of weather conditions and dress appropriately.	
	Physical Hazard: Heat Stress	Make drinking water available to all workers and encourage workers to drink small amounts of water frequently.	III/C/M(3)
		Adjust work/rest regimens during hot weather.	
		Determine appropriate work schedule; take regular breaks.	
		Have adequate water and electrolyte drinks available.	
		Designate shaded break areas.	
		Be aware of symptoms of heat-related illness.	
	Physical Hazard: Weather	Monitor radio for up-to-date severe weather forecasts.	IV/D/L(5)
		Discontinue work during thunderstorms, ice, and severe weather events.	
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation Exposures	UXOSO/SSHO will walk site and identify potential hazardous areas and these will be identified in the daily tailgate safety briefing.	IV/C/L(4)
		Use repellants and proper clothing for protection against insects including ticks and mosquitoes.	
		Stay alert and safe distance away from biological hazards.	
		Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if high probability of encountering snakes, ticks, poison ivy or oak.	
		Workers with allergies should carry antidote kits, if necessary.	IV/C/L(4)
		Exercise caution when moving obstacles, items that could be home to snakes, spiders, or other animals or insects.	
	Physical Hazard: MEC	UXO-qualified personnel will escort non-UXO qualified staff.	II/D/M(3)
		Non-UXO qualified staff will receive site-specific UXO awareness training.	
		Avoidance will be used for intrusive activities (i.e., soil sampling)	
Collect MC Samples *(continued)*	Physical Hazard: MEC *(continued)*	Report all potential MEC to UXO-qualified staff.	
		Do not use cell phones or radio within 50 feet of potential MEC.	
		Do not disturb the ground in potential MEC areas without consulting UXO-qualified staff.	
		Do not move UXO; secure the area and notify SUXOS and/or the UXOSO.	

REQUIRED EQUIPMENT, INSPECTION AND TRAINING:

Equipment	Inspection Requirements	Training Requirements (including Competent Person and Qualified Personnel, if applicable)
• PPE • Support vehicle • Power tools/hand tools • Emergency equipment including first aid kit, eye wash, fire extinguishers	• Inspect PPE prior to each use • Inspect vehicle daily • Inspect emergency equipment/supplies daily (first aid kit, eye wash, fire extinguisher)	• Use and limitations of PPE • Valid driver's license • Lifting • APP and AHA review • First aid/CPR—at least 2 people on site • Hazardous waste sites require 40 hour HAZWOPER training, annual updates for any intrusive activities. • UXOSO/SSHO will require HAZWOPER Supervisor's Training and 30-hour OSHA Construction Safety Course. • UXO Techs: Qualifications and training per DDESB TP-18 • All non-UXO qualified staff will receive site-specific UXO awareness training.

Activity/Activities:	**Field Screening with XRF (Non-Source Based; Ionizing Radiation Producing)**	Phases: **XRF Soil Screening**	Overall Risk Assessment Code (RAC) (highest code from subtasks): **M**
Project Location:	Hancock Field, New York		
Project Number:	6273502		
Date Prepared:	12 April 2018		
Prepared By:	A. Sponagle (RSO); C. Mierczak (SRSL);		
Reviewed By:	P. Garger, CIH/CSP		
Competent and/or Qualified Person(s):	Field XRF Technician / SRSL		

Risk Assessment Code (RAC) Matrix

Severity	Probability 1 Frequent	2 Likely	3 Occasional	4 Seldom	5 Unlikely
1 Catastrophic	E	E	H	H	M
2 Critical	E	H	H	M	L
3 Marginal	H	M	M	L	L
4 Negligible	M	L	L	L	L

Step 1: Review each "hazard" and determine RAC.
Probability = The likelihood to cause an incident, near miss, or accident. Identified as frequent, likely, occasional, seldom, or unlikely.
Severity = The outcome/degree if an incident, near miss, or accident did occur. Identified as catastrophic, critical, marginal, or negligible.
Step 2: Identify the RAC as E, H, M, or L for each hazard on AHA. Select the highest RAC and note at the top of the form.

RAC Chart
E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

TASK BREAKDOWN, HAZARDS, AND CONTROLS: MONTHLY INSPECTION AND MAINTENANCE

Work Task Steps	Hazards	Controls	RAC Severity/ Probability /RAC
Determination of Target Metals Concentrations in Soil sample using XRF	Physical Hazard: Exposure to Radiation	• X-Ray generating equipment will be used on site to screen metals in soil and in accordance with the manufacturer's instructions for use and EA SOP 056. • Signage indicating "Caution, Radiation Area" will be placed a minimum of 15 feet from the work area while the x-ray generating device is in use. When not in use, the device shall be placed within a locked case, in a locked storage area, and in a locked room ("triple locked"). • X-ray generation is via electrical x-ray tube only and will not contain radioactive sources. • All soil samples will be analyzed using a test stand with integrated warning lights, shielding, and lid-activated deadman's switch. • Use of the x-ray generating device as a hand-held instrument is strictly forbidden. • Display any licenses (Maryland state license including reciprocity agreement) necessary for the use of the XRF in the trailer. • Only a qualified person is allowed to use the XRF. The instrument operator shall be trained in the use of the instrument and radiation safety with certifications retained at the job site. Minimum training requirements listed below. • Keep aware of the instrument's shutter location and the direction of its x-ray beam (this information is marked on the front and top sides of the instrument). Device will never be pointed at personnel. • Radiation dosimetry using Landauer NVLAP accredited badge and ring will be worn during all XRF operations to ensure doses are as low as reasonably achievable (ALARA). Dosimetry is personnel-specific and will be replaced every three (3) months. • Any loss, theft, or damage to the x-ray generating device will be reported immediately to the EA Radiation Safety Officer (RSO).	3/3/M
Determination of Target Metals Concentrations in Soil sample using XRF	Physical Hazard: Exposure to Heavy Metals or Spreading Contaminants	• Wear Modified Level D PPE and avoid direct physical contact with the soil. Wash hands immediately after handling samples, before eating, drinking or smoking, and prior to exiting the exclusion zone.	3/3/M

REQUIRED EQUIPMENT, INSPECTION, AND TRAINING:

Equipment	Inspection Requirements	Training Requirements (including Competent Person and Qualified Personnel, if applicable)
• Level D PPE within the exclusion zone (steel/composite toed boots, safety glasses, hard hat, work pants, blaze orange/yellow clothing and/or reflective safety vests) • Modified Level D PPE when handling soil (nitrile gloves) • XRF Niton, Model XL3t • Instrument specific, integrated soil test stand • Testing containers • NIST standards • Radiation dosimetry using Landauer NVLAP accredited badge and ring	• Inspect PPE prior to each use • Inspect XRF prior to use; Immediately remove from service if any warning lights and labels are damaged, inoperative, or missing.	• Use and limitations of PPE • APP/SSHP and general AHA review • Training in use of XRF as specified in EA SOP 056 (X-Ray Fluorescence Analysis of Soil, January 2018) and EA's Corporate Radiation Protection Program (August 2014), including: o Radiation Safety Training o EA and Manufacturer's Operational Training o 49 CFR 100-185 (USDOT) o Lithium ion battery transportation training

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Attachment 3

Field Forms

This attachment contains the APP Field Forms for this project. Contents of this attachment include:

Form D-1 – Tailgate Safety Briefing
Form D-2 – Safety Meeting/Training Record
Form D-3 – Safety Inspection Report
From D-4 – Fall Protection Forms
Form D-5 – Visitors Log
Form D-6 – Accident/Loss Report
Form D-7 – USACE Accident Investigation Report, Eng Form 3394

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TAILGATE SAFETY BRIEFING

Date: _____/_____/_____ **Location: _____**

Time: _____ AM PM **Team #: _____**

1. Reason for Briefing:

	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending:

Name	Signature	Position

Briefing Given By:

3. Topics: (Check All That Apply)

	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
	Physical Hazards		On-Site Injuries/Illnesses
	Chemical/Biological Hazards		Reporting Procedures
	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
	PPE		Medical Monitoring
	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Being Performed		Confined Spaces
	OE Precautions		Other:

4. Remarks:

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SAFETY MEETING/TRAINING RECORD	
DATE: _____/_____/_____	**TIME: _____AM PM**
LOCATION/SITE: _____	

1. Reason for Meeting/Training: (Check all that apply)	
	Daily Safety Meeting/Training
	Initial Site Safety Meeting/Training
	New Task Briefing
	Periodic Safety Meeting/Training
	New Site Procedures
	New Site Information
	Periodic Review of Site Information
	Other (Explain):

2. Personnel Attending Meeting/Training:

Name	Signature	Company

Safety Meeting/Training Record Con't:

3. Topics Covered (Check all that apply)			
	Site Safety Personnel		**Decontamination Procedures**
	Site/Work Area Description		**Emergency Response Plan**
	Site Characterization		**Hazard Communication**
	Biological Hazard(s)		**On-Site Emergency**
	Chemical Hazard(s)		**On-Site Injuries/Illnesses**
	Physical Hazard(s)		**Evacuation Procedures**
	Heat Stress		**Rally Point(s)**
	Cold Stress		**Emergency Communication**
	Site Control		**Directions to Medical Facility**
	Work and Support Zones		**Drug and Alcohol Policies**
	PPE		**Medical Monitoring Program**
	Air monitoring		**Specific Task Training**
	Safe Work Practices		**Confined Spaces**
	Engineering Controls and Equipment		**Heavy Equipment**
	Spill Containment Procedures		**Other: (Specify)**

4. Remarks:

5. Verification:

I certify that the personnel listed above on this record received the Information and/or Training described as indicated. Personnel not attending this meeting/training will receive said information/training prior to commencing their assigned duties.

Date: ____/___/___

_____

SO

EA Engineering, P.C. Safety Inspection Form For
MEC Operations

DATE:	**TIME:**	**LOG NO.:**
PROJECT NO:	**TASK ORDER NO:**	
SITE NAME AND LOCATION:		
TEAM OR NAME OF INSPECTED:		
INSPECTED ITEMS OR OPERATIONS: (List by task, item or other specific identifier)		

II. INSPECTION RESULTS

Item Description	Pass	Item Description	Pass
1. PPE	Y / N	9. MEC/UXO Disposal Operations:	Y / N
2. Compliance with Approved SOP's	Y / N	10. Motor Vehicles / MHE Inspections	Y / N
3. Compliance with Approved Safety Plans	Y / N	11. First Aid / Trauma Kit:	Y / N
4. Safety / Support Equipment	Y / N	12. Other (list):	Y / N
5. On and Off Site Communications	Y / N	13. Other (list):	Y / N
6. Explosives / Ordnance Reference Material	Y / N	14 Other (list):	Y / N
7. MSDSs and Container Labeling per APP or SOP	Y / N	15. Other (list):	Y / N
8 MEC/UXO Precautions Observed	Y / N	16. Other (list):	Y / N

SUMMARY OF DEFICIENCIES NOTED: (If any)

CORRECTIVE ACTIONS RECOMMENDED: (If any)

REINSPECTION RESULTS: (If required)

VI. SIGNATURES:

I acknowledge that I have been briefed on the results of this inspection and will take corrective actions (if necessary).

UXOSO / UXOQC

SUXOS

Note: Safety Inspections are to be conducted each day and documented on this form. This form will also be used to document the present status of the site/site operations, personnel, and will also be used to note the current status of deficiencies noted during daily inspections. Any daily inspection forms where deficiencies have been noted will be forwarded to the Project Manager, Project SUXOS and the Corporate Safety and Health Manager.

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VISITORS LOG

Project Location: _____ Month of: _____

DATE:	NAME:	AGENCY OR COMPANY:	PURPOSE OF VISIT:	SAFETY BRIEFING:	ESCORT REQ:	TIME IN:	TIME OUT:	REMARKS:

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EA Engineering, P.C.

SITE-SPECIFIC FALL PROTECTION PLAN FORM

Project Name:	**Project Number**:
Activity:	**Competent Person**: (Attach qualifications)

Description of Fall Hazards (location, height, work to be done at elevation, etc.)

Controls	**Provide details.** Attach drawings, additional pages, as needed.
☐ Guardrails (Describe guardrail system or attach drawings)	
☐ Fall Restraint (Describe anchorage, harness and restraint lanyard, minimum distance from edge of fall exposure)	
☐ Positioning device (Describe anchorage, harness and restraint lanyards and hardware connectors)	
☐ Personal Fall Arrest System (Describe anchorage, lanyard, harness, fall clearance)	
☐ Do anchor points need to be installed? ☐ No ☐Yes (Provide design details and fall protection method for installers)	
☐ Horizontal Lifeline (Attach Qualified Engineer Design)	
☐ Vertical Lifelines, Rope Grabs (Provide details and limitations on use)	

Rescue Plan (Describe how you will remove a suspended or injured worker from elevations, rescue equipment to be maintained on site, expected time required to affect rescue)

☐ All applicable workers have been trained on this plan and on the selection, use, inspection and maintenance of fall protection equipment.

Competent Person Signature:	**Date:**

EA Engineering, Science, and Technology, Inc., PBC

Elevated Work Platform Inspection Form

Elevated Work Platform Operator must inspect/document equipment daily, using this form.

Project Name:	**Project Number:**	**Date:**
Operator:	**Make/Model:**	

Inspection			
Elevated Work Platform Inspection	**Satisfactory**	**Unsatisfactory**	**N/A**
General appearance (hood, paint, undercarriage)	☐	☐	☐
Tires (adequate treat)	☐	☐	☐
Batteries (tie-downs in place, corroded, leaking)	☐	☐	☐
Hydraulic Oil Levels	☐	☐	☐
Coolant Levels	☐	☐	☐
Structural Arms (welds and paint condition)	☐	☐	☐
Chain properly lubricated	☐	☐	☐
Outriggers deployed and stable	☐	☐	☐
Basket in sound condition (toe boards, flooring)	☐	☐	☐
Guardrails intact, swing gate functional	☐	☐	☐
Controls properly marked/labelled and functional	☐	☐	☐
Ground controls (emergency override) functional	☐	☐	☐
Motion Alarm functional	☐	☐	☐
Fire Extinguisher (min 5 lbs B:C)	☐	☐	☐
Operators manual present	☐	☐	☐
Utilities			
Safe distance from overhead lines (min 10 feet)	☐	☐	☐
Work Area			
Work zone demarcated and barriers erected	☐	☐	☐
Non-essential personnel behind barriers	☐	☐	☐
Area clear of obstructions, holes, uneven surfaces	☐	☐	☐
Travel routes clear	☐	☐	☐
Overhead obstructions marked	☐	☐	☐
Personal Protective Equipment			
Fall protection (harness and lanyard) available and in use	☐	☐	☐
Anchorage points intact	☐	☐	☐

Comments:

EA Engineering, Science, and Technology, Inc., PBC

Harness Inspection Form

Designated Competent Person must inspect/document before initial use, and annually thereafter. The inspection must also be dated on the equipment tag. Defective equipment shall be removed from service and destroyed.

Project Name:	**Project Number:**	**Project Location:**
Date:	**Inspection Completed By:**	

Harness Information:

Harness Manufacturer:	**Manufacture Date:**
Serial Number:	**Harness Class:**

Inspection:

	Description	Pass	Fail
1	Left Shoulder Webbing		
2	Stitching		
3	Mating Buckle		
4	Adjusting Buckle		
5	Stitching		
6	Stitching		
7	Mating Buckle		
8	Stitching		
9	Left Leg Webbing		
10	Mating Buckle		
11	Mating Buckle		
12	Right leg webbing		
13	Stitching		
14	Mating Buckle		
15	Stitching		
16	Stitching		
17	Adjusting Buckle		
18	Mating Buckle		
19	Stitching		
20	Right shoulder webbing		
21	Dorsal D Ring		
22	D-ring back pad		
23	Stitching		
24	Stitching		
25	Stitching		
26	Stitching		
27	Sub-pelvic strap		
28	Belt keepers		
29	Stitching – end pattern		
30	Product label		
31	Back Strap		
32	Stitching – back strap		
	Load Indicators		

Comments:

EA Engineering, Science, and Technology, Inc., PBC

Lanyard Inspection Form

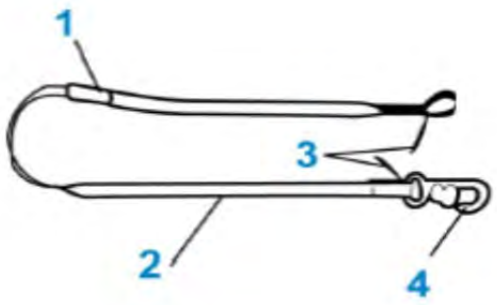
Designated Competent Person must inspect/document before initial use, and annually thereafter. The inspection must also be dated on the equipment tag. Defective equipment shall be removed from service and destroyed.

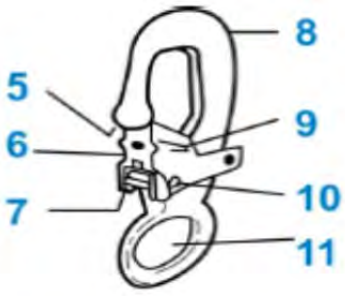
Project Name:	**Project Number:**	**Project Location:**
Date:	**Inspection Completed By:**	

Lanyard Information:

Lanyard Manufacturer:	**Manufacture Date:**
Serial Number:	**Lanyard Type:**

Inspection:





Snaphook, Self-locking
Style A

Snaphook, Self-locking
Style B

	Description	Pass	Fail
1	Flag Indicator	☐	☐
2	Outside Core Webbing	☐	☐
	Core	☐	☐
3	Wear Pads	☐	☐
	Labelling Tags	☐	☐
	Stitching	☐	☐
4	Snaphooks (self-locking)	☐	☐
5	Hook nose	☐	☐
6	Gate (keeper)	☐	☐
7	Lock	☐	☐
8	Hook Body	☐	☐
9	Spring (inside gate)	☐	☐
10	Hinge	☐	☐
11	Eye	☐	☐
12	Lock	☐	☐
13	Gate	☐	☐

Comments:

ACCIDENT/LOSS REPORT

This report must be completed by the injured employee or supervisor and faxed to EA Corporate Human Resources **within 24 hours** of any accident. The fax number is: **(410) 771-1780**.

NOTE: Whenever an employee is sent for medical treatment for a work-related injury or illness, Page 4 of this report must accompany that individual to ensure that all invoices/bills/correspondence are sent to Human Resources for timely response.

A. DEMOGRAPHIC INFORMATION

Name of Injured Employee:						
Home Address:						
Home Phone:		Date of Birth:				
Age:		Sex:	M:		F:	
Marital Status:		Hourly Rate:				
Employee Number:		Date of Hire:				
Number of Dependents:						
Employee's Job Title:						
Department Regularly Employed by:						
Was the Employee Injured on the Job:		Yes:	No:			
Primary Language of the Employee						

B. ACCIDENT/INCIDENT INFORMATION

Date of Accident:		Time of Accident:	
Report to Whom:		Name of Supervisor:	
Exact Location Where Accident Occurred (including street, city, state, and county:			
Explain what happened (include what the employee was doing at the time of the accident and how the accident occurred):			
Describe the injury and the specific part(s) of the body affected (e.g., laceration, right hand, third finger)			

Object or Substance that Directly Injured the Employee:			
Number of Days or Hours Employee Usually Works per Week:			
Is the Employee Expected to Lose at Least One Full Day of Work?			
Does the Employee Have a Previous Claim (Yes or No):		If yes, status (Open/Closed):	
Was the Employee Assigned to Restricted Duty (Yes or No)?			

C. ACCIDENT INVESTIGATION INFORMATION (Yes or No)

Was Safety Equipment Provided?		If yes, was it used	
Was an Unsafe Act Being Performed?		If yes, describe:	
Was a Machine Part Involved?		If yes, describe:	
Was the Machine Part Defective?		If yes, in what way?	
Was a Third Party Responsible for the Accident/Incident?		If yes, list name, address, and phone number:	
Was the Accident/Incident Witnessed?		If yes, list name, full address, and phone number:	

D. PROVIDER INFORMATION

Was First Aid Given Onsite (Yes or No)/		If yes, what type of medical treatment was given	
Physician Information (if medical attention was administered)?		Name, full address, and phone number	
Hospital Address		Name, full address, and phone number:	
Was the Employee Hospitalized (Yes or No)?		If yes, on what date?	
Was the Employee Treated as an Out-Patient. Receive Emergency Treatment, or Ambulance Service (Yes or No)?			

Please attach the physician's written Return to Work slip.

NOTE: A physician's Return to Work Slip is required prior to allowing the worker to return to work.

E. AUTOMOBILE ACCIDENT INFORMATION (complete if applicable)

Authority Contacted and Report Number			
EA Employee Vehicle Year, Make, and Model			
V.I.N.		Plate/Tag No.:	

Owner's Name and Address:			
Driver's Name and Address:		Driver's License No.:	
Relation to Insured:			
Describe Damage to Your Property:			
Describe Damage to Other Vehicle or Property:			

Other Driver's Name and Address:	
Other Driver's Phone No.:	
Other Driver's Insurance Company and Phone Number:	
Location of Other Vehicle:	
Name, Address, and Phone No. of Other Injured Parties:	

Witness 1 Name:		Phone No.:	
Address:			
Statement:			
Signature of Witness 1:			

Witness 2 Name:		Phone No.:	
Address:			
Statement:			
Signature of Witness 2:			

F. ACKNOWLEDGEMENT

Name of Supervisor:			
Report Prepared by:		Date Prepared:	

I have read this report and the contents as to how the accident/loss occurred are accurate to the best of my knowledge.

Signature of Injured Employee Date

I am seeking medical treatment for a work-related injury/illness.

Please forward all bills/invoices/correspondence to:

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.
225 SCHILLING CIRCLE
HUNT VALLEY, MARYLAND 21031

ATTENTION: Michele Bailey
HUMAN RESOURCES

(410) 584-7000
(410) 771-1780 (FAX)

(For Safety Staff only)	REPORT NO.	EROC CODE	**UNITED STATES ARMY CORPS OF ENGINEERS** **ACCIDENT INVESTIGATION REPORT** *(For Use of this Form See Help Menu and USACE Suppl to AR 385-40)*	**REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)**

1. **ACCIDENT CLASSIFICATION**

PERSONNEL CLASSIFICATION	INJURY/ILLNESS/FATAL	PROPERTY DAMAGE	MOTOR VEHICLE INVOLVED	DIVING
GOVERNMENT ☐ CIVILIAN ☐ MILITARY	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ CONTRACTOR	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ PUBLIC	☐ FATAL ☐ OTHER		☐	

2. **PERSONAL DATA**

a. Name *(Last, First, MI)*	b. AGE	c. SEX ☐ MALE ☐ FEMALE	d. SOCIAL SECURITY NUMBER	e. GRADE

f. JOB SERIES/TITLE	g. DUTY STATUS AT TIME OF ACCIDENT	h. EMPLOYMENT STATUS AT TIME OF ACCIDENT
	☐ ON DUTY ☐ TDY ☐ OFF DUTY	☐ ARMY ACTIVE ☐ ARMY RESERVE ☐ VOLUNTEER ☐ PERMANENT ☐ FOREIGN NATIONAL ☐ SEASONAL ☐ TEMPORARY ☐ STUDENT ☐ OTHER *(Specify)* _____

3. **GENERAL INFORMATION**

a. DATE OF ACCIDENT *(month/day/year)*	b. TIME OF ACCIDENT *(Military time)* hrs	c. EXACT LOCATION OF ACCIDENT	d. CONTRACTOR'S NAME (1) PRIME: (2) SUBCONTRACTOR:

e. CONTRACT NUMBER	f. TYPE OF CONTRACT	g. HAZARDOUS/TOXIC WASTE ACTIVITY
_____ ☐ CIVIL WORKS ☐ MILITARY ☐ OTHER *(Specify)* _____	☐ CONSTRUCTION ☐ SERVICE ☐ A/E ☐ DREDGE ☐ OTHER *(Specify)* _____	☐ SUPERFUND ☐ DERP ☐ IRP ☐ OTHER *(Specify)* _____

4. **CONSTRUCTION ACTIVITIES ONLY** *(Fill in line and corresponding code number in box from list - see help menu)*

a. CONSTRUCTION ACTIVITY	(CODE) #	b. TYPE OF CONSTRUCTION EQUIPMENT	(CODE) #

5. INJURY/ILLNESS INFORMATION *(Include name on line and corresponding code number in box for items e, f & g - see help menu)*

a. SEVERITY OF ILLNESS/INJURY	(CODE) #	b. ESTIMATED DAYS LOST	c. ESTIMATED DAYS HOSPITALIZED	d. ESTIMATED DAYS RESTRICTED DUTY

e. BODY PART AFFECTED	(CODE) #	g. TYPE AND SOURCE OF INJURY/ILLNESS	(CODE) #
PRIMARY _____		TYPE _____	
SECONDARY _____		SOURCE _____	
f. NATURE OF ILLNESS/INJURY _____			

6. PUBLIC FATALITY *(Fill in line and correspondence code number in box - see help menu)*

a. ACTIVITY AT TIME OF ACCIDENT	(CODE) #	b. PERSONAL FLOATATION DEVICE USED?
		☐ YES ☐ NO ☐ N/A

7. MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE	b. TYPE OF COLLISION	c. SEAT BELTS	USED	NOT USED	NOT AVAILABLE
☐☐ PICKUP/VAN ☐☐ AUTOMOBILE ☐☐ TRUCK ☐☐ OTHER *(Specify)* _____	☐ SIDE SWIPE ☐ HEAD ON ☐ REAR END ☐ BROADSIDE ☐ ROLL OVER ☐ BACKING ☐ OTHER *(Specify)* _____	(1) FRONT SEAT			
		(2) REAR SEAT			

8. PROPERTY/MATERIAL INVOLVED

a. NAME OF ITEM	b. OWNERSHIP	c. $ AMOUNT OF DAMAGE
(1)		
(2)		
(3)		

9. VESSEL/FLOATING PLANT ACCIDENT *(Fill in line and correspondence code number in box from list - see help menu)*

a. TYPE OF VESSEL/FLOATING PLANT	(CODE) #	b. TYPE OF COLLISION/MISHAP	(CODE) #

10. ACCIDENT DESCRIPTION *(Use additional paper, if necessary)*

11. **CAUSAL FACTOR(S)** *(Read Instruction Before Completing)*

a. (Explain YES answers in item 13)	YES	NO
DESIGN: Was design of facility, workplace or equipment a factor?	☐	☐
INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor?	☐	☐
PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor?	☐	☐
OPERATING PROCEDURES: Were operating procedures a factor?	☐	☐
JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred?	☐	☐
HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident?	☐	☐
ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident?	☐	☐

a. *(CONTINUED)*	YES	NO
CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident?	☐	☐
OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident?	☐	☐
SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task?	☐	☐
PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident?	☐	☐
DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident	☐	☐

b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?

☐ YES *(If yes, attach a copy.)* ☐ NO

12. **TRAINING**

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?	b. TYPE OF TRAINING.	c. DATE OF MOST RECENT FORMAL TRAINING.
☐ YES ☐ NO	☐ CLASSROOM ☐ ON JOB	(Month) (Day) (Year)

13. **FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES** *(See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)*

a. DIRECT CAUSE

b. INDIRECT CAUSE(S)

14. **ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).**

DESCRIBE FULLY:

15. **DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.**

a. BEGINNING (Month/Day/Year)	b. ANTICIPATED COMPLETION (Month/Day/Year)		
c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT CORPS _____ CONTRACTOR _____	d. DATE *(Mo/Da/Yr)*	e. ORGANIZATION IDENTIFIER *(Div, Br, Sect)*	f. OFFICE SYMBOL

16. **MANAGEMENT REVIEW** *(1st)*

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

17. **MANAGEMENT REVIEW** *(2nd - Chief Operations, Construction, Engineering, etc.)*

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

18. **SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW**

a. ☐ CONCUR b. ☐ NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS

SIGNATURE	TITLE	DATE

19. **COMMAND APPROVAL**

COMMENTS

COMMANDER SIGNATURE	DATE

*U.S. GOVERNMENT PRINTING OFFICE: 1993-0-791-757

10. ACCIDENT DESCRIPTION ***(Continuation)***

13a. DIRECT CAUSE ***(Continuation)***

13b.	INDIRECT CAUSES *(Continuation)*

14.	ACTION(S) TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE(S) *(Continuation)*

GENERAL. Complete a separate report for each person who was injured, caused, or contributed to the accident (excluding uninjured personnel and witnesses). Use of this form for reporting USACE employee first-aid type injuries not submitted to the Office of Workers' Compensation Programs (OWCP) shall be at the descretion of the FOA commander. Please type or print legibly. Appropriate items shall be marked with an "X" in box(es). If additional space is needed, provide the information on a separate sheet and attach to the completed form. Ensure that these instructions are forwarded with the completed report to the designated management reviewers indicated in sections 16 and 17.

INSTRUCTIONS FOR SECTION 1 - ACCIDENT CLASSIFICATION

(Mark All Boxes That Are Applicable)

a. GOVERNMENT. Mark "CIVILIAN" box if accident involved government civilian employee; mark "MILITARY" box if accident involved U.S. military personnel.

(1) INJURY/ILLNESS/FATALITY - Mark if accident resulted in any government civilian employee injury, illness, or fatality that requires the submission of OWCP Forms CA-1 (injury), CA-2 (illness) or CA-6 (fatality) to OWCP; mark if accident resulted in military personnel lost-time or fatal injury or illness.

(2) PROPERTY DAMAGE - Mark the appropriate box if accident resulted in any damage of $1000 or more to government property (including motor vehicles).

(3) VEHICLE INVOLVED - Mark if accident involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.

(4) DIVING ACTIVITY - Mark if the accident involved an in-house USACE diving activity.

b. CONTRACTOR.

(1) INJURY/ILLNESS/FATALITY - Mark if accident resulted in any contractor lost-time injury/illness or fatality.

(2) PROPERTY DAMAGE - Mark the appropriate box if accident resulted in any damage of $1000 or more to contractor property (including motor vehicles).

(3) VEHICLE INVOLVED - Mark if accident involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.

(4) DIVING ACTIVITY - Mark if the accident involved a USACE Contractor diving activity.

c. PUBLIC.

(1) INJURY/ILLNESS/FATALITY - Mark if accident resulted in public fatality or permanent total disability. (The "OTHER" box will be marked when requested by the FOA to report an unusual non-fatal public accident that could result in claims against the government or as otherwise directed by the FOA Commander).

(2) VOID SPACE - Make no entry.

(3) VEHICLE INVOLVED - Mark if accident resulted in a fatality to a member of the public and involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" is marked.

(4) VOID SPACE - Make no entry.

INSTRUCTIONS FOR SECTION 2 - PERSONAL DATA

a. NAME - (MANDATORY FOR GOVERNMENT ACCIDENTS. OPTIONAL AT THE DISCRETION OF THE FOA COMMANDER FOR CONTRACTOR AND PUBLIC ACCIDENTS). Enter last name, first name, middle initial of person involved.

b. AGE - Enter age.

c. SEX - Mark appropriate box.

d. SOCIAL SECURITY NUMBER - (FOR GOVERNMENT PERSONNEL ONLY) Enter the social security number (or other personal identification number if no social security number issued).

e. GRADE - (FOR GOVERNMENT PERSONNEL ONLY) Enter pay grade. Example: 0-6; E-7; WG-8; WS-12; GS-11; etc.

f. JOB SERIES/TITLE - For government civilian employees enter the pay plan, full series number, and job title, e.g., GS-0810/Civil Engineer. For military personnel enter the primary military occupational specialty (PMOS), e.g., 15A30 or 11G50. For contractor employees enter the job title assigned to the injured person, e.g., carpenter, laborer, surveyor, etc.

g. DUTY STATUS - Mark the appropriate box.

(1) ON DUTY - Person was at duty station during duty hours or person was away from duty station during duty hours but on official business at time of the accident.

(2) TDY - Person was on official business, away from the duty station and with travel orders at time of accident. Line-of-duty investigation required.

(3) OFF DUTY - Person was not on official business at time of accident.

h. EMPLOYMENT STATUS - (FOR GOVERNMENT PERSONNEL ONLY) Mark the most appropriate box. If "OTHER" is marked, specify the employment status of the person.

INSTRUCTION FOR SECTION 3 - GENERAL INFORMATION

a. DATE OF ACCIDENT - Enter the month, day, and year of accident.

b. TIME OF ACCIDENT - Enter the local time of accident in military time. Example: 1430 hrs (not 2:30 p.m.).

c. EXACT LOCATION OF ACCIDENT - Enter facts needed to locate the accident scene, (installation/project name, building number, street, direction and distance from closest landmark, etc.).

d. CONTRACTOR NAME

(1) PRIME - Enter the exact name (title of firm) of the prime contractor.

(2) SUBCONTRACTOR - Enter the name of any subcontractor involved in the accident.

e. CONTRACT NUMBER - Mark the appropriate box to identify if contract is civil works, military, or other: if "OTHER" is marked, specify contract appropriation on line provided. Enter complete contract number of prime contract, e.g., DACW 09-85-C-0100.

f. TYPE OF CONTRACT - Mark appropriate box. A/E means architect/engineer. If "OTHER" is marked, specify type of contract on line provided.

g. HAZARDOUS/TOXIC WASTE ACTIVITY (HTW) - Mark the box to identify the HTW activity being performed at the time of the accident. For Superfund, DERP, and Installation Restoration Program (IRP) HTW activities include accidents that occurred during inventory, predesign, design, and construction. For the purpose of accident reporting, DERP Formerly Used DoD Site (FUDS) activities and IRP activities will be treated separately. For Civil Works O&M HTW activities mark the "OTHER" box.

INSTRUCTIONS FOR SECTION 4 - CONSTRUCTION ACTIVITIES

a. CONSTRUCTION ACTIVITY - Select the most appropriate construction activity being performed at time of accident from the list below. Enter the activity name and place the corresponding code number identified in the box.

CONSTRUCTION ACTIVITY LIST

1. MOBILIZATION
2. SITE PREPARATION
3. EXCAVATION/TRENCHING
4. GRADING (EARTHWORK)
5. PIPING/UTILITIES
6. FOUNDATION
7. FORMING
8. CONCRETE PLACEMENT
9. STEEL ERECTION
10. ROOFING
11. FRAMING
12. MASONRY
13. CARPENTRY
14. ELECTRICAL
15. SCAFFOLDING/ACCESS
16. MECHANICAL
17. PAINTING
18. EOUIPMENT/MAINTENANCE
19. TUNNELING
20. WAREHOUSING/STORAGE
21. PAVING
22. FENCING
23. SIGNING
24. LANDSCAPING/IRRIGATION
25. INSULATION
26. DEMOLITION

b. TYPE OF CONSTRUCTION EQUIPMENT - Select the equipment involved in the accident from the list below. Enter the name and place the corresponding code number identified in the box. If equipment is not included below, use code 24, "OTHER", and write in specific type of equipment.

CONSTRUCTION EQUIPMENT

1. GRADER
2. DRAGLINE
3. CRANE (ON VESSEL/BARGE)
4. CRANE (TRACKED)
5. CRANE (RUBBER TIRE)
6. CRANE (VEHICLE MOUNTED)
7. CRANE (TOWER)
8. SHOVEL
9. SCRAPER
10. PUMP TRUCK (CONCRETE)
11. TRUCK (CONCRETE/TRANSIT MIXER)
12. DUMP TRUCK (HIGHWAY)
13. DUMP TRUCK (OFF HIGHWAY)
14. TRUCK (OTHER)
15. FORKLIFT
16. BACKHOE
17. FRONT-END LOADER
18. PILE DRIVER
19. TRACTOR (UTILITY)
20. MANLIFT
21. DOZER
22. DRILL RIG
23. COMPACTOR/VIBRATORY ROLLER
24. OTHER

INSTRUCTIONS FOR SECTION 5 - INJURY/ILLNESS INFORMATION

a. SEVERITY OF INJURY/ILLNESS - Reference para 2-10 of USACE Suppl 1 to AR 385-40 and enter code and description from list below.

NOI NO INJURY
FAT FATALITY
PTL PERMANENT TOTAL DISABILITY
PPR ERMANENT PARTIAL DISABILITY
LWD LOST WORKDAY CASE INVOLVING DAYS AWAY FROM WORK
NLW RECORDABLE CASE WITHOUT LOST WORKDAYS
RFA RECORDABLE FIRST AID CASE

b. ESTIMATED DAYS LOST - Enter the estimated number of workdays the person will lose from work.

c. ESTIMATED DAYS HOSPITALIZED - Enter the estimated number of workdays the person will be hospitalized.

d. ESTIMATED DAYS RESTRICTED DUTY - Enter the estimated number of workdays the person, as a result of the accident, will not be able to perform all of their regular duties.

e. BODY PART AFFECTED - Select the most appropriate primary and when applicable, secondary body part affected from the list below. Enter body part name on line and place the corresponding code letters identifying that body part in the box.

GENERAL BODY AREA	CODE	BODY PART NAME
ARM/WRIST	AB	ARM AND WRIST
	AS	ARM OR WRIST
TRUNK, EXTERNAL MUSCULATURE	B1	SINGLE BREAST
	B2	BOTH BREASTS
	B3	SINGLE TESTICLE
	B4	BOTH TESTICLES
	BA	ABDOMEN
	BC	CHEST
	BL	LOWER BACK
	BP	PENIS
	BS	SIDE
	BU	UPPER BACK
	BW	WAIST
	BZ	TRUNK OTHER
HEAD, INTERNAL	C1	SINGLE EAR INTERNAL
	C2	BOTH EARS INTERNAL
	C3	SINGLE EYE INTERNAL
	C4	BOTH EYES INTERNAL
	CB	BRAIN
	CC	CRANIAL BONES
	CD	TEETH
	CJ	JAW
	CL	THROAT, LARYNX
	CM	MOUTH
	CN	NOSE
	CR	THROAT, OTHER
	CT	TONGUE
	CZ	HEAD OTHER INTERNAL
ELBOW	EB	BOTH ELBOWS
	ES	SINGLE ELBOW
FINGER	F1	FIRST FINGER
	F2	BOTH FIRST FINGERS
	F3	SECOND FINGER
	F4	BOTH SECOND FINGERS
	F5	THIRD FINGER
	F6	BOTH THIRD FINGERS
	F7	FOURTH FINGER
	F8	BOTH FOURTH FINGERS
TOE	G1	GREAT TOE
	G2	BOTH GREAT TOES
	G3	TOE OTHER
	G4	TOES OTHER

GENERAL BODY AREA	CODE	BODY PART NAME
HEAD, EXTERNAL	**H1**	**EYES EXTERNAL**
	H2	**BOTH EYES EXTERNAL**
	H3	**EAR EXTERNAL**
	H4	**BOTH EARS EXTERNAL**
	HC	**CHIN**
	HF	**FACE**
	HK	**NECK/THROAT**
	HM	**MOUTH/LIPS**
	HN	**NOSE**
	HS	**SCALP**
KNEE	**KB**	**BOTH KNEES**
	KS	**KNEE**
LEG, HIP, ANKLE, BUTTOCK	**LB**	**BOTH LEGS/HIPS/ ANKLES/BUTTOCKS**
	LS	**SINGLE LEG/HIP ANKLE/BUTTOCK**
HAND	**MB**	**BOTH HANDS**
	MS	**SINGLE HAND**
FOOT	**PB**	**BOTH FEET**
	PS	**SINGLE FOOT**
TRUNK, BONES	**R1**	**SINGLE COLLAR BONE**
	R2	**BOTH COLLAR BONES**
	R3	**SHOULDER BLADE**
	R4	**BOTH SHOULDER BLADES**
	RB	**RIB**
	RS	**STERNUM (BREAST BONE)**
	RV	**VERTEBRAE (SPINE; DISC)**
	RZ	**TRUNK BONES OTHER**
SHOULDER	**SB**	**BOTH SHOULDERS**
	SS	**SINGLE SHOULDER**
THUMB	**TB**	**BOTH THUMBS**
	TS	**SINGLE THUMB**
TRUNK, INTERNAL ORGANS	**V1**	**LUNG, SINGLE**
	V2	**LUNGS, BOTH**
	V3	**KIDNEY, SINGLE**
	V4	**KIDNEYS, BOTH**
	VH	**HEART**
	VL	**LIVER**
	VR	**REPRODUCTIVE ORGANS**
	VS	**STOMACH**
	VV	**INTESTINES**
	VZ	**TRUNK, INTERNAL; OTHER**

f. NATURE OF INJURY/ILLNESS - Select the most appropriate nature of injury/illness from the list below. This nature of injury/illness shall correspond to the primary body part selected in 5e, above. Enter the nature of injury/illness name on the line and place the corresponding CODE letters in the box provided.

*** The injury or condition selected below must be caused by a specific incident or event <u>which occurred during a single work day or shift.</u>**

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
***TRAUMATIC INJURY OR DISABILITY**	**TA**	**AMPUTATION**
	TB	**BACK STRAIN**
	TC	**CONTUSION; BRUISE; ABRASION**
	TD	**DISLOCATION**
	TF	**FRACTURE**
	TH	**HERNIA**
	TK	CONCUSSION
	TL	LACERATION, CUT
	TP	PUNCTURE
	TS	STRAIN, MULTIPLE
	TU	BURN, SCALD, SUNBURN
	TI	TRAUMATIC SKIN DISEASES/CONDITIONS INCLUDING DERMATITIS
	TR	TRAUMATIC RESPIRATORY DISEASE
	TQ	TRAUMATIC FOOD POISONING
	TW	TRAUMATIC TUBERCULOSIS
	TX	TRAUMATIC VIROLOGICAL/ INFECTIVE/PARASITIC DISEASE
	T1	TRAUMATIC CEREBRAL VASCULAR CONDITION/STROKE
	T2	TRAUMATIC HEARING LOSS
	T3	TRAUMATIC HEART CONDITION
	T4	TRAUMATIC MENTAL DISORDER, STRESS; NERVOUS CONDITION
	T8	TRAUMATIC INJURY - OTHER (EXCEPT DISEASE, ILLNESS)

** A nontraumatic physiological harm or loss of capacity produced by systemic infection; continued or repeated stress or strain; exposure to toxins, poisons, fumes, etc.; or other continued and <u>repeated exposures to conditions of the work environment over a long period of time</u>. For practical purposes, an occupational illness/disease or disability is any reported condition which does not meet the definition of traumatic injury or disability as described above.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
**NON-TRAUMATIC ILLNESS/DISEASE OR DISABILITY		
RESPIRATORY DISEASE	RA	ASBESTOSIS
	RB	BRONCHITIS
	RE	EMPHYSEMA
	RP	PNEUMOCONIOSIS
	RS	SILICOSIS
	R9	RESPIRATORY DISEASE, OTHER
VIROLOGICAL, INFECTIVE & PARASITIC DISEASES	VB	BRUCELLOSIS
	VC	COCCIDIOMYCOSIS
	VF	FOOD POISONING
	VH	HEPATITIS
	VM	MALARIA
	VS	STAPHYLOCOCCUS
	VT	TUBERCULOSIS
	V9	VIROLOGICAL/INFECTIVE/ PARASITIC - OTHER
DISABILITY, OCCU-PATIONAL	DA	ARTHRITIS, BURSITIS
	DB	BACK STRAIN, BACK SPRAIN
	DC	CEREBRAL VASCULAR CONDITION; STROKE

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
	DD	ENDEMIC DISEASE (OTHER THAN CODE TYPES R&S)
	DE	EFFECT OF ENVIRON-MENTAL CONDITION
	DH	HEARING LOSS
	DK	HEART CONDITION
	DM	MENTAL DISORDER, EMOTIONAL STRESS, NERVOUS
CONDITION		
	DR	RADIATION
	DS	STRAIN, MULTIPLE
	DU	ULCER
	DV	OTHER VASCULAR CONDITIONS
	D9	DISABILITY, OTHER
SKIN DISEASE OR CONDITION	SB	BIOLOGICAL
	SC	CHEMICAL
	S9	DERMATITIS, UNCLASSIFIED

g. TYPE AND SOURCE OF INJURY/ILLNESS (CAUSE) - Type and Source Codes are used to describe what caused the incident. The Type Code stands for an ACTION and the Source Code for an OBJECT or SUBSTANCE. Together, they form a brief description of how the incident occurred. Where there are two different sources, code the initiating source of the incident (see example 1, below). Examples:

(1) An employee tripped on carpet and struck his head on a desk.
TYPE: 210 (fell on same level) SOURCE: 0110 (walking/working surface).

NOTE: This example would NOT be coded 120 (struck against) and 0140 (furniture).

(2) A Park Ranger contracted dermatitis from contact with poison ivy/oak.
TYPE: 510 (contact) SOURCE: 0920 (plant)

(3) A lock and dam mechanic punctured his finger with a metal sliver while grinding a turbine blade.
TYPE: 410 (punctured by) SOURCE: 0830 (metal)

(4) An employee was driving a government vehicle when it was struck by another vehicle.
TYPE: 800 (traveling in) SOURCE: 0421 (government-owned vehicle, as driver)

NOTE: The Type Code 800, "Traveling In" is different from the other type codes in that its function is not to identify factors contributing to the injury or fatality, but rather to collect data on the type of vehicle the employee was operating or traveling in at the time of the incident.

Select the most appropriate TYPE and SOURCE identifier from the list below and enter the name on the line and the corresponding code in the appropriate box.

CODE	TYPE OF INJURY NAME
	STRUCK
0110	STRUCK BY
0111	STRUCK BY FALLING OBJECT
0120	STRUCK AGAINST
	FELL, SLIPPED, TRIPPED
0210	FELL ON SAME LEVEL
0220	FELL ON DIFFERENT LEVEL
0230	SLIPPED, TRIPPED (NO FALL)
	CAUGHT
0310	CAUGHT ON
0320	CAUGHT IN
0330	CAUGHT BETWEEN
	PUNCTURED, LACERATED
0410	PUNCTURED BY
0420	CUT BY
0430	STUNG BY
0440	BITTEN BY
	CONTACTED
0510	CONTACTED WITH (INJURED PERSON MOVING)
0520	CONTACTED BY (OBJECT WAS MOVING)
	EXERTED
0610	LIFTED, STRAINED BY (SINGLE ACTION)
0620	STRESSED BY (REPEATED ACTION)
	EXPOSED
0710	INHALED
0720	INGESTED
0730	ABSORBED
0740	EXPOSED TO
0800	TRAVELING IN

CODE	SOURCE OF INJURY NAME
0100	BUILDING OR WORKING AREA
0110	WALKING/WORKING SURFACE (FLOOR, STREET, SIDEWALKS, ETC.)
0120	STAIRS, STEPS
0130	LADDER
0140	FURNITURE, FURNISHINGS, OFFICE EQUIPMENT
0150	BOILER, PRESSURE VESSEL
0160	EQUIPMENT LAYOUT (ERGONOMIC)
0170	WINDOWS, DOORS
0180	ELECTRICITY
0200	ENVIRONMENTAL CONDITION
0210	TEMPERATURE EXTREME (INDOOR)
0220	WEATHER (ICE, RAIN, HEAT, ETC.)
0230	FIRE, FLAME, SMOKE (NOT TOBACCO)
0240	NOISE
0250	RADIATION
0260	LIGHT
0270	VENTILATION
0271	TOBACCO SMOKE
0280	STRESS (EMOTIONAL)
0290	CONFINED SPACE
0300	MACHINE OR TOOL
0310	HAND TOOL (POWERED; SAW, GRINDER, ETC.)
0320	HAND TOOL (NONPOWERED)
0330	MECHANICAL POWER TRANSMISSION APPARATUS
0340	GUARD, SHIELD (FIXED, MOVEABLE, INTERLOCK)

CODE	TYPE OF INJURY NAME
0350	VIDEO DISPLAY TERMINAL
0360	PUMP, COMPRESSOR, AIR PRESSURE TOOL
0370	HEATING EQUIPMENT
0380	WELDING EQUIPMENT
0400	VEHICLE
0411	AS DRIVER OF PRIVATELY OWNED/RENTAL VEHICLE
0412	AS PASSENGER OF PRIVATELY OWNED/RENTAL VEHICLE
0421	DRIVER OF GOVERNMENT VEHICLE
0422	PASSENGER OF GOVERNMENT VEHICLE
0430	COMMON CARRIER (AIRLINE, BUS, ETC.)
0440	AIRCRAFT (NOT COMMERCIAL)
0450	BOAT, SHIP, BARGE
0500	MATERIAL HANDLING EQUIPMENT
0510	EARTHMOVER (TRACTOR, BACKHOE, ETC.)
0520	CONVEYOR (FOR MATERIAL AND EQUIPMENT)
0530	ELEVATOR, ESCALATOR, PERSONNEL HOIST
0540	HOIST, SLING CHAIN, JACK
0550	CRANE
0551	FORKLIFT
0560	HANDTRUCK, DOLLY
0600	DUST, VAPOR, ETC.
0610	DUST (SILICA, COAL, ETC.)
0620	FIBERS
0621	ASBESTOS
0630	GASES
0631	CARBON MONOXIDE
0640	MIST, STEAM, VAPOR, FUME
0641	WELDING FUMES
0650	PARTICLES (UNIDENTIFIED)
0700	CHEMICAL, PLASTIC, ETC.
0711	DRY CHEMICAL - CORROSIVE
0712	DRY CHEMICAL - TOXIC
0713	DRY CHEMICAL - EXPLOSIVE
0714	DRY CHEMICAL FLAMMABLE
0721	LIQUID CHEMICAL - CORROSIVE
0722	LIQUID CHEMICAL - TOXIC
0723	LIQUID CHEMICAL - EXPLOSIVE
0724	LIQUID CHEMICAL - FLAM-MABLE
0730	PLASTIC
0740	WATER
0750	MEDICINE
0800	INAMINATE OBJECT
0810	BOX, BARREL, ETC.
0820	PAPER
0830	METAL ITEM, MINERAL
0831	NEEDLE
0840	GLASS

CODE	SOURCE OF INJURY NAME
0850	SCRAP, TRASH
0860	WOOD
0870	FOOD
0880	CLOTHING, APPAREL, SHOES
0900	ANIMATE OBJECT
0911	DOG
0912	OTHER ANIMAL
0920	PLANT
0930	INSECT
0940	HUMAN (VIOLENCE)
0950	HUMAN (COMMUNICABLE DISEASE)
0960	BACTERIA, VIRUS (NOT HUMAN CONTACT)
1000	PERSONAL PROTECTIVE EQUIPMENT
1010	PROTECTIVE CLOTHING, SHOES, GLASSES, GOGGLES
1020	RESPIRATOR, MASK
1021	DIVING EQUIPMENT
1030	SAFETY BELT, HARNESS
1040	PARACHUTE

INSTRUCTIONS FOR SECTION 6 - PUBLIC FATALITY

a. ACTIVITY AT TIME OF ACCIDENT - Select the activity being performed at the time of the accident from the list below. Enter the activity name on the line and the corresponding number in the box. If the activity performed is not identified on the list, select from the most appropriate primary activity area (water related, non-water related or other activity), the code number for "Other", and write in the activity being performed at the time of the accident.

WATER RELATED RECREATION

1. Sailing
2. Boating-powered
3. Boating-unpowered
4. Water skiing
5. Fishing from boat
6. Fishing from bank dock or pier
7. Fishing while wading
8. Swimming/supervised area
9. Swimming/designated area
10. Swimming/other area
11. Underwater activities (skin diving, scuba, etc.)
12. Wading
13. Attempted rescue
14. Hunting from boat
15. Other

NON-WATER RELATED RECREATION

16. Hiking and walking
17. Climbing (general)
18. Camping/picnicking authorized area
19. Camping/picnicking unauthorized area
20. Guided tours
21. Hunting
22. Playground equipment
23. Sports/summer (baseball, football, etc.)
24. Sports/winter (skiing, sledding, snowmobiling etc.)
25. Cycling (bicycle, motorcycle, scooter)
26. Gliding
27. Parachuting
28. Other non-water related

OTHER ACTIVITIES

29. Unlawful acts (fights, riots, vandalism, etc.)
30. Food preparation/serving
31. Food consumption
32. Housekeeping
33. Sleeping
34. Pedestrian struck by vehicle
35. Pedestrian other acts
36. Suicide
37. "Other" activities

b. PERSONAL FLOTATION DEVICE USED - If fatality was water-related was the victim wearing a person flotation device? Mark the appropriate box.

INSTRUCTIONS FOR SECTION 7 - MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE - Mark appropriate box for each vehicle involved. If more than one vehicle of the same type is involved, mark both halves of the appropriate box. USACE vehicle(s) involved shall be marked in left half of appropriate box.

b. TYPE OF COLLISION - Mark appropriate box.

c. SEAT BELT - Mark appropriate box.

INSTRUCTIONS FOR SECTION 8 - PROPERTY/MATERIAL INVOLVED

a. NAME OF ITEM - Describe all property involved in accident. Property/material involved means material which is damaged or whose use or misuse contributed to the accident. Include the name, type, model; also include the National Stock Number (NSN) whenever applicable.

b. OWNERSHIP - Enter ownership for each item listed. (Enter one of the following: USACE; OTHER GOVERNMENT; CONTRACTOR; PRIVATE)

c. $ AMOUNT OF DAMAGE - **E**nter the total estimated dollar amount of damage (parts and labor), if any.

INSTRUCTIONS FOR SECTION 9 - VESSEL/ FLOATING PLANT ACCIDENT

a. TYPE OF VESSEL/FLOATING PLANT - Select the most appropriate vessel/floating plant from list below. Enter name and place corresponding number in box. If item is not listed below, enter item number for "OTHER" and write in specific type of vessel floating plant.

VESSEL/FLOATING PLANTS

1. ROW BOAT
2. SAIL BOAT
3. MOTOR BOAT
4. BARGE
5. DREDGE/HOPPER
6. DREDGE/SIDE CASTING
7. DREDGE/DIPPER
8. DREDGE/CLAMSHELL, BUCKET
9. DREDGE/PIPE LINE
10. DREDGE/DUST PAN
11. TUG BOAT
12. OTHER

b. COLLISION/MISHAP - Select from the list below the object(s) that contributed to the accident or were damaged in the accident.

COLLISION/MISHAP

1. COLLISION W/OTHER VESSEL
2. UPPER GUIDE WALL
3. UPPER LOCK GATES
4. LOCK WALL
5. LOWER LOCK GATES
6. LOWER GUIDE WALL
7. HAULAGE UNIT
8. BREAKING TOW
9. TOW BREAKING UP
10. SWEPT DOWN 0N DAM
11. BUOY/DOLPHIN/CELL
12. WHARF OR DOCK
13. OTHER

INSTRUCTIONS FOR SECTION 10 - ACCIDENT DESCRIPTION

DESCRIBE ACCIDENT - Fully describe the accident. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role(s) in the accident. Ensure that relationships between personnel and equipment are clearly specified. Continue on blank sheets if necessary and attach to this report.

INSTRUCTIONS FOR SECTION 11 - CAUSAL FACTORS

a. Review thoroughly. Answer each question by marking the appropriate block. If any answer is yes, explain in item 13 below. Consider, as a minimum, the following:

(1) DESIGN - Did inadequacies associated with the building or work site play a role? Would an improved design or layout of the equipment or facilities reduce the likelihood of similar accidents? Were the tools or other equipment designed and intended for the task at hand?

(2) INSPECTION/MAINTENANCE - Did inadequately or improperly maintained equipment, tools, workplace, etc. create or worsen any hazards that contributed to the accident? Would better equipment, facility, work site or work activity inspections have helped avoid the accident?

(3) PERSON'S PHYSICAL CONDITION - Do you feel that the accident would probably not have occurred if the employee was in "good" physical condition? If the person involved in the accident had been in better physical condition, would the accident have been less severe or avoided altogether? Was over exertion a factor?

(4) OPERATING PROCEDURES - Did a lack of or inadequacy within established operating procedures contribute to the accident? Did any aspect of the procedures introduce any hazard to, or increase the risk associated with the work process? Would establishment or improvement of operating procedures reduce the likelihood of similar accidents?

(5) JOB PRACTICES - Were any of the provisions of the Safety and Health Requirements Manual (EM 385-1-1) violated? Was the task being accomplished in a manner which was not in compliance with an established job hazard analysis or activity hazard analysis? Did any established job practice (including EM 385-1-1) fail to adequately address the task or work process? Would better job practices improve the safety of the task?

(6) HUMAN FACTORS - Was the person under undue stress (either internal or external to the job)? Did the task tend toward overloading the capabilities of the person; i.e., did the job require tracking and reacting to many external inputs such as displays, alarms, or signals? Did the arrangement of the workplace tend to interfere with efficient task performance? Did the task require reach, strength, endurance, agility, etc., at or beyond the capabilities of the employee? Was the work environment ill-adapted to the person? Did the person need more training, experience, or practice in doing the task? Was the person inadequately rested to perform safely?

(7) ENVIRONMENTAL FACTORS - Did any factors such as moisture, humidity, rain, snow, sleet, hail, ice, fog, cold, heat, sun, temperature changes, wind, tides, floods, currents, dust, mud, glare, pressure changes, lightning, etc., play a part in the accident?

(8) CHEMICAL AND PHYSICAL AGENT FACTORS - Did exposure to chemical agents (either single shift exposure or long-term exposure) such as dusts, fibers (asbestos, etc.), silica, gases (carbon monoxide, chlorine, etc.,), mists, steam, vapors, fumes, smoke, other particulates, liquid or dry chemicals that are corrosive, toxic, explosive or flammable, byproducts of combustion or physical agents such as noise, ionizing radiation, non-ionizing radiation (UV radiation created during welding, etc.) contribute to the accident/incident?

(9) **OFFICE FACTORS** - Did the fact that the accident occurred in an office setting or to an office worker have a bearing on its cause? For example, office workers tend to have less experience and training in performing tasks such as lifting office furniture. Did physical hazards within the office environment contribute to the hazard?

(10) **SUPPORT FACTORS** - Was the person using an improper tool for the job? Was inadequate time available or utilized to safely accomplish the task? Were less than adequate personnel resources (in terms of employee skills, number of workers, and adequate supervision) available to get the job done properly? Was funding available, utilized, and adequate to provide proper tools, equipment, personnel, site preparation, etc.?

(11) **PERSONAL PROTECTIVE EQUIPMENT** - Did the person fail to use appropriate personal protective equipment (gloves, eye protection, hard-toed shoes, respirator, etc.) for the task or environment? Did protective equipment provided or worn fail to provide adequate protection from the hazard(s)? Did lack of or inadequate maintenance of protective gear contribute to the accident?

(12) **DRUGS/ALCOHOL** - Is there any reason to believe the person's mental or physical capabilities, judgment, etc., were impaired or altered by the use of drugs or alcohol? Consider the effects of prescription medicine and over the counter medications as well as illicit drug use. Consider the effect of drug or alcohol induced "hangovers".

b. **WRITTEN JOB/ACTIVITY HAZARD ANALYSIS** - Was a written Job/Activity Hazard Analysis completed for the task being performed at the time of the accident? Mark the appropriate box. If one was performed, attach a copy of the analysis to the report.

INSTRUCTIONS FOR SECTION 12 - TRAINING

a. **WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?** - For the purpose of this section "trained" means the person has been provided the necessary information (either formal and/or on-the-job (OJT) training) to competently perform the activity/task in a safe and healthful manner.

b. **TYPE OF TRAINING** - Mark the appropriate box that best indicates the type of training; (classroom or on-the-job) that the injured person received before the accident happened.

c. **DATE OF MOST RECENT TRAINING** - Enter the month, day, and year of the last formal training completed that covered the activity task being performed at the time of the accident.

INSTRUCTIONS FOR SECTION 13 - CAUSES

a. DIRECT CAUSES - The direct cause is that single factor which most directly lead to the accident. See examples below.

b. INDIRECT CAUSES - Indirect causes are those factors which contributed to but did not directly initiate the occurrence of the accident.

Examples for section 13:

a. Employee was dismantling scaffold and fell 12 feet from unguarded opening.

Direct cause: failure to provide fall protection at elevation.
Indirect causes: failure to enforce USACE safety requirements; improper training/motivation of employee (possibility that employee was not knowledgeable of USACE fall protection requirements or was lax in his attitude towards safety); failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.

b. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by USACE vehicle. (Note: USACE vehicle was in proper/safe working condition).

Direct cause: failure of USACE driver to maintain control of and stop USACE vehicle within safe distance.
Indirect cause: failure of employee to pay attention to driving (defensive driving).

INSTRUCTIONS FOR SECTION 14 - ACTION TO ELIMINATE CAUSE(S)

DESCRIPTION - Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/illnesses. Continue on blank sheets of paper if necessary to fully explain and attach to the completed report form.

INSTRUCTIONS FOR SECTION 15 - DATES FOR ACTION

a. **BEGIN DATE** - Enter the date when the corrective action(s) identified in section 14 will begin.

b. **COMPLETE DATE** - Enter the date when the corrective action(s) identified in section 14 will be completed.

c. **TITLE AND SIGNATURE** - Enter the title and signature of supervisor completing the accident report. For a GOVERNMENT employee accident/illness the immediate supervisor will complete and sign the report. For PUBLIC accidents the USACE Project Manager/Area Engineer responsible for the USACE property where the accident happened shall complete and sign the report. For CONTRACTOR accidents the Contractor's project manager shall complete and sign the report and provide to the USACE supervisor responsible for oversight of that contractor activity. This USACE supervisor shall also sign the report. Upon entering the information required in 15.d, 15.e and 15.f below, the responsible USACE supervisor shall forward the report for mangement review as indicated in section 16.

d. **DATE SIGNED** - Enter the month, day, and year that the report was signed by the responsible supervisor.

e. **ORGANIZATION NAME** - For GOVERNMENT employee accidents enter the USACE organization name (Division, Branch, Section, etc.) of the injured employee. For PUBLIC accidents enter the USACE organization name for the person identified in block 15.c. For CONTRACTOR accidents enter the USACE organization name for the USACE office responsible for providing contract administration oversight.

f. **OFFICE SYMBOL** - Enter the latest complete USACE Office Symbol for the USACE organization identified in block 15.e.

INSTRUCTIONS FOR SECTION 16 - MANAGEMENT REVIEW (1st)

1ST REVIEW - Each USACE FOA shall determine who will provide 1st management review. The responsible USACE supervisor in section 15.c shall forward the completed report to the USACE office designated as the 1st Reviewer by the FOA. Upon receipt, the Chief of the Office shall review the completed report, mark the appropriate box, provide substantive comments, sign, date, and forward to the FOA Staff Chief (2nd review) for review and comment.

INSTRUCTIONS FOR SECTION 17 - MANAGEMENT REVIEW (2nd)

2ND REVIEW - The FOA Staff Chief (i.e., FOA Chief of Construction, Operations, Engineering, Planning, etc.) shall mark the appropriate box, review the completed report, provide substantive comments, sign, date, and return to the FOA Safety and Occupational Health Office.

INSTRUCTIONS FOR SECTION 18 - SAFETY AND OCCUPATIONAL HEALTH REVIEW

3RD REVIEW - The FOA Safety and Occupational Health Office shall review the completed report, mark the appropriate box, ensure that any inadequacies, discrepancies, etc. are rectified by the responsible supervisor and management reviewers, provide substantive comments, sign, date and forward to the FOA Commander for review, comment, and signature.

INSTRUCTION FOR SECTION 19 - COMMAND APPROVAL

4TH REVIEW - The FOA Commander shall (to include the person designated Acting Commander in his absence) review the completed report, comment if required, sign, date, and forward the report to the FOA Safety and Occupational Health Office. Signature authority shall not be delegated.

Attachment 4

Directions to the Hospital and Emergency Telephone Numbers

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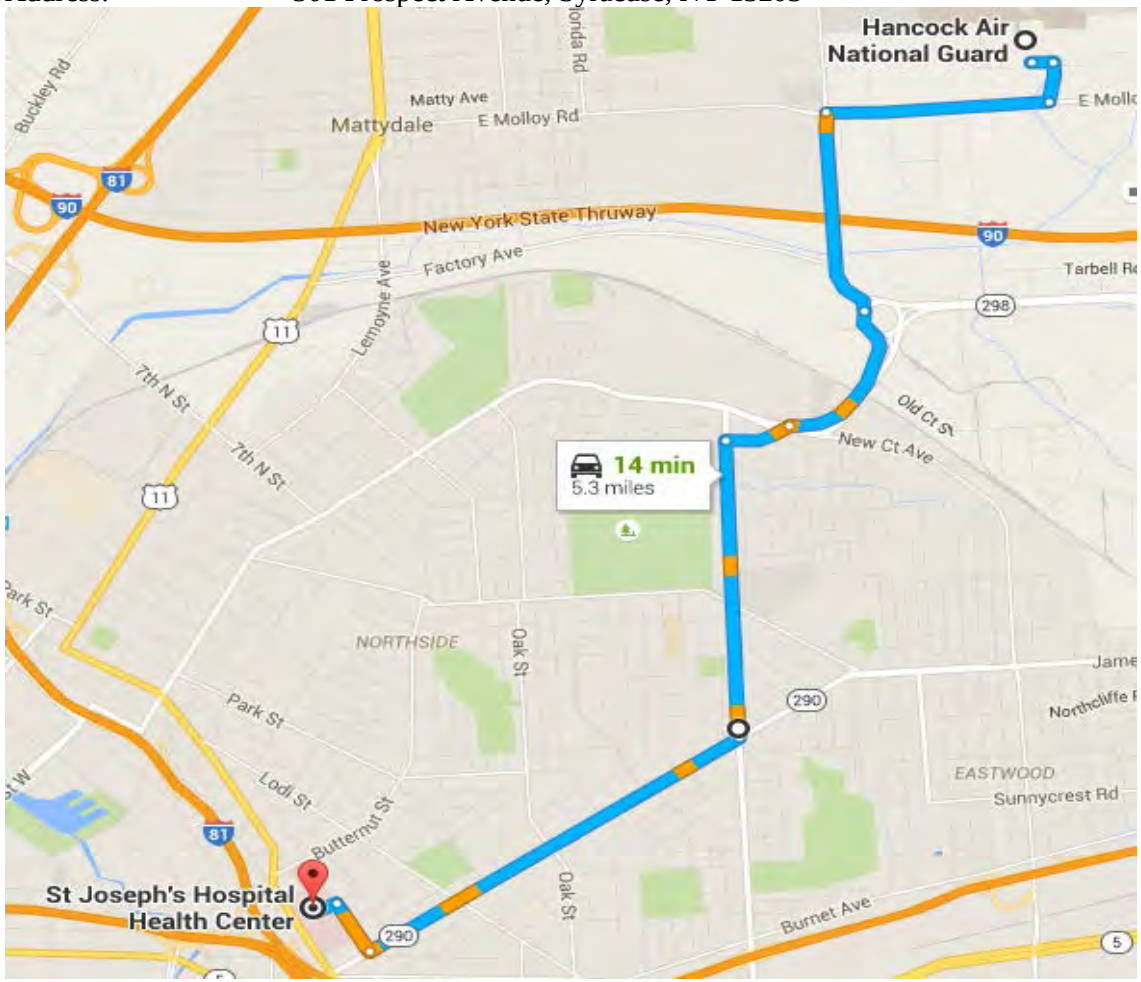
Attachment 4
Directions to the Hospital

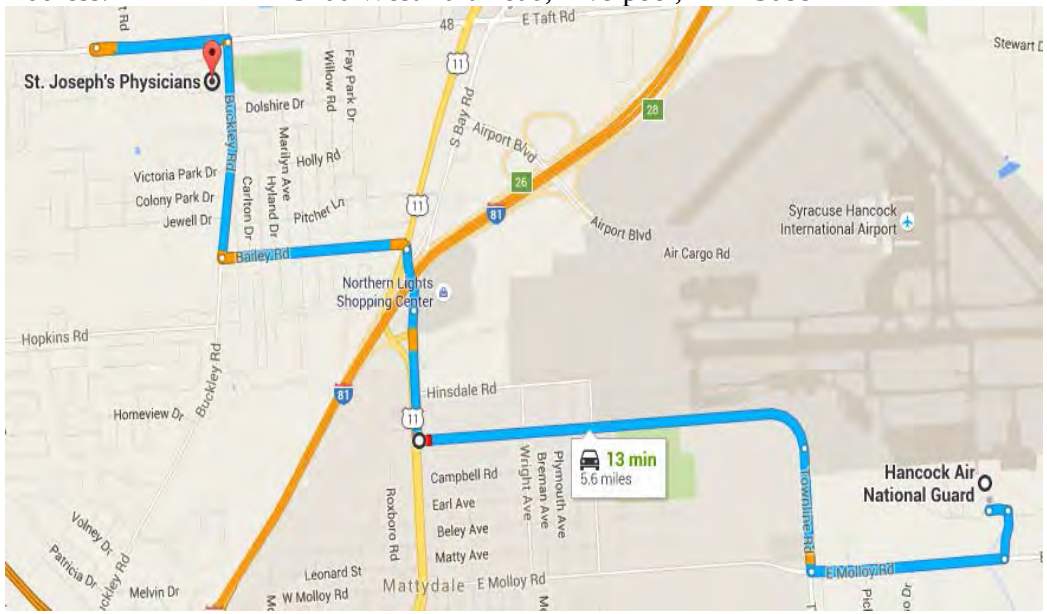
Name: **St. Joseph's Hospital**
Phone: (315) 448-5111
Address: 301 Prospect Avenue, Syracuse, NY 13203



Head east towards East Molloy Rd
0.2 miles
Turn right towards East Molloy Rd
0.1 miles
Turn right onto East Molloy Rd
0.7 miles
Turn left onto Townline Rd
0.8 miles
At the traffic circle, take the 2nd exit onto NY- 298W
0.6 miles
Use the left two lanes to turn slightly left onto Arterial Rd
0.2 miles
Turn left onto Teall Ave
1.1 miles
Turn right onto James St
1.4 miles
Turn right onto North Townsend St
0.2 miles
Turn left at the 3rd cross street onto Union Ave
348 ft
Destination will be on the right

Directions to the Occupational Clinic

Name: **St. Joseph's Physicians**
Phone: (315) 452-2333
Address: 5100 West Taft Road, Liverpool, NY 13088



Head east towards East Molloy Rd
0.2 miles
Turn right towards East Molloy Rd
0.1 miles
Turn right onto East Molloy Rd
0.7 miles
Turn right onto Townline Rd
0.4 miles
Continue onto Malden Rd
1.5 miles
Turn right onto US-11 N/Brewerton Rd
0.4 miles
Continue straight to stay on US-11 N
0.2 miles
Turn left onto Bailey Rd
0.7 miles
Turn right onto 48/Buckley Rd
0.7 miles
Turn left onto 48/W Taft Rd
0.5 miles
Make a U-turn at Wintersweet Dr
Destination will be on the right
0.4 miles

Emergency Phone Numbers

Contact	Number
Contact for any emergency situation	911
Medical Emergencies	911
Fire Emergencies	911
Police Department – Emergency Situations	911
Fire Department – Non-Emergency Situations	(315) 455-2511
Hancock Field Site Contact – Captain Brent Lynch	(315) 233-2111
Medical Facility St. Joseph's Hospital Health Center 301 Prospect Avenue, Syracuse, NY 13203	(315) 448-5101
Non-Emergency Medical Treatment St. Joseph's Physicians 5100 West Taft Road, Liverpool, NY 13088	(315) 452-2333
Poison Control Center	(800) 222-1222
Federal OSHA Hotline	(800) 321-6742
State OSHA Hotline-Syracuse Area Office	(315) 451-0808
Dig Safely New York	(800) 962-7962; or (315) 437-7394; or 811
USACE PM – James Bouvier	(402) 995-2730
USACE Lead OESS – John Kochefko	(402) 995-2281
Program Manager – H. Lee Becker	(410) 584-7000
Project Manager –Joseph Von Uderitz	(774) 244-7103 Cell
Site Supervisor and Site UXO Supervisor (SUXOS) – JD Marlowe	(443) 752-1775 Cell
Certified Industrial Hygienist (CIH) – Pete Garger	(410) 527-2425 (410) 790-6338 Cell
UXO Safety Officer (UXOSO) and UXO Quality Control Specialist (UXOQCS) – John Monk	(717) 887-5582 Cell

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Attachment 5

Site Safety and Health Plan

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LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

°F	Degrees Fahrenheit
APP	Accident Prevention Plan
AHA	Activity hazard analysis
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CPR	Cardiopulmonary resuscitation
DDESB	Department of Defense Explosives Safety Board
EA	EA Engineering, P.C.
ft	Foot (feet)
Hancock Field	Hancock Field Air National Guard Base, Syracuse, New York
lb	Pound(s)
MD	Munitions debris
MEC	Munitions and explosives of concern
MPPEH	Material potentially presenting an explosive hazard
MRS	Munitions Response Site
NTCRA	Non-Time Critical Removal Action
OESS	Ordnance and Explosives Safety Specialist
OSHA	Occupational Safety and Health Administration
PPE	Personal protective equipment
QD	Quantity distance
SSHP	Site Safety and Health Plan
SUXOS	Senior Unexploded Ordnance Supervisor
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
UXOSO	Unexploded Ordnance Safety Officer
WBGT	Wet-bulb globe temperature

SIGNATURE SHEET

SITE SAFETY AND HEALTH PLAN FOR THE MILITARY MUNITIONS RESPONSE PROGRAM NON-TIME CRITICAL REMOVAL ACTION HANCOCK FIELD, NEW YORK

14 March 2019

Joseph Von Uderitz, P.G.
Project Manager
Date

14 March 2019

Peter Garger, CIH, CSP
Health and Safety Manager
ABIH No. 3118, BCSP No. 20560
Date

1. INTRODUCTION

The provisions of the Site Safety and Health Plan (SSHP) are mandatory for all onsite EA Engineering, P.C. (EA) employees engaged in hazardous material management activities associated with this project that may involve health and safety hazards.

Changing and/or unanticipated site conditions may require modification of this SSHP in order to maintain a safe and healthful work environment. Any proposed changes to this SSHP must be approved by the EA Certified Industrial Hygienist (CIH) prior to their implementation. The Unexploded Ordnance (UXO) Safety Officer (UXOSO) will record all changes in the field logbook; under no circumstances will modifications to this plan conflict with federal, state, or other governmental health and safety regulations.

EA is providing a copy of this plan to each site subcontractor in order to fulfill its obligation under 29 Code of Federal Regulations (CFR) 1910.120(b) to inform subcontractors of site hazards. This plan provides minimum requirements and does not relieve subcontractors of their responsibility and obligations to comply with Occupational Safety and Health Administration (OSHA) requirements.

This chapter presents the SSHP for the Non-Time Critical Removal Action (NTCRA) at Hancock Field, Air National Guard Base, Syracuse, New York (Hancock Field). The activities covered by the SSHP are described in Chapters 3, 4, and 5.

This SSHP establishes guidelines and requirements for the safety of field personnel during completion of NTCRA field activities at Hancock Field. All employees and subcontractors of EA involved in this project are required to abide by the provisions of the Accident Prevention Plan (APP)/SSHP. They are required to read and sign acknowledgment of this plan prior to commencement of work activities. All personnel involved with completion of field activities associated with the NTCRA are required to have 40-hour OSHA Hazardous Waste Operations and Emergency Response training. Site supervisors are required to have an additional 8 hours of Site Supervisor training.

The health and safety guidelines and requirements presented are based on a review of available information and an evaluation of potential hazards. This SSHP outlines the health and safety procedures and equipment required for activities at Hancock Field to minimize the potential for exposures of field personnel.

1.1 PROJECT SCOPE OF WORK AND SITE DESCRIPTION

See Chapter 1 of the APP.

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2. CONTAMINATION CHARACTERIZATION

See Chapter 1 of the Work Plan.

2.1 HAZARD RISK ANALYSIS

Work activities, as well as explosive, biological, and chemical hazards, will present a risk to workers on this project. The level of risk is dependent upon the type of work being done. This section identifies the hazards associated with tasks being performed on this project and the procedures that are to be employed to prevent accidents, injuries, and illness. **Table 2-1** identifies the hazards that may be encountered during this NTCRA.

2.2 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIILITIES

See Chapter 3 of the APP.

2.3 HAZARD EVALUATION AND CONTROL

2.3.1 Hazard Communication

Materials that are considered hazardous materials under the OSHA Hazard Communication Standard (29 CFR 1910.1200) will be used during this project. In accordance with the EA Hazard Communication Program, the safety data sheets are included in Attachment 6 of the APP. The UXOSO will make copies of these safety data sheets available to any subcontractors (i.e., surveyors, excavators) on this project.

Table 2-1 Hazards

Type Hazard	Hazard	Yes	No
Safety	Confined space entry		X
	Drowning		X
	Electrical shock	X	
	Equipment and machinery	X	
	Trench entry		X
	Lacerations and skin punctures	X	
	Lifting and moving (excess of 25 pounds individual and 50 pounds 2-person lift)	X	
	Slips, trips, and falls	X	
Chemical	Diesel fuel #2	X	
	Unleaded gasoline	X	
	Lead	X	
	Aluminum		X
Physical	Heat and cold stress	X	
	Noise	X	
Radiological	Ionization radiation		X
Biological	Spiders	X	
	Ticks and mites	X	
	Hazardous plants	X	
	Animals-dogs		X
	Poisonous snakes	X	
Explosive	Munitions and explosives of concern	X	
	Unexploded ordnance	X	
	Material potentially presenting an explosive hazard	X	

3. PHYSICAL AND BIOLOGICAL HAZARDS

3.1 PHYSICAL, SAFETY, AND EXPLOSIVE HAZARDS

There is a risk of physical injury from physical hazards at the site. Personnel should be aware of the fact that when protective equipment is worn, visibility, hearing, and manual dexterity are impaired. Slips, trips, and falls are the most common cause of onsite injuries.

3.1.1 Munitions and Explosives of Concern Hazard

Based on the site history and previous investigations, a determination has been made by the project team (United States Army Corps of Engineers [USACE] and EA) that there is a potential for encountering munitions and explosives of concern (MEC) during the field work. EA will follow the procedures identified in the Work Plan and the Explosives Safety Submission (Appendix B of the Work Plan) when conducting the NTCRA. Field personnel will avoid any surface MEC and subsurface anomalies (i.e., buried munitions debris [MD]) during vegetation removal and FIB demolition. Additional precautions will be taken during mag and dig and sifting operations.

3.1.2 Explosion and Fire Hazards

No flammable liquids will be brought into the Exclusion Zone, with the exception of gasoline or diesel used to fuel engines and motor oil used for engine lubrication in closed containers that will remain closed while in the Exclusion Zone during intrusive MEC operations. Tanker trucks for refueling equipment will be kept outside of the Exclusion Zone during intrusive MEC operations. Intrusive MEC operations will cease temporarily while equipment is being refueled within the Exclusion Zone.

A minimum of two 10-pound (lb), BC rated fire extinguishers will be kept onsite at the Munitions Response Site (MRS) during work activity. These fire extinguishers will have current inspection tags and will be secured to prevent tip-over. All fire extinguishers will be available for response and will be positioned to be within 10 seconds of a potential fire event.

3.1.3 Electrical Safety

During work activities, the potential for exposure to electrical hazards exists. The primary hazards associated with electrical hazards are shock, burns, arc-blast, fire, and explosion. Lockout/tagout procedures must be used when working on any electrical equipment that has the potential to be energized.

To further safeguard workers, the assumption will always be that energetics may be uncovered. For this reason, the generation of static electricity and current flow due to induction field establishment will be minimized.

All vacuums and pumps used will be grounded. Vacuum transmittal hoses and inlet portals will be non-conductive materials and the hose will be grounded at mid-length if energetics area suspected in the uptake liquid or solids.

All motor housings will be guarded, and motors that emit sparks will not be used.

If live panel electrical work is required either in the installation of temporary power or the repair of equipment, only a licensed electrician will do this work. Licensure will be attached to this SSHP and will be available onsite during all such electrical work. The electrician will comply with National Fire Protection Association 70E-2000 Part II 2-3.1.5, which requires a hazard/risk evaluation procedure as part of an electrical safety program.

This evaluation includes determination of the shock approach boundaries, flash hazard analysis as required by National Fire Protection Association 70E-2000 Part II 2-1.3.3, and equipment labeling for equipment that must remain energized while being serviced. Work areas determined to contain an arc flash hazard will be entered only by the licensed electrician, and these areas will be marked with signage and barricade tape to prohibit all other entry.

3.1.4 Heat and Cold Stress Monitoring

It is the responsibility of the Senior Unexploded Ordnance Supervisor (SUXOS) and UXOSO that each employee ensure that temperature stress controls are adequate for the site conditions and tasks. All employees, and specifically the SUXOS, are empowered and expected to stop or modify work and take any precautionary measures to prevent temperature related illnesses.

3.1.4.1 Heat Stress

Heat stress hazards can occur even in temperatures not commonly considered ‘hot” due to the level of physical activity, the level of personal protective equipment (PPE) the worker is wearing, or the physical condition of the worker. Illness resulting from exposure to extreme heat is possible during field operations.

Personnel, especially those in impermeable clothing (i.e., chemical suits), will be familiar with the signs and symptoms of heat stress, including:

- ***Heat Cramps***—Muscle spasms in the abdomen or limbs. Frequent rest periods and fluid intake are appropriate measures to prevent or reduce heat cramps.

- ***Heat Exhaustion***—Severe dehydration; pale, clammy skin; profuse sweating; dizziness, light-headedness; slurred speech; rapid pulse; confusion; fainting; fatigue; cool skin; nausea. Affected personnel will be escorted from the site, decontaminated promptly, set in a cool, shaded area, and given fluids slowly.

- ***Heat Stroke***—Life-threatening condition occurring when the body’s temperature-regulating system improperly functions. Hot dry skin; rapid, deep breathing; lack of perspiration; delirium; high fever (often 106 degrees Fahrenheit [ºF] or more), nausea;

unconsciousness. Brain damage and/or death may occur, if body temperature is not reduced. Provide fluids, use cooling devices (hose-down or shower), and call emergency medical services or transport to hospital immediately.

Some preventive measures to avoid heat stress include:

- Frequent resting in cool or shaded areas.
- Prevent heat stress by resting frequently in a shaded area and consuming large quantities of fresh potable water (more than amount needed to simply "quench thirst"). Drink at least 8 ounces of water or diluted Gatorade every 2 hours when temperatures exceed 75ºF. Do not consume alcoholic beverages to combat dehydration or heat stress.

When ambient temperatures exceed 77°F, wet-bulb globe temperature (WBGT) index equivalent temperature readings will be taken every two hours during the course of the day during field activities and the work/rest regimen guidelines below will be implemented. WBGT Index-equivalent temperature readings and associated recommendations are available on the OSHA Heat Stress application available for all smartphones.

A suggested work-rest regimen is listed in **Table 3-1**.

Table 3-1 Permissible Heat Exposure Threshold Limit Value

Allocation of Work in a Work/Rest Cycle	Acclimatized				Action Limit (Unacclimatized)			
	Light	Moderate	Heavy	Very Heavy	Light	Moderate	Heavy	Very Heavy
75-100%	87.8	82.4	--	--	82.4	77.0	--	--
50-75%	87.8	84.2	81.5	--	83.3	78.8	75.2	--
25-50%	89.6	86.0	84.2	82.4	85.1	80.6	77.9	76.1
0-25%	90.5	88.7	86.9	86.0	86.0	84.2	82.4	80.6

NOTES:
Assumes 8-hour workdays in a 5-day work week with conventional breaks.
Threshold Limit Values assume that workers exposed to these conditions are adequately hydrated, are not taking medication, are wearing lightweight clothing, and are in generally good health.

Examples of workloads:
Rest = Sitting (quietly or with moderate arm movements).
Light Work = Sitting or standing to control machines; performing light hand or arm work (e.g., using a table saw); occasional walking; driving.
Moderate Work = Walking about with moderate lifting and pushing or pulling; walking at moderate pace; e.g., scrubbing in a standing position.
Heavy Work = Pick and shovel work, digging, carrying, pushing/pulling heavy loads; walking at fast pace; e.g., carpenter sawing by hand.
Very Heavy = Very intense activity at fast to maximum pace; e.g., shoveling wet sand.
Adapted from: 2011 Threshold Limit Values (TLVs)® and Biological Exposure Indices (BEIs)® – Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati: American Conference of Governmental Industrial Hygienists, 2011, p. 221.

Other factors, such as a worker's level of acclimation, level of physical fitness, and age, may increase or decrease his/her susceptibility to heat stress. Before assigning a task to an individual worker, these factors will be taken into account to ensure that the task will not endanger the worker's health.

If a heat-related illness is suspected or observed, the affected person will be moved to a cool or shaded area and given plenty of liquids to consume. If symptoms of a heat stroke are observed, the victim will be cooled immediately, and emergency medical services will be called immediately.

The threshold limit values listed in **Table 3-1** apply to physically fit, acclimatized individuals wearing light summer clothing. If heavier clothing that impedes sweat or has a higher insulation value is required, the permissible heat exposure threshold limit values in **Table 3-1** must be reduced by the corrections shown in **Table 3-2**.

3.1.4.2 Cold Stress

Cold stress hazards are most likely to occur at low temperatures or low wind chill factors, with wet, windy conditions contributing to risk. Workers will be familiar with the signs and symptoms of cold stress, which include:

- ***Hypothermia***—Cold related decreasing of the core body temperature that produces shivering, numbness, drowsiness, and muscular weakness. If severe enough, it can lead to unconsciousness and death.

- ***Frostbite***—Constriction of blood vessels in the extremities and decreasing the supply of warming blood may result in formation of ice crystals in the tissues, causing tissue damage. Condition may range from frostnip, which is a numbing of extremities, to deep-freezing tissue beneath the skin. Symptoms include white or grayish skin, blisters, numbness, mental confusion, failing eyesight, fainting, shock, and cessation of breathing. Death may occur from heart failure.

Table 3-2 WBGT Correction Factors

Clothing Type	Clo* Value	WBGT Correction
Summer lightweight working clothing	0.6	0
Cotton coveralls	1	-2
Winter work clothing	1.4	-4
Water barrier, permeable	1.2	-6

*Clo: Insulation value of clothing. One clo = 5.55 kcal/m^2/hour of heat exchange by radiation and convection of each degree $^{\circ}$C difference in temperature between the skin and the adjusted dry bulb temperature.

NOTE: Deleted from the previous version are trade names and "fully encapsulating suit, gloves, boots and hood" including its clo value of 1.2 and WBGT correction of -10.

Pain in the extremities may be the first warning of cold stress, and precautions will be taken to

reduce exposure. Maximum severe shivering will be taken as a sign of immediate danger to the worker, and exposure to cold will be immediately terminated. Personnel exhibiting signs and symptoms of cold stress will be removed from the site, decontaminated, and given appropriate first aid. Emergency medical services will be contacted if symptoms are severe (e.g., more than numbness of the extremities or shivering). When air temperatures are less than 36ºF (including wind chill), workers who become immersed in water or whose clothing becomes wet will be immediately provided a change of clothing and be treated for hypothermia.

As a precautionary measure, employees will wear layers of loose-fitting clothing including insulated coveralls, head cover (perhaps a liner beneath a hard hat), and boots when temperatures fall below 40°F, including wind chill. Protection of the hands, feet, and head is particularly important because these are likely to be injured first by cold. However, actual injury to hands, feet, and head is not likely to occur without prior development of early signs of hypothermia such as numbing and shivering. Bare skin contact with cold surfaces (below 32ºF) will be avoided. **Table 3-3** presents the cooling power of wind on exposed flesh expressed as equivalent temperature. Personnel will wear wind resistant outer shell to decrease wind chill effects. No continuous exposure to cold is permitted when the air speed and temperature results in an equivalent chill temperature of 26ºF or less.

Table 3-3 Wind Chill Temperature

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

Green: **LITTLE DANGER** (frostbite occurs in >2 hours in dry, exposed skin)
Yellow: **INCREASED DANGER** (frostbite could occur in 45 minutes or less in dry, exposed skin)
Red: **GREAT DANGER** (frostbite could occur in 5 minutes or less in dry, exposed skin)
Adapted from: Sustaining Health and Performance in Cold Weather Operations: U.S. Army Research Institute of Environmental Medicine. October 2001

A temperature-dependent work regimen limiting lengthy periods of outdoor activity may be necessary. Workers entering heated shelters will remove the outer layer of clothing and loosen remaining clothing to permit the evaporation of perspiration. Workers will avoid dehydration by drinking water or other decaffeinated beverages, including warm drinks and soups, excluding alcoholic beverages.

3.1.5 Noise Hazards

Previous surveys indicate that heavy equipment such as earth-moving equipment and or heavy equipment may produce continuous and impact noise at or above the action level of 85 decibels. All personnel within 25 feet (ft) of operating equipment, or near an operation that creates noise levels high enough to impair conversation, will wear hearing protective devices (either muffs or plugs). EA personnel who are in the Medical Surveillance Program are automatically enrolled in the Hearing Conservation Program and have had baseline and, where appropriate, annual audiograms. Personnel will wash their hands with soap and water prior to inserting earplugs to avoid initiating ear infections.

3.1.6 Slip/Trip/Fall Hazards

Personnel should exercise caution when walking around the site to avoid fall and trip hazards. If there are holes or uneven terrain in the work area that could cause site personnel to fall or trip, they must be covered, flagged, or marked to warn personnel. If conditions become slippery, personnel should take small steps with their feet pointed slightly outward to decrease the probability of slipping. Gravel or sand should be spread in muddy areas to reduce slipperiness. Personnel should watch where they are walking and walk only in areas of good stability.

3.1.7 Sanitation

EA employees and subcontractors are to have appropriate personal hygiene facilities including toilets, washing supplies, and eating facilities to protect employees from unsanitary conditions when onsite.

3.1.8 Lifting Hazards

The following guidelines will be followed whenever lifting equipment such as portable generators, coolers, water, or any other objects that are of odd size or shape, or that weigh over 25 lb.

- Get help when lifting heavy loads. Portable generators will only be lifted using a two-person lift.
- When moving heavy objects such as drums or containers, use a dolly or other means of assistance.
- Plan the lift. If lifting a heavy object, plan the route and where to place the object.

- In addition, plan the communication signals to be used (e.g., "1, 2, 3, lift").
- Wear sturdy shoes in good condition that supply traction when performing lifts.
- Keep your back straight and head aligned during the lift and use your legs to lift the load; do not twist or bend from the waist. Keep the load in front of you; do not lift or carry objects from the side.
- Keeping the heavy part of the load close to your body will help maintain your balance.

3.1.9 Hand Tools and Portable Equipment

Field personnel may use hand tools and portable equipment in the activities specified in this SSHP. To prevent possible injury to the body, some general guidelines should be applied:

- Keep hand and power tools in good repair and use only for the task for which they were designed.
- Remove damaged or defective tools from service.
- Keep surfaces and handles clean and free of excess oil to prevent slipping.
- Do not carry sharp tools in pockets.
- Clean tools and return to the toolbox or storage area upon completion of a job.
- Wrenches must have a good bite before pressure is applied.
- When working with tools overhead, place tools in a holding receptacle or secure when not in use.
- Do not throw tools from place to place, from person to person, or drop from heights.
- Use non-sparking tools in atmospheres with flammable or explosive characteristics.
- Avoid use of flammable or explosive chemicals when a safer alternative is available.
- Inspect all tools prior to start-up or use to identify any defects.
- Powered hand tools should not be capable of being locked in the on-position.
- Require that all power-fastening devices be equipped with a safety interlock capable of activation only when in contact with the work surface.
- Do not allow loose clothing, long hair, loose jewelry, rings, and chains to be worn while working with power tools.

- Do not use cheater pipes.

- Make provisions to prevent machines from automatically restarting upon restoration of power.

3.1.10 Hand Safety

EA personnel are to perform work that could expose them to hand injury. All EA personnel are to wear protective gloves specific to their task at hand. For sampling activities, EA personnel are to wear nitrile gloves. If cold conditions exist, glove liners should be worn underneath all protective gloves. Physical protection gloves (i.e., leather) should be worn as necessary. Hands are to be kept clean to prevent slipping and contamination. Hand tools should be kept in good repair and sharp tools should be handled with extra care. All tools should be kept in proper storage. As mentioned above, EA personnel will wear leather gloves during hand excavation work to prevent puncture injuries.

3.1.11 Heavy Equipment

Operation of heavy equipment during site activities presents potential physical hazards to personnel. Issues associated with heavy equipment operations are included in EA's Corporate Construction Operations Manual. This document will be made available onsite during intrusive activities and covered during training of site personnel.

- PPE such as safety-toed shoes, safety glasses or goggles, and hard hats must be worn whenever such equipment is present.

- Personnel must at all times be aware of the location and operation of heavy equipment and take precautions to avoid getting in the way of its operation. Never assume that the equipment operator sees you; make eye contact and use hand signals to inform the operator of your intent, particularly if you intend to work near or approach the equipment.

- Traffic safety vests are required for onsite personnel working near mobile heavy equipment such as backhoes and other excavators.

- Never walk directly in back of or to the side of heavy equipment without the operator's acknowledgment.

- When an equipment operator must operate in tight quarters, the equipment subcontractor should provide a person to assist in guiding the operator's movements.

- Keep all non-essential personnel out of the work area.

- Heavy equipment will be completely decontaminated if it comes in contact with contaminated soil.

3.1.12 Excavation and Trenching Hazards

EA employees may be exposed to hazards associated with trenching and excavation activities during the course of field activities. Hazards associated with excavation areas include, but are not limited to, stability of adjacent structures, electrical hazards, underground utilities, slip/trip/fall hazards, and hazardous atmospheres. In the field, approaches that do not require personnel to enter excavation are preferred.

An OSHA Competent Person will coordinate with the UXOSO to control digging slowly and methodically. Hazards associated with excavation cave-ins will be avoided by maintaining a 1.5-ft horizontal to 1-ft vertical slope. Specific requirements for excavation safety are included in are included in EA's Corporate Construction Operations Manual. This document will be made available onsite during intrusive activities and covered during training of site personnel.

A Competent Person will inspect open excavations less than 5 ft deep daily to determine if a protective system is required. Engineering controls will be used for all excavations greater than 4 ft in depth by sloping (benching) of side walls. For excavations greater than 5 ft a protective system for entry to the excavation will be reviewed and approved by the corporate Health and Safety Manager. Qualifications of the Excavation Competent Person will be documented and maintained by EA.

3.1.13 Underground Utilities

The SUXOS or UXOSO is responsible for coordinating with the installation regarding dig permits prior to the commencement of any subsurface (>0.3 meter [1 ft] below ground surface) activities. Resources include site plans, utility companies, and regional utility locating services. The proper utility company personnel will certify in writing to the Field Manager or UXOSO the deactivation of underground utilities, and the certification will be retained in the project files.

3.2 BIOLOGICAL HAZARDS

3.2.1 Insects

See Section 13.5.1 in the APP.

3.2.2 Venomous Snakes

See Section 13.5.2 in the APP.

3.2.3 Plants

See Section 13.5.3 in the APP.

3.2.4 Other Animals

See Section 13.5.4 in the APP.

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4. PROJECT HAZARD ANALYSES

Aspects of the NTCRA contain certain innate risks. **Table 4-1** shows the Project Hazard Analysis for work elements presented in the activity hazard analyses (AHAs) included in Attachment 2 of the APP that will be conducted as part of the NTCRA. **Table 4-1** Project Hazard Analysis is a brief summary of anticipated frequency of exposures to general categories of hazards and does not include all of the hazards covered in the AHAs.

4.1 ACTIVITY HAZARD ANAYLSIS

An AHA has been developed for every operation involving a type of work presenting hazards. The AHAs define the activity being performed, sequence of work, specific safety and health hazards anticipated, control measures, equipment, inspection requirements, training requirements, and the Competent Person in charge of that phase of work. AHAs are included in Attachment 2 of the APP.

4.2 DAILY SAFETY TASK ANAYLSIS

Prior to initiating work each day, the UXOSO will perform a safety analysis on daily tasks, recording the results on the Daily Safety Record (included in Appendix F of the Work Plan).

The current conditions will be evaluated compared to conditions anticipated and hazards found in the applicable activity hazard analysis for the activity (i.e., job or task) to be performed that day. If the current activity hazard analysis does not adequately address unanticipated hazards, the activity hazard analysis must be updated and approved by the EA CIH.

4.3 DAILY TAILGATE SAFETY MEETING

Daily Tailgate Safety Meetings will be conducted by the UXOSO with all personnel who will be working in the field. Any unsafe conditions or activities observed during the previous day will be discussed at the daily meeting. The results of the Daily Safety Record will be reviewed at the Daily Tailgate Safety Meeting. Attendance/participation in the meeting will be documented. Additional site safety briefings will also be conducted whenever there is a change in task or location. Briefings will also be conducted whenever new personnel report to Hancock Field.

Table 4-1 Project Hazard Analysis

Activity	Radiation Hazard	Chemical Hazard	Heat Stress	Noise Hazard	Slip/Trip/ Fall Hazard	Manual Lifting Hazard	Electrical Hazard	MEC Explosive Hazard
Mobilization/Demobilization	N/A	N/A	Med	Low	Med	Med	Med	N/A
Vegetation Clearing	N/A	N/A	Med	Low	Med	Med	N/A	High
Detector-Aided Surface Clearance	N/A	N/A	Med	Low	Med	N/A	N/A	High
Intrusive Investigation of Anomalies	N/A	N/A	Med	Low	Med	Med	N/A	High
MPPEH Inspection and Disposition	N/A	Low	Med	Med	N/A	Med	N/A	High
Soil Sifting	N/A	Med	Med	Med	Med	Low	High	High
Demolition of Concrete Structure	N/A	N/A	Med	Med	Med	Low	N/A	High
Excavation and Backfill	N/A	Med	Med	Med	Med	Low	N/A	High
Soil Sampling	N/A	Low	Med	N/A	Low	Low	N/A	Med
X-Ray Fluorescence (XRF)	Low	Low	Med	N/A	Med	N/A	N/A	N/A

NOTES: Low = Exposure likely less than 10 percent of the time or exposure could result in first aid injury.
Med = Exposure likely 10-50 percent of the time or exposure could result in medical injury.
High = Exposure likely more than 50 percent of the time or exposure could result in lost time injury.
N/A = Exposure not anticipated.
MEC = Munitions and explosives of concern.
MPPEH = Material potentially presenting an explosive hazard.

5. OCCUPATIONAL EXPOSURE ACTION LEVELS

Not applicable.

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6. RESPONSIBILITIES

EA has site safety and health oversight and coordination responsibilities for all personnel onsite. EA will strictly adhere to the provisions of the Work Plan and APP, along with the applicable regulations issued by government entities.

Changing and/or unanticipated site conditions may require modification of this SSHP in order to maintain a safe and healthful work environment. Any proposed changes to this plan will be reviewed and approved by the EA CIH and Project Manager prior to their implementation. The UXOSO will record all changes in the onsite APP. Under no circumstances will modifications to this plan conflict with federal, state, or other governmental health and safety regulations.

EA is providing a copy of the APP to each subcontractor in order to fulfill its obligation under 29 CFR 1910.120(b) to inform subcontractors of site hazards. Each subcontractor is to provide an APP that complies with 29 CFR 1910.120 and addresses the activities of its employees relative to this project. In addition, each subcontractor will provide training certifications for 40-hour OSHA Hazardous Waste Operation and Emergency Response training, and 8-hour Hazardous Waste Operation and Emergency Response refresher training for personnel involved with field activities.

6.1 SITE SUPERVISOR AND SENIOR UXO SUPERVISOR

The Site Supervisor will direct EA onsite operations and will also serve as the SUXOS to ensure that field personnel conduct operations at the site in accordance with the Work Plan and APP and in a systematic manner using proven operating methods and techniques. The Site Supervisor/SUXOS will report directly to the Project Manager.

The Site Supervisor/SUXOS has primary responsibility for the following:

- Seeing that appropriate PPE and monitoring equipment are available and properly utilized by all onsite EA employees.
- Establishing that EA personnel are aware of the provisions of this plan, are instructed in the work practices necessary to ensure safety and are familiar with planned procedures for dealing with emergencies.
- Establishing that all onsite personnel have completed a minimum of 40 hours of health and safety training and have appropriate medical clearance as required by 29 CFR 1910.120, and have been fit tested for the appropriate respirators, if needed.
- Seeing that personnel are aware of the potential hazards associated with site operations.
- Monitoring the safety performance of all personnel to see that the required work practices are employed.

- Correcting any work practices or conditions that may result in injury or exposure to hazardous substances.
- Preparing any accident/incident reports, ENG 3394 (Attachment 3).
- Halting site operations, if necessary, in the event of an emergency or to correct unsafe work practices.
- Seeing that utility clearances are obtained prior to the commencement of work.
- Reviewing project APP.

All activities will be conducted under the direction, supervision, and observation of the Site Supervisor/SUXOS. Additional responsibilities of the Site Supervisor/SUXOS include, but are not limited to:

- Authorizing initiation of all demolition operations.
- Certifying munitions/range debris as ready for turn-in or disposal.
- Coordinating onsite field activities (e.g., intrusive investigations) to preclude impacts to productivity and ensuring compliance with the APP.
- Directly interfacing with and relaying safety and health concerns to the Site Supervisor.
- Ensuring that site operations are conducted in accordance with all relevant safety and health specifications, regulations, and standards.
- Managing the onsite manpower and equipment necessary to safely conduct the tasks associated with the field investigation.
- Performing a final inspection of MD and certifying it to be free of any explosive hazard.
- Preparing and submitting, daily, a detailed accounting of activities performed each workday.

6.2 UXO SAFETY OFFICER

The UXOSO will meet all applicable requirements of Department of Defense Explosives Safety Board (DDESB) TP18, report directly to the EA Corporate Health and Safety Manager and Quality Managers, and coordinate schedules and activities with the Project Manager. The UXOSO is assigned the following authority and responsibilities during all activities:

- Has stop work responsibility related to safety and health issues.

- Implements and enforces the APP, along with safety concerns contained in the standard operating procedures and reports violations to the Project Manager and EA CIH.
- Determines that monitoring equipment is used properly by personnel and is calibrated in accordance with manufacturer's instructions or other standards, and that results are properly recorded and filed.
- Controls access to established work zones and exclusion zones, if any.
- Provides overall safety oversight during disposal operations.
- Becomes the On-Scene Incident Commander in the event of an accident or an emergency.
- Investigates accidents/incidents and "near misses."
- Notifies and coordinates offsite emergency and medical response agencies.
- Enforces the "buddy system."
- Conducts visitor orientations, onsite safety training, and operational reviews in coordination with the EA Project Manager.
- Ensures that decontamination procedures described in this document are followed by personnel.
- Provides ongoing review of the protection level needs as project work is performed and informs the Site Supervisor of the need to upgrade/downgrade protection levels as appropriate.
- Establishes monitoring of personnel and recording results of exposure evaluations.
- Reviews and verifies correct/proper identification for all recovered MEC.
- Checks for defective or damaged equipment.
- Conducts quality control inspections of all MEC- and explosives-related operations.
- Verifies appropriate personnel are being utilized during all field investigation activities.
- Conducts examination of the quality of workmanship.
- Maintains all inspection and surveillance documentation (e.g., quality control reports, equipment standardization results and equipment maintenance results, nonconformance and corrective action documents).
- Performs and documents daily inspections/surveillances of job site activities.

- Verifies all required equipment tests have been performed and that inspection and standardization results comply with contract requirements and approved Work Plan.

6.3 UXO TECHNICIANS

All UXO Technicians will meet all applicable requirements of DDESB TP18 as applicable for the specific position and will be onsite, as necessary, during applicable site activities. The UXO Technicians will provide the ordnance expertise to identify MEC-related hazards.

6.4 PROJECT PERSONNEL

Project personnel involved in onsite investigations and operations are responsible for:

- Taking all reasonable precautions to prevent injury to themselves and to their fellow employees.

- Performing only those tasks that they believe they can do safely, and immediately reporting any accidents and/or unsafe conditions to the UXOSO or Site Supervisor.

- Implementing the procedures set forth in the Work Plan and APP and reporting any deviations from the procedures described in the Plans to the UXOSO or Project Manager for action.

- Notifying the Site Supervisor and UXOSO of any special medical problems (i.e., allergies) and seeing that all onsite personnel are aware of such problems.

- Reviewing and signing the project APP.

- Attending and participating in daily tailgate safety briefings.

7. TRAINING AND MEDICAL SURVEILLANCE

7.1 HAZARDOUS WASTE OPERATIONS TRAINING AND MEDICAL SUREVEILLANCE

See Chapter 5 of the APP for training requirements. Additionally, all personnel and subcontractor personnel working within the MRS will have met the requirements of 29 CFR 1910.120(e), including:

- 40 hours of initial offsite training or its recognized equivalent
- 8 hours of annual refresher training for all personnel (as required)
- 8 hours of supervisor training for all UXO Technician IIIs and above
- 30-hour OSHA Construction Safety Training for personnel serving as UXOSOs
- At all times, at least two of the field workers onsite will have current first aid and cardiopulmonary resuscitation (CPR) certification.

All site personnel are participating in medical surveillance programs that meet the requirements of 29 CFR 1910.120(f). Current copies of training certificates and statements of medical program participation for all personnel are maintained by the Corporate office and onsite.

7.1.1 Other Safety Training Requirements

An Excavation Competent Person must inspect open excavations and trenches daily and document their inspection and finding daily.

7.1.2 Behavior-Based Safety

Most accidents are due to unsafe behavior, and behavior changes may be made that significantly reduce accident risk. All personnel are expected to value safety and be responsible for their safety as well as the safety of others. The UXOSO is expected to provide clear safety expectations and provide positive and negative feedback for safe and unsafe behavior. Peers are expected to intervene upon an unsafe behavior and provide positive feedback for safe behavior.

7.1.3 Initial Site Safety Briefings

Prior to the start of field activities, and for every new employee assigned to the field crew, the UXOSO will conduct a site safety briefing. The initial site safety briefing will include discussion on:

- Contents of the APP

- Limited use of XRF and potential for radiation exposure. Note: Only trained personnel will be allowed to use the XRF equipment and will do so in accordance with the manufacturer's user guide and EA SOP 17.

- Types of physical and chemical hazards (extent and concentrations) at the site and means for minimizing exposure to hazards

- Health effects of chemicals hazards

- The type of monitoring that will be performed

- Action levels for upgrade and downgrade of PPE that will be used

- Site-specific respiratory protection requirements

- Decontamination protocol

- Site control measures, including safe operating practices and communication

- Location and use of emergency equipment (e.g., first aid kit, fire extinguishers)

- Evacuation signals and procedures

- Verification that the health and safety plan has been reviewed

- Emergency contacts

- Route to the hospital.

All site personnel, including subcontractor personnel, are to attend the briefing, review the SSHP, and sign the Safety Briefing and/or Meeting Record in Attachment 3 of the APP. Copies of these forms will be maintained in the project file.

7.1.4 Daily Safety Meeting

A Daily Safety Meeting will be conducted prior to initiating field work each day. The Daily Safety Task Analysis will be utilized to record the meeting.

7.1.5 Hazardous Waste Operations Medical Surveillance

Site personnel are required to participate in medical surveillance programs that meet the requirements of 29 CFR 1910.120(f). Current copies of training certificates and statements of medical program participation for onsite personnel will be maintained onsite.

8. PERSONAL PROTECTIVE EQUIPMENT

Site personnel will be in Level D or modified Level D PPE. The minimum PPE for site personnel includes the following.

- Long pants and long-sleeve shirts
- Hardhat (when overhead hazards exist)
- Safety glasses (or impact-resistant goggles)
- Safety-toed boots (composite-toe for UXO technicians performing work with magnetometers)
- Ear protection in the vicinity of noisy equipment
- Work gloves and/or chemical-resistant gloves. Chemical resistant gloves of 6-mil nitrile will be used for all wood sampling activities. Change-out of the gloves will be required if any mechanical penetration of the gloves occurs.

8.1 RESPIRATOR DONNING REQUIREMENTS AND SELECTION

8.1.1 Medical Clearance and Fit Testing

Respirators are not anticipated to be needed for the NTCRA, but the information below would be implemented if respirators were deemed necessary during the execution of the NTCRA.

Only personnel medically cleared to wear respirators will be assigned to the project. All onsite workers will be clean-shaven in the area of the face piece seal. Long hair, sideburns, and skullcaps that extend under the seal are not allowed. Glasses with temple pieces extending under the seal are not allowed for full-face air purifying respirators. Persons with facial conditions (e.g., missing dentures, scars, severe acne.) that prevent a proper seal are not allowed to wear a respirator until the condition is corrected. Contact lenses may not be worn.

No individual will enter an area where the use of respiratory protective equipment is required unless the person has been fit tested within the last year. Records of fit testing will be maintained onsite and at the EA Corporate office.

8.1.2 Respirator Use Instructions

Only workers trained in the use of air purifying respirators will be allowed to use them onsite. Personnel must be properly trained and fitted for the respirator that each individual will use onsite. This training will be in accordance with 29 CFR 1910.134. Site-specific training on inspecting and donning air purifying respirators, including those slung for escape, will be provided during Site Safety Briefings conducted by the UXOSO. Training will be documented.

Respirator wearers will perform a user seal (pressure) check each time the respirator is donned. For air-purifying respirators, the positive user seal check is performed by first removing the exhalation valve cover, then placing the palm over the respirator exhalation valve and exhaling gently. The respirator mask will puff out without noticeable leakage. The negative user seal check is performed by placing the palms over both of the respirator cartridges, inhaling gently, and holding the breath for 10 seconds. The respirator mask will remain collapsed on the face without noticeable leakage.

All respirator cartridges will be changed out at least daily. The chemical respirator's fit will be rechecked, and the cartridges changed if cartridge breakthrough or leakage is suspected. If chemical irritation is present on the skin within the respirator, the worker will leave the area within the hot zone and proceed to the decontamination zone where doffing of the respirator will occur. As soon as practicable, notify the UXOSO who will investigate the area where the chemical irritation was noticed. Investigation will include renewed monitoring upon approach to the area of concern.

8.1.3 Respirator Inspection

The user will inspect respirators before and after each use. The inspection procedure for air-purifying respirators (e.g., full-face piece and half-face piece cartridge respirators) is presented below.

- Examine the face piece for:
  - — Excessive dirt
  - — Cracks, tears, holes, or distortion from improper storage
  - — Inflexibility
  - — Cracked or badly scratched lenses (full-face only)
  - — Incorrectly mounted eyeglass lenses or broken or missing mounting clips (full-face only)
  - — Cracked or broken air-purifying element holder, badly worn threads, or missing gaskets.
- Examine the head straps or head harness for:
  - — Breaks or cracks
  - — Broken or malfunctioning buckles
  - — Excessively worn serration on the head straps, which may permit slippage.

- Examine the inhalation valves (two) and exhalation valve for:

  — Foreign material (e.g., hairs, particles, etc.)
  — Improper insertion of the valve body in the face piece
  — Cracks, tears, or chips in the valve body, particularly in the sealing surface
  — Missing or defective exhalation valve covers.

- Examine the air-purifying cartridge for:

  — Missing or worn cartridge holder gasket
  — Incorrect cartridge/canister for the hazard
  — Incorrect cartridge installation, loose connections, or cross threading in the holder
  — Cracks or dents in the outside case or threads of filter or cartridge/canister.

8.1.4 Cleaning of Respirators

Respirators assigned and worn by one individual must be dismantled and thoroughly cleaned and disinfected after each day's use. Visitors or multi-assigned respirators must be cleaned and disinfected after each use. A disinfectant spray or wipe is approved as a disinfectant between uses during the day but not for cleaning and sanitizing after each day's use. Care must be taken to prevent damage from rough handling during the cleaning procedure. After cleaning, respirators must be reassembled. The respirator cleaning procedure is presented below:

- ***Washing***—Disassemble and wash with a mild liquid detergent in warm water (not to exceed 110°F). A stiff bristle (not wire) brush may be used.

- ***Rinsing***—Rinse in clean water to remove all traces of detergent. This is very important to prevent dermatitis.

- ***Disinfecting***—Thoroughly rinse or immerse in a sanitizer provided by the manufacturer. Alternatively, a weak chlorine bleach solution (1 milliliter liquid bleach/liter of water) may be used.

- ***Final Rinsing***—Rinse thoroughly in clean water (110°F maximum) to remove all traces of disinfectant. This is very important to prevent dermatitis.

- ***Drying***—Drain and dry hanging by the straps from racks (take care to prevent damage) or towel dry with a clean soft cloth or paper towels.

8.1.5 Maintenance of Respirators

Routine respirator maintenance, such as replacing missing valves, gaskets, nose cups etc., must only be performed by trained respirator users or a respirator manufacturer's representative. Only approved replacement parts must be used. Substitution of parts from a different brand or type of respirator invalidates the respirator, which is not permitted. Any respirator suspected of being defective must be removed from service and replaced.

8.1.6 Storage of Respirators

When not in use, respirators must be stored to protect them from dust, sunlight, heat, extreme cold, excessive moisture, damaging chemicals, and physical damage. Respirators must be stored in re-sealable (e.g., Ziploc®) reusable plastic bags between uses. The respirator storage environment must be clean, dry, and away from direct sunlight. Cabinets or cases are suggested. Storing bagged respirators in vehicles is discouraged due to the potential for damage from other material or equipment.

9. SITE CONTROL MEASURES

9.1 SITE MAP

During the installation entrance briefing and site safety meeting the SUXOS and UXOSO will review the locations of potentially hazardous areas that the field team will be working in, the assembly areas to be used in the event of site evacuation, and any other information relevant to general site safety.

9.2 SITE ACCESS

Site workers will enter the range areas through the main installation entrance. Alternative site routing may be established on the first day of field activities and times will be established as to ingress and egress for emergencies. It is the UXOSO's responsibility to notify all project personnel of the proper route to the site and specify if there are any direction changes to access emergency care.

9.3 WORK ZONES

Site work zones will be established by the SUXOS and/or UXOSO prior to initiating operations to control site access. Establishment of site work zones is based upon site conditions, activities, and exposure potentials. A site Exclusion Zone or quantity distance (QD) arc will be set up, which includes the footprint of the area where work will take place and a fragmentation distance around that to protect areas outside the site from potential fragmentation. The fragmentation distance will be based on the munitions with the greatest fragmentation distance for the site. Within the Exclusion Zone, operating teams will maintain a minimum separation distance to protect the teams from each other's operations. Exclusion zones and minimum safety distances are presented in the Explosives Safety Submission (Appendix B of the Work Plan).

9.3.1 Exclusion Zone

The Exclusion Zone, or QD arc, will follow the approved Explosives Safety Submission provided as Appendix B of the Work Plan. Since this area shall be considered active, all personnel within the area must use the prescribed levels of PPE. Only authorized personnel will be located within the Exclusion Zone during activities. Upon entry by non-essential or not authorized but essential personnel into the Exclusion Zone, all work will cease until notifications and corrective measures have been taken. EA will incorporate the use of a laser range finder to assist in Exclusion Zone markings.

During all work activities within an Exclusion Zone, the implementation of a buddy system is mandatory. A buddy system requires that at least two people work as a team and maintain visual and audio contact with each other at all times. The UXOSO shall maintain a portable cellular telephone or radio onsite with key personnel for emergency response notifications and communications.

9.3.2 Support Zone

The Support Zone shall consist of a staging area in a non-hazardous or clean area. It shall contain the team vehicles, a first aid/medical monitoring station, and other elements necessary to support site activities. Normal work clothes and boots may be worn in this area. Location shall be based upon favorable wind direction, topography, and site accessibility when conditions allow.

10. ENGINEERING CONTROLS

If site activities generate sustained visible dust, a water mist will be applied to reduce dust generation.

Some equipment is shielded and includes other specialized engineering controls are described in the Explosives Safety Submission (Appendix B of Work Plan).

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11. PERSONAL HYGIENE AND DECONTAMINATION

Field work is anticipated to be conducted in Level D. Site personnel will wash their hands, face, and exposed skin surfaces upon leaving the Exclusion Zone, as needed, and prior to ingestion of food, liquids, or any other hand to mouth activities. A portable hand washing facility with potable water, soap, and paper towels shall be located in the Support Zone.

11.1 EQUIPMENT DECONTAMINATION

Equipment decontamination during this project will consist of brushing off excess soil from heavy equipment within the contaminated areas, prior to leaving the area.

A designated "clean area" will be provided within the Support Zone for performing equipment maintenance. This area shall be used when personnel are required by normal practices to come in contact with the ground (i.e., checking project equipment).

11.2 RESPIRATOR DECONTAMINATION

Respirator use is not anticipated during this project. However, in the event respirator use becomes necessary, respirators will be decontaminated at least once a day. Soap and water will be used to wipe down respirators and the air cartridges will be replaced.

11.3 EMERGENCY AND FIRST AID EQUIPMENT

A complete first aid kit (one per team or 25 personnel), meeting the requirements of a Type III, 16-unit or larger in a waterproof container, and containing at a minimum, a pocket mouthpiece for cardiopulmonary resuscitation, absorbent compresses, adhesive bandages, adhesive tape, antiseptic swabs, burn gel, sterile pads, and a triangular bandage will be readily available onsite. The contents of the kit(s) will be evaluated and possibly modified for this specific project. Kit(s) will be located not more than 25 ft from the work activity. The contents will be checked prior to their utilization for sterility and to replace expended items. The UXOSO or other designated individual will inventory the kit(s) weekly and document the results in a log or on an inspection form. Expended or non-sterile contents will be replaced with serviceable items.

Prior to the start of work, the UXOSO will discuss with site personnel the prevention steps, symptoms, and medical personnel available to assist with injuries or questions on diseases, plants, or animals that could be encountered while working on this project.

A working cell phone or radio with adequate signal in this area will be maintained onsite and fully charged at the start of each work day.

A fire extinguisher, A 2A:10B:C, will be maintained in each vehicle as well. Vehicles transporting explosives will maintain a second 2A:10B:C. Personnel will be instructed on the proper use of fire extinguishers.

11.4 DECONTAMINATION – NON-CHEMICAL MEDICAL EMERGENCIES

In the event of physical injury or other serious medical concerns, immediate first aid is to be administered in lieu of further decontamination efforts.

11.5 EMERGENCY INFORMATION

Project emergency contact information is presented in Attachment 4 of the APP.

The hospital route map is presented in the Attachment 4 of the APP. A copy of the hospital route map must be readily available in each site vehicle that may be used to transport accident victims to the hospital.

12. EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

Emergency contact and information is presented in Attachment 4 of the APP. The route to the hospital is provided in Attachment 4 of the APP.

Illnesses, injuries, and accidents occurring onsite must be attended to immediately. The Accident/Loss Report is included in Attachment 3 of the APP. The Accident/Loss Report must be completed and submitted internally to the EA Human Resource Director within 24 hours of the reported incident for medical treatment cases and within 5 days for other incidents. The EA Project Manager and Corporate Health and Safety Manager will also be notified.

12.1 EMERGENCY ACTION PLAN

The Emergency Action Plan for the site is summarized in this section. Should an emergency occur, including fire or injury, the individual who notices the incident should signal those around and the UXOSO. This may be done by pressing the horn three times on a vehicle or by using a portable alerting air horn. The UXOSO will assess the scene for safety, to determine what happened, how many victims there are, and whether there are others who can assist. Should the UXOSO determine the site is unsafe, the dangers must be removed, equipment must be shut down, or personnel must be removed to a safe location. Should injury occur, the UXOSO will check the victim for consciousness. The victim may need to be moved to a safe location. If not, do not move the victim and assess the cause of the injury. The UXOSO is to call the emergency contacts listed in Attachment 4 of the APP or ask another to make the calls. Once emergency services arrive, allow them to provide care for the victim. If an ambulance is not necessary, but medical help is still sought, the directions to the hospital are included in Attachment 4 of the APP. Once the immediate danger is dealt with, the UXOSO is to complete appropriate emergency notifications and incident reports.

12.2 MEDICAL EMERGENCIES RESPONSE PLAN

At a minimum, two personnel onsite will have a current certificate in American Red Cross Standard First Aid. This training provides Adult CPR and Basic First Aid. If a medical emergency exists, consult the emergency contact information list in Attachment 4 of the APP and request an ambulance immediately. Perform first aid/CPR as necessary, stabilize the injured, decontaminate if necessary, and extricate only if the environment they are in is dangerous or unsafe and only if the rescuers are appropriately protected for potential hazards they may encounter during the rescue. When emergency services personnel arrive, communicate all first aid activities that have occurred. Transfer responsibility for care of the injured/ill to the emergency services personnel.

The following items and emergency response equipment will be located within easy access at all times:

- First aid kit and infection control kit.

- Eyewash – A 15-minute American National Standards Institute compliant eyewash and an appropriate amount of portable sterile eyewash bottles will be available onsite for flushing foreign particles or contaminants out of eyes. The UXOSO will demonstrate the proper operation of the unit(s) prior to the start of work.

- Emergency contact information.

- Portable radios for emergency communications in remote areas. NOTE: Portable radios and cell phones must be cleared by the UXOSO.

- Drugs, inhalants, or medications shall not be included in the first aid kit.

Supplies should be re-ordered as they are used. A monthly inventory must be done on the first aid kit and infection control kit contents and supplies re-ordered that have been used and not reported.

12.3 INJURY/ILLNESS/INCIDENT REPORTING AND NOTIFICATIONS

All personnel onsite will immediately notify the UXOSO of a reportable incident. The UXOSO will contact the Project Manager. The employee involved will suspend operations and if possible, record information pertaining to the incident. The UXOSO or the Project Manager will notify the Ordnance and Explosives Safety Specialist (OESS) who will notify the client and federal and state authorities as appropriate. An Accident/Loss Report Form will need to be completed and submitted to EA's Human Resources Director within 24 hours. A USACE Engineering Form 3394 (Attachment 3) must be completed.

In accordance with USACE LRL-01525, November 2003, in case of an accident, the field crew will "Notify the Contracting Officer as soon as practical, but not later than (4 hours), after any accident meeting the definition of Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than $5,000."

Information shall include contractor name; contract title; type of contract; name of activity, installation, or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence of the accident site until the government investigation team arrive onsite and the government investigation is conducted.

12.4 INJURY MANAGEMENT

To ensure that employees receive appropriate, immediate, and high-quality health care services that will minimize disability, promote rapid recovery and save lives, injury management procedures will be put in place and followed. The UXOSO should evaluate the work site to identify potential hazards and means of treatment. At a minimum, at least two persons must be trained in first aid and be trained in bloodborne pathogens. First aid kits, emergency information, eyewash facilities, and identification of medical facilities are to be up to date and

available to those onsite. Should an employee be critically injured, the Emergency Action Plan should be followed, and transportation should be provided to the employee. Non-critical injuries should be properly diagnosed and treated.

12.5 INCIDENT INVESTIGATION

The EA CIH or designee will investigate significant incidents. Field personnel may be involved in providing information for the investigation reports.

12.6 DISCOVERY OF MEC OR UXO

Field activities will include investigation of possible MEC; MEC removal, and detonation (if needed); disposal of material potentially presenting an explosive hazard (MPPEH)/MD; and site restoration (as needed). The field team will follow the procedures identified in the Work Plan and the Explosives Safety Submission (Appendix B of the Work Plan) when interacting with MEC during the NTCRA.

12.7 PLACES OF REFUGE

In the event of a site emergency requiring evacuation, all personnel will evacuate to a pre-designated area located a safe distance from any health or safety hazard. The UXOSO (in cooperation with a facility representative) will designate a primary assembly area prior to the start of work each day. The daily pre-designated assembly area may have to be re-designated by the UXOSO in the event of an emergency where the area of influence affects the primary assembly area. Once assembled, the UXOSO shall take a head count. The UXOSO will evaluate the assembly area to determine if the area is outside the influence of the situation; if not, the UXOSO will redirect the group to a new assembly area where a new head count will be taken.

During any site evacuation, all employees shall be instructed to observe wind direction indicators. During evacuation, employees will be instructed to travel upwind or crosswind of the area of influence. The UXOSO will provide specific evacuation instructions, via the site emergency radio if necessary, to site personnel regarding the actual site conditions.

12.8 FIRE

To protect against fires, the following special precautions must be taken:

- Smoking will be restricted to designated areas.

- Before any flame-producing devices (i.e., cutting torches or welding irons) are used in the Exclusion Zone, the SUXOS and UXOSO must be contacted. A detailed inspection of the work area will be conducted to determine if potential fire sources exist. The fire sources must be removed to at least 35 ft away before work can commence. Type B:C fire extinguishers will be available onsite to contain and extinguish small fires. The local or facility fire department shall be summoned in the event of any fire onsite.

12.9 COMMUNICATION

A communication network must be set up to alert site personnel of emergencies and to summon outside emergency assistance. Where voice communication is not feasible an alarm system (i.e., sirens, horns, etc.) should be set up to alert employees of emergencies. Radio communication may also be used to communicate with personnel in the Exclusion Zone. Where phone service is not readily available, radios or portable phones should be used to communicate with outside agencies. Site personnel should be trained on the use of the site emergency communication network. Emergency phone numbers shall be posted at the phone or radio used for outside communication. The UXOSO is responsible for establishing the communication network prior to the start of work, and for explaining it to all site personnel during the site safety briefing.

In the event of an emergency, personnel will use the hand signals shown in Table 12-1 where voice communications are not feasible.

Table 12-1 Hand Signals

Hand Signal	Definition
Hand clutching throat	Out of air/can't breathe
Hands on top of head	Need assistance
Thumbs up	OK/I'm alright/I understand
Thumbs down	No/negative
Arms waving upright	Send back support
Grip partner's wrist	Exit area immediately

12.10 EMERGENCY RESPONSE TEAM

The emergency response team will consist of employees who assume the following roles:

- Emergency care provider(s)
  - — Provide first aid/CPR as needed.
- Communicator
  - — The role of the communicator is to maintain contact with appropriate emergency services, providing as much information as possible, such as the number injured, the type and extent of injuries, and the exact location of the accident scene. The communicator should be located as close to the scene as possible in order to transmit to the emergency care providers any additional instructions that may be given by emergency services personnel in route.
- Senior UXO Supervisor
  - — The SUXOS should survey and assess existing and potential hazards, evacuate personnel as needed, and contain the hazard. Follow-up responsibilities include

replacing or repairing damaged equipment, documenting the incident, and notifying appropriate personnel/agencies described under incident reporting.

— It also includes reviewing and revising site safety and contingency plans as necessary.

12.11 OPERATION SHUTDOWN

Under certain extreme hazardous situations, the SUXOS or UXOSO may request that site operations be temporarily suspended while the underlying hazard is corrected or controlled. During operation shutdown, all personnel will be required to stand upwind to prevent exposure to fugitive emissions. The UXOSO, with concurrence from the OESS, will have ultimate authority for operations shutdown and restart.

12.12 SPILL OR HAZARDOUS MATERIAL RELEASE

Small spills are immediately reported to the SUXOS and or UXOSO and are dealt with according to the chemical manufacturer's recommended procedures found on the material safety data sheets. Steps will be taken to contain and/or collect small spills for approved storage and disposal.

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13. PUBLIC SAFETY

Criteria for initiating a community alert program, contacts, and follow-up will be developed prior to the initiation of intrusive activities. Site methodology used to protect the public against site contaminants will include notification of emergency providers.

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14. RECORDKEEPING

The Site Supervisor, UXOQCS, and UXOSO are responsible for site recordkeeping. Prior to the start of onsite work, they will review the SSHP. If no SSHP changes are needed, they will sign the acknowledgment form located in the APP.

The following safety records will be maintained in the onsite project files. These records must be available in the event of an internal or external compliance audit:

- Daily Safety Task Analysis Worksheet to include daily safety inspection logs
- Fit test records (if respirators are used)
- Safety training records
- Medical clearance records in accordance with medical surveillance recordkeeping requirements
- Training logs
- Employee/visitor registers
- Safety Inspection Records:
  - Field first aid kit supply list (SMS 24-9 – monthly inspection documentation)
  - Monthly Fire Extinguisher
  - Air Monitoring Results
  - Personnel Exposure Records
- Incidence and Near Miss Report Records
- Confined Space Entry Permits
- Heat and Cold Stress Monitoring Results.

EA will maintain a list of alternate points of contact in the event the Contract Officer is not available.

14.1 SAFETY EXPOSURE REPORT

The Safety Exposure Report, a tabulation of field labor hours, lost workday accidents, and number of lost workdays, will be submitted monthly. (NOTE: This report does not negate the requirement to submit an ENG FORM 3394 to report an accident.) The report will include the following information:

- Title of Report.

- Month and year for which the report is made.

- Contract Number/Task Order/Delivery Order/Project Name/Site Name and Location. Report each Task Order/Delivery Order on a separate line on the form.

- Hours worked in direct support of the contract (by all personnel) during the reported month, and cumulative. Do not report hours expended on corporate personnel issues, payroll, or hours expended by subcontract personnel in direct support of the contract.

- Total number of lost workday accidents during the reported month and cumulatively since task initiation.

- Total number of lost workdays due to on-the-job accidents during the reported month and cumulatively since task initiation.

- Number of property damage accidents (includes vehicles) with property loss value of $5,000 or more, during the reported month and cumulative since task initiation.

- Signature, Title, and Date: A corporate manager will sign and date the exposure data report along with the progress report. Both reports will be submitted under a single letter of transmittal to the Contract Officer, with two copies furnished to USACE-Omaha District.

14.2 RECORDKEEPING FOR INCIDENTS

Any incident will be investigated, and the Incident Report form will be completed and forwarded to the Project Manager.

The Project Manager and the UXOSO will establish a system appropriate to the investigation site that will record, at a minimum, the following information:

- Personnel conducting the site activities, their arrival and departure times, and their destination at the site.

- Incidents and unusual activities that occur on the site such as, but not limited to, accidents, breaches of security, injuries, equipment failures, and weather-related problems.

- Changes to the Work Plan and the APP.

- Daily information such as:

  — Work accomplished and the current site status
  — Equipment calibrations, repairs, and results
  — Site work zones.

15. LONE WORKER

Individuals are considered to be "lone workers" when their normal duties require them to work where they cannot be seen or heard by another person, cannot expect a visit from another worker or member of the public during the normal course of their work, and/or where assistance is not readily available.

Individuals are prohibited from acting as "lone workers" on field work associated with this project while intrusive MEC operations are being performed. In the event it becomes necessary to guard a MEC item overnight, a lone worker may be utilized after work hours if they have radio or cell phone contact with their supervisor (or approved alternate). The lone worker shall contact the supervisor (or approved alternate) a minimum of every 4 hours.

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Attachment 6

Safety Data Sheets

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SAFETY DATA SHEETS

This attachment contains the Safety Data Sheet (SDS) for materials potentially present on this project location. Contents of this attachment include:

1. Cast Boosters PETN
2. Deep Woods Off
3. Detonating Cord
4. Diesel Fuel #2
5. Electric and Non-Electric Detonators
6. Fire Extinguishers
7. Hydraulic Fluid
8. Insect Repellent
9. Shape Charge
10. Sunscreen
11. Unleaded Gas

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Accurate Energetic Systems, LLC

Section 1: Identification

Product Identifier/Name: AES Cast Boosters

Product Use: Military or Industrial

Product Uses Advised Against: None

AES SDS Number: 2AES.016.GHS

Outside USA/Canada number: +1-352-323-3500

Manufacturer: Accurate Energetic Systems, LLC
5891 HWY 230 West
McEwen, TN 37101

Non-Emergency Phone Number: 931-729-4207

Emergency Phone Number: 931-729-6621

Additional Emergency Number: INFOTRAC: 800-535-5053

Section 2: Hazard Identification

GHS Classification: Explosives

Signal Word: **DANGER**

Pictograms:

Hazard Statements:
Explosive; mass explosion hazard - H201
Toxic if swallowed - H301
Causes skin irritation - H315
Causes eye irritation - H319

Precautionary Statements:
Keep away from heat/sparks/open flames. No smoking - P201
Do not subject to grinding/shock/friction - P250
Avoid breathing dust (after detonation) - P261
Wash thoroughly after handling; if on skin wash with plenty of water
Use personal protective equipment (PPE) as required - P281

Response Precautionary Statements:
Explosion risk in case of fire - P372
DO NOT fight fire when reaches explosives - P373
Evacuate area - P380

Storage Precautionary Statements:
Store in accordance with local/regional/national/international regulations - P401

Disposal Precautionary Statements:
Dispose of contents/containers in accordance with local/regional/national/international regulations - P501

Section 3: Composition/Information on Ingredients

Chemical Name	Trade, Common Names	CAS Number	EC Number	Composition
TNT	trinitrotoluene; trinitrotoluol; trotyl; tolite	118-96-7	609-008-00-4	20-100%
RDX	hexogen, cyclonite	121-82-4	204-500-1	0-65%
HMX	Cyclotetramethylene tetranitramine, octogen	2691-41-0	210-260-0	0-65%
PETN	pentaerythritol tetranitrate	78-11-5	603-035-00-5	0-65%
Desensitizing Wax	paraffin wax	No data	282-315-6	0-7%
Aluminum Powder	No data	7429-90-5	231-072-3	0-25%

Section 4: First-Aid Measures

Inhalation:	Avoid inhalation of dusts, fumes, mist or vapors. Remove to fresh air. Get medical attention if symptoms persist.
Skin:	Avoid skin contact. If on skin, wash with soap then rinse thoroughly. Seek medical attention if symptoms persist.
Eyes:	If in eyes, flush eyes with water for at least 15 minutes. If eye irritation persists, get medical attention.
Ingestion:	If conscious, drink large amounts of water and induce vomiting. Get medical attention immediately.

Routes & Effects of Exposure	Acute Symptoms	Chronic Symptoms

Inhalation/Ingestion:	Post-detonation fumes are toxic. NOTE: The following information is for the explosives constituents - Can cause irritation to mucous membranes. Excessive exposure may cause convulsions, unconsciousness, headache, dizziness, flushing of skin, fall in blood pressure, and methemoglobinemia. Other symptoms may include sneezing; coughing and sore throat; muscular pain; cardiac irregularities; nausea and vomiting; blood damage.	Inhalation and ingestion can result in systemic poisoning, usually affecting the bone marrow and the liver. Excessive exposure to TNT can cause liver damage; cyanosis; peripheral neuropathy; kidney damage; leukocytosis; cardiac irregularities; anorexia; aplastic anemia. Acute symptoms may also persist.
Skin:	Can cause allergic skin reaction.	May cause yellowing of the skin, hair, and nails.
Eyes:	Can cause eye irritation.	May cause cataract development.

Section 5: First-Fighting Measures

Extinguishing Media:	Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain (due to aluminum content).	**Unsuitable Extinguishing Media:**	**DO NOT USE WATER, CO_2 OR FOAM ON MATERIAL ITSELF.**

Special Hazards from the Chemicals: Explosion risk in case of fire

Special Protective Equipment & Precautions for Firefighters:	If explosive is burning, evacuate immediately and DO NOT fight the fire. Any fire fighting done to non-explosives should be done remotely; use information such as quantity of explosives and DOT Emergency Response Guide (ERG) to determine the safe distance. Anticipate flying and falling fragments following an explosion; utilize PPE and other means, such as terrain, to shield the body.

Section 6: Accidental Release Measures

Personal Precautions, Protective Equipment, and Emergency Procedures:	Eliminate all ignition sources. Evacuate non-essential personnel from scene. Do not walk through spilled material. Use PPE and non-sparking tools as needed.
Environmental Precautions:	Avoid run off to waterways and sewers. Collect spilled material.

Methods & Materials for Containment and Clean-Up: Never employ water. Remove all sources of ignition and avoid any and all situations which could initiate the material, such as heat and/or shock, sparks, impact, friction, or electrostatic discharge. Gently sweep up spill with a soft bristle brush and a non-sparking pan or shovel. Place material in a properly labeled storage container and store in an approved storage magazine for further disposition. If material becomes wet, place material in vented container and move container to remote area.

Section 7: Handling & Storage

Precautions for Safe Handling:	Keep away from heat and ignition sources. Do not smoke. Do not expose charge or it's container to pressure, cutting, welding, drilling, heat, flames or other activities that could be ignition sources.
Conditions for Safe Storage:	Store in a designated place. Keep containers closed when not in use.
Incompatible Materials:	Alkalis, alkoxides, and ammonia react with TNT to form dangerously sensitive compounds. Avoid contact with potassium hydroxide, sodium carbonate, sodium sulfide, and potassium methylate. Also avoid acids, strong oxidizers, ammonia, reducing agents, initiating explosives, as well as physical sensitizers such as glass, sand, and metal fragments. When subjected to a water content greater than 0.2%, the explosive composition has a tendency to become more sensitive due to the aluminum forming combustible hydrogen gas.

Section 8: Exposure Controls/Personal Protection

Control Parameters:

Chemical Name:	OSHA		NIOSH		ACGIH	
	PEL	IDLH	TWA	IDLH	TLV	STEL/C
TNT	1.5mg/m³ (Skin)	No data	0.5mg/m³ (Skin)	500 mg/m³	0.1 mg/m³ (Skin)	No data
RDX	1.5mg/m³ (Skin)	3mg/m³	1.5mg/m³ (Skin)	3mg/m³	0.5mg/m³ (Skin)	No data
HMX	No data	No data	No data	No data	No data	No data
PETN	No data	No data	No data	No data	No data	No data

Aluminum Powder	15mg/m³ (Total Dust)	No data	5mg/m³ (Respirable)	No data	10mg/m³ (Total Dust)	No data
Exposure Times:	PEL/TWA/TLV=8 hours. IDLH=30 minutes, without any escape impairing symptoms or long term effects. STEL=15 minutes. C=No amount of exposure is acceptable above this level.					

Keys to Abbreviations

OSHA= Occupational Safety & Health Administration
NIOSH= National Institute of Occupational Safety & Health
ACGIH= American Conference of Governmental Industrial Hygienists
IDLH=Immediately Dangerous to Life & Health
PEL= Permissible Exposure Limit
TWA= Time-Weighted Average
TLV-Threshold Limit Value
STEL=Short Term Exposure Limit
C= Ceiling

Exposure Controls	
Engineering Controls:	Use outdoors or in ventilated areas to keep dust/fumes below exposure limits.
Personal Protective Equipment:	
Respiratory	Not anticipated during normal handling. Avoid post detonation fumes and dust until they have had time to disperse. Follow all Safety and Industrial Hygiene protocols.
Eye	ANSI approved Safety glasses and side shields or goggles are recommended.
Ears	Hearing protection is recommended at detonation time.
Hands	Chemical resistant gloves, such as nitrile, are recommended when handling and cleaning up.
Body	Cotton clothing is recommended to control static electricity, if handling explosive powder. Conductive-soled footwear is also recommended if handling explosive powder.
Personal Hygiene Measures:	Wash hands after handling and use. Keep away from food, drinks, tobacco products, or any other items that may touch the body or be ingested. Change uniform daily. Store and wash work uniform separate from other clothing.

Section 9: Physical & Chemical Properties

Physical State:	Solid	**Vapor Pressure:**	0.1 @ 100°C (TNT/RDX)
Color:	Cardboard or plastic tube containing tan to dark, grayish-brown material	**Vapor Density:**	No data
Odor:	No discernible odor	**Relative Humidity:**	No data
Odor Threshold:	No data	**Solubility:**	0.1% @67°C (TNT)
pH Value:	No data	**Partition Coefficient:**	No data
Melting Point:	78-80°C (TNT), 142°C (PETN), 191°C (RDX)	**Specific Gravity:**	1.15 minimum
Boiling Point:	240°C (TNT explodes)	**Autoignition Temp:**	217°C (RDX), 191°C (PETN)
Flash Point:	Explodes	**Decomposition Temp:**	246°C (TNT)
Evaporation Rate:	No data	**Explosive Limits:**	*Explosion caused by friction, impact, static electricity, or heat*
Flammability:	Explosive		

Section 10: Stability & Reactivity

Chemical Stability:	Aluminum content may react with water, acids, and alkalis to form combustible hydrogen gas.
Possible Hazardous Reactions:	Explosion
Conditions to Avoid:	Avoid friction, impact, shock, heat, electrostatic discharge.
Hazardous Decomposition Products:	During decomposition emits toxic oxides of nitrogen, carbon monoxide, or carbon dioxide.

Section 11: Toxicological Information

Routes & Symptoms of Exposure - Refer to Section 4 - First Aid Measures

Target Organs: Skin, Blood, Liver, and Kidneys

Information on Toxicological Information

Chemical Name	Testing Data	Carcinogenicity	Mutagen/Teratogen
TNT	Oral LD50: Rat 765 mg/kg	Not classified by the IARC or NTP	No data
RDX	Oral LD50: Rat 100 mg/kg Oral LDLO: Rat 500 mg/kg	Not classified by the IARC or NTP	No data
HMX	Oral LD50:Rabbit 50 mg/kg Oral LDLO:Rabbit 100 mg/kg	Not classified by the IARC or NTP	No data
PETN	Oral LD50:Rat 1660 mg/kg Oral LDLO:Rat 5000 mg/kg	Not classified by the IARC or NTP	No data
Aluminum Powder	Oral LD50:Rat >15900 mg/kg	Not classified by the IARC or NTP	No data

Section 12 Ecological Information:

Toxicity:	Constituents may accumulate in the environment. TNT and RDX are possibly toxic to fish and plants, however, full toxicological effects are not fully known at this time.
Persistence and Degradability:	Explosive constituents may enter the environment in waste waters and solid wastes resulting from the manufacturing of explosives. It is important to prevent explosives from entering waterways and
Bioaccumulative Potential:	TNT: Kow=2.03; BCF=3.4 RDX: Kow=0.87; BCF=1.86 HMX: Kow=-0.16; BCF=1 PETN: Kow=2.38; BCF=1.13
Mobility in Soil:	Depending on the explosive used in manufacturing process, some are mobile in the soil and do not readily biodegrade due to sun exposure or aerobic/anaerobic processes.
Other Adverse Affects:	No data

Section 13 Disposal Considerations:

Follow all local, state, federal, and international regulations when disposing of the product and packaging. Do not use original containers for other means, unless all explosive markings and labels have been removed.

Section 14: Transport Information:

UN Number	UN Proper Shipping Name	Transport Hazard Class	Packing Group	Marine Pollutant	ERG Guide Number
UN0042	Boosters	1.1D	II	No	112

Special Precautions:	Understand the hazards of transporting explosives. Follow DOT guidelines and review the Emergency Response Guide before driving. Following any accident, immediately notify First Responders of the cargo.

Section 15 Regulatory Information:

Chemical	TSCA	CAA	RCRA	CERCLA/SARA
TNT	No	No	No	No
RDX	Yes	Yes	Yes	Yes
HMX	No	No	No	No
PETN	Yes	Yes	Yes	Yes
Aluminum Powder	Yes	No	No	Yes

Section 16 Other Information:

Effective Date: 3/9/2016 **Supercedes:** 5/29/2015

CAUTION: High explosives are extremely dangerous. When initiated, the cast booster detonates producing a severe blast overpressure with the possibility of secondary fragments from the surface which the charge is placed against. The cast boosters should be handled only by qualified personnel who are experienced and highly trained in the use of and familiar with the hazards inherent with this product. When the cast booster is detonated or destructively tested, all personnel must be protected from the effects of blast overpressure and fragmentation. Allow the post-detonation fumes and dust to clear prior to entering the area. Follow all safety regulations and precautions when handling, storing, or processing explosive material.

The information contained herein is believed to be accurate and represents the best information currently available. Data is based on information obtained through numerous regulatory and scientific agencies; said material may change over time. Product users are advised to confirm in advance of need that information is current, applicable, and suited to the circumstance of use. This document should be used to supplement the end users own information, safety procedures and training. Buyer and user assume any and all risk, responsibility, and liability for any and all injury (including death), loss, or damage arising from usage.

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200

OFF!® DEEP WOODS® INSECT REPELLENT V

Version *1.1*

Print Date 03/04/2015

Revision Date 02/23/2015

SDS Number 350000004807

1. PRODUCT AND COMPANY IDENTIFICATION

Product information

Product name : **OFF!® DEEP WOODS® INSECT REPELLENT V**

Recommended use : Insect Repellent

Manufacturer, importer, supplier : S.C. Johnson & Son, Inc.
1525 Howe Street
Racine WI 53403-2236

Telephone : +18005585252

Emergency telephone number : 24 Hour Medical Emergency Phone: (866)231-5406
24 Hour International Emergency Phone: (703)527-3887
24 Hour Transport Emergency Phone: (800)424-9300

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

Globally Harmonized System (GHS) Classification

Hazard classification	Hazard category	Hazards identification
Aerosol	Category 1	Extremely flammable aerosol.
Gases under pressure	Liquefied gas	Contains gas under pressure; may explode if heated.

Labelling
Hazard symbols
Flame
Gas cylinder

Signal word
Danger

Hazard statements
Extremely flammable aerosol.
Contains gas under pressure; may explode if heated.

Precautionary statements
Protect from sunlight. Do not expose to temperatures exceeding 50 °C/ 122 °F.
Protect from sunlight. Store in a well-ventilated place.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Do not spray on an open flame or other ignition source.
Do not pierce or burn, even after use.

Other hazards : None identified

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Weight percent
Ethyl alcohol	64-17-5	30.00 - 60.00
N,N-Diethyl-m-toluamide	134-62-3	10.00 - 30.00
Butane	106-97-8	1.00 - 5.00
Propane	74-98-6	1.00 - 5.00
Isobutane	75-28-5	1.00 - 5.00

The specific chemical identity and/or exact percentage (concentration) of this composition has been withheld as a trade secret.

For additional information on product ingredients, see www.whatsinsidescjohnson.com.

4. FIRST AID MEASURES

Eye contact : No special requirements

Skin contact : If you suspect a reaction to this product, discontinue use and remove contaminated clothing.

Inhalation : No special requirements.

Ingestion : No special requirements

5. FIREFIGHTING MEASURES

Suitable extinguishing media : Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Specific hazards during firefighting : Aerosol Product - Containers may rocket or explode in heat of fire. Do not allow run-off from fire fighting to enter drains or water courses.

Further information : Fight fire from maximum distance or protected area. Cool and use caution when approaching or handling fire-exposed containers. Wear full protective clothing and positive pressure

self-contained breathing apparatus. In case of fire and/or explosion do not breathe fumes.

NFPA Classification : NFPA Level 2 Aerosol

6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Remove all sources of ignition.
Wear personal protective equipment.
Wash thoroughly after handling.

Environmental precautions : Do not flush into surface water or sanitary sewer system.
Use appropriate containment to avoid environmental contamination.
Outside of normal use, avoid release to the environment.

Methods and materials for containment and cleaning up : If damage occurs to aerosol can:
Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).
Use only non-sparking equipment.
Dike large spills.
Clean residue from spill site.

7. HANDLING AND STORAGE

Handling

Precautions for safe handling : Avoid contact with eyes and lips.
For personal protection see section 8.
Use only as directed.
KEEP OUT OF REACH OF CHILDREN AND PETS.
Pressurized container.
Do not pierce or burn, even after use.

Advice on protection against fire and explosion : Keep away from sources of ignition - No smoking.
Do not spray on an open flame or other ignition source.

Storage

Requirements for storage areas and containers : Protect from sunlight. Do not expose to temperatures exceeding 50 °C/ 122 °F.

Keep away from food, drink and animal feedingstuffs.
Keep in a dry, cool and well-ventilated place.

Other data : Stable under recommended storage conditions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Components	CAS-No.	mg/m3	ppm	Non-standard units	Basis
Ethyl alcohol	64-17-5	1,900 mg/m3	1,000 ppm	-	OSHA TWA
Ethyl alcohol	64-17-5	-	1,000 ppm	-	ACGIH STEL
Butane	106-97-8	-	1,000 ppm	-	ACGIH STEL
Propane	74-98-6	-	1,000 ppm	-	ACGIH TWA
Propane	74-98-6	1,800 mg/m3	1,000 ppm	-	OSHA TWA
Isobutane	75-28-5	-	1,000 ppm	-	ACGIH STEL

Personal protective equipment

Respiratory protection : Do not spray in enclosed areas.

Hand protection : No special requirements.

Eye protection : No special requirements.

Skin and body protection : No special requirements.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Wash thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

OFF!® DEEP WOODS® INSECT REPELLENT V

Version *1.1*

Print Date 03/04/2015

Revision Date 02/23/2015

SDS Number 350000004807

Form	:	aerosol
Form	:	Compressed gas
Color	:	clear
Odor	:	Alcohol Odor
Odour Threshold	:	No data available
pH	:	No data available
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	No data available
Flash point	:	-7 °C 19.4 °F
Evaporation rate	:	No data available
Flammability (solid, gas)	:	No data available
Upper/lower flammability or explosive limits	:	No data available
Vapour pressure	:	No data available
Vapour density	:	No data available
Relative density	:	0.84 g/ml at 21 °C
Solubility(ies)	:	slightly soluble

Partition coefficient: n-octanol/water	:	No data available
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity, dynamic	:	No data available
Viscosity, kinematic	:	No data available
Oxidizing properties	:	No data available
Volatile Organic Compounds Total VOC (wt. %)*	:	64.2 % - additional exemptions may apply *as defined by US Federal and State Consumer Product Regulations
Other information	:	None identified

10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	:	Stable under recommended storage conditions.
Conditions to avoid	:	Heat, flames and sparks.
Incompatible materials	:	Strong oxidizing agents
Hazardous decomposition products	:	Thermal decomposition can lead to release of irritating gases and vapours.

11. TOXICOLOGICAL INFORMATION

OFF!® DEEP WOODS® INSECT REPELLENT V

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Emergency Overview : Danger

Acute oral toxicity : No data available
Acute inhalation toxicity : No data available

Acute dermal toxicity : No data available

GHS Properties	Classification	Routes of entry
Acute toxicity	No classification proposed	-
Skin corrosion/irritation	No classification proposed	-
Serious eye damage/eye irritation	No classification proposed	-
Skin sensitisation	No classification proposed	-
Respiratory sensitisation	No classification proposed	-
Germ cell mutagenicity	No classification proposed	-
Carcinogenicity	No classification proposed	-
Reproductive toxicity	No classification proposed	-
Specific target organ toxicity - single exposure	No classification proposed	-
Specific target organ toxicity - repeated exposure	No classification proposed	-
Aspiration hazard	No classification proposed	-

Aggravated Medical Condition : Do not apply to cuts or irritated skin.

12. ECOLOGICAL INFORMATION

Product : The product itself has not been tested.

Toxicity
The ingredients in this formula have been reviewed and no adverse impact to the environment is expected when used according to label directions.

Toxicity to fish

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Components	End point	Species	Value	Exposure time
Ethyl alcohol	flow-through test LC50	Pimephales promelas (fathead minnow)	14,200 mg/l	96 h
N,N-Diethyl-m-toluamide	static test LC50	Oncorhynchus mykiss (rainbow trout)	71.25 mg/l	96 h
Butane	No data available			
Propane	LC50	Fish	27.98 mg/l	96 h
Isobutane	LC50	Fish	27.98 mg/l	96 h

Toxicity to aquatic invertebrates

Components	End point	Species	Value	Exposure time
Ethyl alcohol	static test EC50	Daphnia magna (Water flea)	2 mg/l	48 h
	NOEC	Daphnia magna	9.6 mg/l	9 d
N,N-Diethyl-m-toluamide	No data available			
Butane	No data			

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	available			
Propane	LC50	Daphnid	14.22 mg/l	48 h
Isobutane	LC50	Daphnid	16.33 mg/l	48 h

Toxicity to aquatic plants

Components	End point	Species	Value	Exposure time
Ethyl alcohol	Static EC50	Chlorella vulgaris (Fresh water algae)	275 mg/l	72 h
N,N-Diethyl-m-toluamide	No data available			
Butane	No data available			
Propane	No data available			
Isobutane	EC50	Green algea	8.57 mg/l	96 h

Persistence and degradability

Component	Biodegradation	Exposure time	Summary
Ethyl alcohol	97 %	28 d	Readily biodegradable
N,N-Diethyl-m-toluamide	No data available		
Butane	100 %	385.5 h	Readily biodegradable
Propane	70 %	< 10 d	Readily biodegradable
Isobutane	70 %	< 10 d	Readily biodegradable

Bioaccumulative potential

Component	Bioconcentration	Partition Coefficient n-

	factor (BCF)	Octanol/water (log)
Ethyl alcohol	3.2 estimated	-0.35 Measured
N,N-Diethyl-m-toluamide	No data available	No data available
Butane	No data available	2.89
Propane	No data available	2.36
Isobutane	1.57 - 1.97	2.8

Mobility

Component	End point	Value
Ethyl alcohol	No data available	
N,N-Diethyl-m-toluamide	No data available	
Butane	No data available	
Propane	No data available	
Isobutane	No data available	

PBT and vPvB assessment

Component	Results
Ethyl alcohol	Not fulfilling PBT and vPvB criteria
N,N-Diethyl-m-toluamide	Not fulfilling PBT and vPvB criteria
Butane	Not fulfilling PBT and vPvB criteria
Propane	Not fulfilling PBT and vPvB criteria
Isobutane	Not fulfilling PBT and vPvB criteria

Other adverse effects : None known.

13. DISPOSAL CONSIDERATIONS

PESTICIDAL WASTE:
For disposal information, please read and follow Disposal instructions on the pesticide label.
Consumer may discard empty container in trash, or recycle where facilities exist.

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14. TRANSPORT INFORMATION

Please refer to the Bill of Lading/receiving documents for up-to-date shipping information.

	Land transport	Sea transport	Air transport
UN number	1950	1950	1950
UN proper shipping name	AEROSOLS, Flammable, 2.1	AEROSOLS, Flammable, 2.1	AEROSOLS, Flammable, 2.1
Transport hazard class(es)	2.1	2	2.1
Packing group	-	-	-
Environmental hazards	-	-	-
Special precautions for user	Limited quantities derogation may be applicable to this product, please check transport documents.	Limited quantities derogation may be applicable to this product, please check transport documents.	Limited quantities derogation may be applicable to this product, please check transport documents.

15. REGULATORY INFORMATION

FIFRA Labeling

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals.
Following is the hazard information as required on the pesticide label:

CAUTION:
Causes moderate eye irritation.
Harmful if swallowed.
Use of this product may cause skin reactions in rare cases.
Flammable.
Contents under pressure.
Exposure to temperatures above 120° F may cause bursting.

Notification status : All ingredients of this product are listed or are excluded from listing on the U.S. Toxic Substances Control Act (TSCA)

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Chemical Substance Inventory.

Notification status : All ingredients of this product comply with the New Substances Notification requirements under the Canadian Environmental Protection Act (CEPA).

California Prop. 65 : This product is not subject to the reporting requirements under California's Proposition 65.

Registration # / Agency
4822-167/US/EPA

16. OTHER INFORMATION

HMIS Ratings

Health	2
Flammability	4
Reactivity	0

NFPA Ratings

Health	2
Fire	4
Reactivity	0
Special	-

This information is being provided in accordance with the Occupational Safety and Health Administration (OSHA) regulation (29 CFR 1910.1200). The information supplied is designed for workplaces where product use and frequency of exposure exceeds that established for the labeled consumer use.

Further information

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This document has been prepared using data from sources considered to be technically reliable. It does not constitute a warranty, expressed or implied, as to the accuracy of the information contained herein. Actual conditions of use are beyond the seller's control. User is responsible to evaluate all available information when using product for any particular use and to comply with all Federal, State, Provincial and Local laws and regulations.

Prepared by	SC Johnson Global Safety Assessment & Regulatory Affairs (GSARA)

SECTION 1: IDENTIFICATION

Product Identifier: Detonating Cord

Product Names and Synonyms: Lite Line, Scotch Cord, A-Cord, No. 10 through No. 400 cord series, Seismic Detonating Cord, Slide Line Series, Special Series Detonating Cords, *Cordeau detonant fuse*

Intended Use: As a commercial explosive.

Intended Users: For use only under strictly controlled conditions and only by qualified personnel who are fully trained in the handling and use of this product.

Name, Address, and Telephone of the Manufacturer:

Austin Powder Company
25800 Science Park Dr.
Cleveland, OH 44122
216-464-2400 during normal business hours
877-836-8286 Toll Free 24/7
www.austinpowder.com

In Case of Emergency Call CHEMTREC – TOLL FREE 24/7
800-424-9300 DOMESTIC
1-703-527-3887 INTERNATIONAL AND MARINE

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture – Hazard Statements (GFHS-US)

Physical Hazards:

H201 – May mass explode in a fire, Division 1.1

Health Hazards:

H302 – Toxic if swallowed, acute toxicity, Hazard Category 4
H311 – Toxic in contact with skin, acute toxicity, Hazard Category 3
H331 – Toxic if inhaled, acute toxicity, Hazard Category 3
H370 – May cause damage to organs, Specific Target Organ Toxicity, single exposure, Hazard Category 1
H373 – May cause damage to organs through prolonged or repeated exposure, Specific Target Organ Toxicity, repeated exposure, Hazard Category 2

Label Elements

Signal Word: Danger

Hazard Pictograms (GHS-US):

Precautionary Statements (GHS-US):

P210 – Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P250 – Do not subject to grinding, friction, impact or shock.
P260 – Do not breathe dust or fumes.
P270 – Do not eat, drink or smoke when using this product.
P273 – Avoid release to the environment.
P280 – Wear eye protection, protective gloves recommended.
P308+P313+P314 – If exposed or concerned or you do not feel well: Get medical attention.
P370+P372+P373 – In case of fire: Extreme risk of explosion. Evacuate area. DO NOT fight fire when fire reaches explosives.
P401+P403+P405 – Store locked-up in a ventilated space, in accordance with all applicable regulations.
P501 – Dispose of contents/container in accordance with all applicable regulations.

Other Hazards

Exposure reaction may be aggravated for those with pre-existing eye, skin, or respiratory conditions. Causes methemoglobinemia. Methemoglobinemia decreases the blood's ability to carry oxygen and results in symptoms such as dizziness, drowsiness, headache, shortness of breath, blue skin and lips, rapid heart rate, unconsciousness, and possibly death.

Unknown Acute Toxicity (GHS-US): Not available

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

Name	Product Identifier	% (w/w)	Classification (GHS-US)
Pentaerythrite tetranitrate (PETN)	CAS No. 78-11-5	100%	H201 – Explosive, Division 1.1

SECTION 4: FIRST AID MEASURES

General: Never give anything by mouth to an unconscious person. If you feel unwell, get medical attention, show the label where possible.

Inhalation: Not expected to be a hazard under normal conditions of use.

Skin Contact: Not expected to be a hazard under normal conditions of use.

Eye Contact: Not expected to be a hazard under normal conditions of use.

Ingestion: Not expected to be a hazard under normal conditions of use.

Most Important Symptoms and Effects both Acute and Delayed:

Inhalation: None expected.

Skin Contact: None expected.

Eye Contact: None expected.

Ingestion: None expected.

Chronic Symptoms: None expected.

Indication of Any Immediate Medical Attention and Special Treatment Needed:

If exposed, concerned or you don't feel well, get medical attention.

SECTION 5: FIRE FIGHTING MEASURES

DO NOT fight fires involving Explosives. There is an extreme risk that explosives involved in a fire may detonate, especially if confined. Evacuate the area in all directions for 1 mile or more if any amount of explosives are involved in a fire. Evacuation is recommended if the initial (incipient) fire, not involving explosives, becomes intense. General extinguishers may be used on the initial fire, not involving explosives, such as electrical equipment fires, tire fires or a general plant fire. Water may be used to cool explosives not involved in the initial fire. Consult the most current Emergency Response Guidebook (ERG), Guide 112 for additional information.

Extinguishing Media

Suitable Extinguishing Media: None.

Unsuitable Extinguishing Media: For fires near explosives, dry chemical, foams, steam and smothering devices are not effective, can lead to possible explosion and must not be used.

Special Hazards Arising From the Substance or Mixture

Fire Hazard: There is an extreme risk that explosives involved in a fire may detonate.

Advice for Firefighters

Precautionary Measures: It is recommended that the amount and location of any explosives stored near a fire be determined prior to committing firefighters to fight the fire.

Firefighting Instructions: When fighting the initial fire, not involving explosives, firefighters should follow standard firefighting procedures for the materials involved.

Hazardous Combustion Products: No unusual combustion products are expected. However, toxic fumes (CO, CO_2 NOx, sulfur oxides and other typical combustion gasses) will be present.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Contact the manufacturer or CHEMTREC. No smoking, open flames or flame/spark producing items in the area.

For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).

Emergency Procedures: Isolate the area from unnecessary personnel.

For Emergency Personnel

Protective Equipment: Provide cleanup crew with proper PPE.

Emergency Procedures: Stop the discharge if safe to do so. Ventilate area.

Environmental Precautions: Avoid release to the environment.

Methods and Material for Containment and Cleaning Up

Contact manufacturer or CHEMTREC.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Additional Hazards When Processed: Avoid heating explosives in a confined space. Any proposed use of this product in elevated-temperature processes should be thoroughly evaluated to assure that safe operating conditions are established and maintained. A "hot work" program consistent with OSHA requirements at 29 CFR 1910.252 must be used when preforming hot work on explosive process equipment, storage areas or containers.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with soap and water before eating, drinking, or smoking and again when leaving work.

Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Smoking, open flames, and unauthorized sparking or flame-producing devices are prohibited.

Storage Conditions: Storage areas should be inspected regularly by an individual trained to identify potential hazards and ensure that all safety and security control measures are being properly implemented. All explosives storage sites must comply with ATF or NRCAN regulations.

Incompatible Materials: Avoid contamination with combustible or flammable materials. Strong acids, strong bases, strong oxidizing agents, reducing agents, chlorinated compounds, copper (any alloys like bronze and brass) metal powders, and peroxides.

Special Rules on Packaging: Packaging in accordance with USDOT or NRCAN regulations.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure limits: Not available

Exposure Controls:

Appropriate Engineering Controls: Product should be handled and used under strictly controlled conditions.

Personal Protective Equipment:

Hand Protection: Chemically resistant gloves are recommended, but not required.

Eye Protection: Safety glasses with side shields or safety goggles.

Respiratory Protection: Approved respiratory protection should be when recommended by a risk assessment or if irritation is experienced.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Physical and Chemical Properties:

Appearance:	Small diameter rope with white powdery core
Odor:	None
Odor threshold:	Not available
Vapor density:	Not available
pH:	Not relevant

Melting point:	140°C (284°F)
Initial boiling point and boiling range:	Not available
Flash point (oil):	Not available
Evaporation rate:	Not relevant
Flammability:	Not available
Upper / lower flammability or explosive limits:	Not available
Vapor pressure:	Not available
Density:	Not relevant
Solubility:	Not soluble in water
Partition coefficient: n-octol/water:	Not available
Auto-ignition temperature:	Not Available
Decomposition temperature:	>150°C (300°F)
Viscosity:	Not relevant
Explosive properties:	Mass detonation hazard when involved in a fire
Explosion Data – Sensitivity to Mechanical Impact:	Sensitive to mechanical impact
Explosion Data – Sensitivity to Static Discharge:	Sensitive to static discharge

SECTION 10: STABILITY AND REACTIVITY

Reactivity and Chemical Stability: Stable and non-reactive under normal conditions of transportation, storage, handling and use.
Possibility of Hazardous Reactions: Polymerization will not occur.
Conditions to Avoid: Open flame and elevated temperatures.
Incompatible Materials: Strong acids.
Hazardous Decomposition Products: No unusual fumes or decomposition products expected. However, toxic fumes (CO, CO_2 NOx, and other typical combustion gasses) will be present.

SECTION 11: TOXICOLOGY INFORMATION

Information on Toxicological Effects:
Acute Toxicity: Not classified
LD50 and LC50 Data: Not available for product
Skin Corrosion/Irritation: Not classified
Eye Damage/Irritation: May cause serious eye irritation
Respiratory or Skin Sensitization: Not classified
Germ Cell Mutagenicity: Not classified
Teratogenicity: Not available
Carcinogenicity: Suspected of causing cancer
Reproductive Toxicity: Not classified
Specific Target Organ Toxicity (Single Exposure): None
Specific Target Organ Toxicity (Repeated Exposure): None
Aspiration Hazard: Not classified
Symptoms/Injuries after Inhalation: Not expected to be a hazard under normal conditions of use.
Symptoms/Injuries after Skin Contact: Not expected to be a hazard under normal conditions of use.
Symptoms/Injuries after Eye Contact: Not expected to be a hazard under normal conditions of use.
Symptoms/Injuries after Ingestion: Not expected to be a hazard under normal conditions of use.

Chronic Symptoms: None.

Information on Toxicological Effects, Ingredients – Not available.

SECTIONS 12 - 15: These sections are not required by OSHA or CCOSH. The general information shown is not intended to be a comprehensive listing of all data or information available.

SECTION 12: ECOLOGY INFORMATION

Toxicity Ecology: Not expected.
Persistence and Degradability: Not available
Bioaccumulative Potential: Not available
Mobility in Soil: Not available
Other Adverse Effects: Not available

SECTION 13: DISPOSAL CONSIDERATIONS

Call manufacturer or CHEMTREC.

SECTION 14: TRANSPORTATION INFORMATION

Agency	UN Number	Proper Shipping Name	Hazard Class	Label Codes	PG	Marine Pollutant	Other
US DOT	UN0065	Cord, detonating, *flexible*	1.1D	1.1D	II	No	ERG-112
Canadian TDG	UN0065	Cord, detonating, *flexible*	1.1D	1.1D	II	No	--
IMDG (Vessel)	UN0065	Cord, detonating, *flexible*	1.1D	1.1D	II	No	EmS-No, Fire: F-B Spillage: S-X
IATA (Air)	Rules and limits apply. USDOT Special Permits may be needed for Air Transportation. Contact the manufacturer.						

SECTION 15: REGULATORY INFORMATION

US Federal Regulations:

SARA Section 311/312	Fire hazard Sudden release of pressure hazard.
TSCA	All the ingredients are on the United States TSCA (Toxic Substances Control Act) inventory.

Canadian Regulations:

WHMIS Classification	Note: Explosives are regulated by NRCAN and not classified under WHMIS
DSL	Pentaerythrite tetranitrate (PETN) is listed on the Canadian DSL (Domestic Substances List)

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF LAST REVISION

This SDS was prepared in accordance with US (29 CFR 1900.1200) and Canadian (WHMIS 2015) requirements.

SDS: P-8 Initial Issue Date: 6/1/2015 Last Revision Date: 8/1/2015 Version: 3

Party Responsible for the Preparation of This Document:

Austin Powder Company
Cleveland, OH 44122
216-464-2400

This information is based on Austin Powder Company's current knowledge and is intended to describe the product for the purposes of health and safety requirements only. It should not be construed as guaranteeing any specific property of the product.

Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

Material Name	:	**Diesel (ULSD/Gasoil)**
Recommended Use / Restrictions of Use	:	Fuel for on-road diesel-powered engines. Fuel for use in off-road diesel engines, boilers, gas turbines and other combustion equipment.
Supplier	:	**Shell Eastern Trading (PTE) Ltd** 9 North Buona Vista Drive, #07-01, Tower 1, The Metropolis Singapore 138588 Singapore
Telephone	:	+65-6384 8000
Emergency Telephone Number	:	+44 (0) 151 350 4595

2. HAZARDS IDENTIFICATION

GHS Classification	:	Flammable liquids, Category 3 Aspiration hazard, Category 1 Acute toxicity, Category 4, Inhalation Skin corrosion/irritation, Category 2 Carcinogenicity, Category 2 Specific target organ toxicity - repeated exposure, Category 2, Blood., Thymus., Liver Hazardous to the aquatic environment - Long-term Hazard, Category 2 Acute hazards to the aquatic environment, Category 2
GHS Label Elements **Symbol(s)**	:	
Signal Words	:	Danger
Hazard Statement	:	PHYSICAL HAZARDS: H226: Flammable liquid and vapour. HEALTH HAZARDS:

H304: May be fatal if swallowed and enters airways.
H315: Causes skin irritation.
H332: Harmful if inhaled.
H351: Suspected of causing cancer.
H373: May cause damage to organs or organ systems through prolonged or repeated exposure.

ENVIRONMENTAL HAZARDS:
H411: Toxic to aquatic life with long lasting effects.
H401: Toxic to aquatic life.

GHS Precautionary Statements

Prevention : P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
P280: Wear protective gloves/protective clothing/eye protection/face protection.

Response : P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P331: Do NOT induce vomiting.

Disposal: : P501: Dispose of contents and container to appropriate waste site or reclaimer in accordance with local and national regulations.

Other Hazards which do not result in classification : Vapour in the headspace of tanks and containers may ignite and explode at temperatures exceeding auto-ignition temperature, where vapour concentrations are within the flammability range.
May ignite on surfaces at temperatures above auto-ignition temperature.
This material is a static accumulator. Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.

Additional Information : This product is intended for use in closed systems only.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture Description : Complex mixture of hydrocarbons consisting of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons with carbon

numbers predominantly in the C9 to C25 range. May also contain several additives at <0.1% v/v each. May contain cetane improver (Ethyl Hexyl Nitrate) at <0.2% v/v.

May contain catalytically cracked oils in which polycyclic aromatic compounds, mainly 3-ring but some 4- to 6-ring species are present.

Classification of components according to GHS

Chemical Identity	Synonyms	CAS	Hazard Class (category)	Hazard Statement	Conc.
Fuels, diesel	Fuels, diesel	68334-30-5	Flam. Liq., 3; Asp. Tox., 1; Acute Tox., 4; Skin Corr., 2; Carc., 2; STOT RE, 2; Aquatic Chronic, 2; Aquatic Acute, 2;	H226; H304; H332; H315; H351; H373; H411; H401;	60.00 - 100.00 %
Distillates (Fischer-Tropsch) C8-26 - Branched and Linear	Distillates (Fischer-Tropsch) C8-26 - Branched and Linear	848301-67-7	Asp. Tox., 1; Flam. Liq., 4;	H304; H227;	0.00 - 30.00 %
Kerosine (Fischer Tropsch), Full range, C8-C16 branched and linear alkanes	Kerosine (Fischer Tropsch), Full range, C8-C16 branched and linear alkanes	848301-66-6	Asp. Tox., 1; Flam. Liq., 3;	H304; H226;	0.00 - 10.00 %

Additional Information : Dyes and markers can be used to indicate tax status and prevent fraud. Contains Cumene, CAS# 98-82-8 Contains Naphthalene, CAS # 91-20-3.

Refer to Ch 16 for full text of H phrases.

4. FIRST-AID MEASURES

Inhalation : Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.

Skin Contact : Remove contaminated clothing. Immediately flush skin with

		large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment. When using high pressure equipment, injection of product under the skin can occur. If high pressure injuries occur, the casualty should be sent immediately to a hospital. Do not wait for symptoms to develop.
Eye Contact	:	Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion	:	If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing. Give nothing by mouth.
Most Important Symptoms/Effects, Acute & Delayed	:	If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. The onset of respiratory symptoms may be delayed for several hours after exposure. Skin irritation signs and symptoms may include a burning sensation, redness, or swelling.
Immediate medical attention, special treatment	:	Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Specific hazards arising from Chemicals	:	Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Oxides of sulphur. Unidentified organic and inorganic compounds. Carbon monoxide may be evolved if incomplete combustion occurs. Will float and can be reignited on surface water. Flammable vapours may be present even at temperatures below the flash point. The vapour is heavier than air, spreads along the ground and distant ignition is possible.
Suitable Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Extinguishing Media	:	Do not use direct water jets on the burning product as they could cause a steam explosion and spread of the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Protective Equipment & Precautions for Fire Fighters	:	Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).
Additional Advice	:	Keep adjacent containers cool by spraying with water. If possible remove containers from the danger zone. If the fire cannot be extinguished the only course of action is to evacuate immediately. Contain residual material at affected sites to prevent material from entering drains (sewers), ditches, and waterways.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations. Evacuate the area of all non-essential personnel. Ventilate contaminated area thoroughly. Take precautionary measures against static discharges.

Personal Precautions, Protective Equipment and Emergency Procedures	:	Do not breathe fumes, vapour. Do not operate electrical equipment. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area and evacuate all personnel. Attempt to disperse the gas or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Monitor area with combustible gas meter.
Environmental Precautions	:	Take measures to minimise the effects on groundwater. Contain residual material at affected sites to prevent material from entering drains (sewers), ditches, and waterways. Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers.
Methods and Material for Containment and Cleaning Up	:	Take precautionary measures against static discharges. For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate

absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. Shovel into a suitable clearly marked container for disposal or reclamation in accordance with local regulations.

Additional Advice : Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained. Maritime spillages should be dealt with using a Shipboard Oil Pollution Emergency Plan (SOPEP), as required by MARPOL Annex 1 Regulation 26.

7. HANDLING AND STORAGE

General Precautions : Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material. Air-dry contaminated clothing in a well-ventilated area before laundering. Prevent spillages. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Never siphon by mouth. Contaminated leather articles including shoes cannot be decontaminated and should be destroyed to prevent reuse.
Maintenance and Fuelling Activities - Avoid inhalation of vapours and contact with skin.

Precautions for Safe Handling : Avoid inhaling vapour and/or mists. Avoid prolonged or repeated contact with skin. When using do not eat or drink. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Earth all equipment. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. The vapour is heavier than air, spreads along the ground and distant ignition is possible.

Conditions for Safe Storage : Drum and small container storage: Drums should be stacked to a maximum of 3 high. Use properly labelled and closeable containers. Tank storage: Tanks must be specifically designed for use with this product. Bulk storage tanks should be diked (bunded). Locate tanks away from heat and other sources of ignition. Must be stored in a diked (bunded) well-ventilated area, away from sunlight, ignition sources and other sources of heat. Vapours from tanks should not be released to

		atmosphere. Breathing losses during storage should be controlled by a suitable vapour treatment system. The vapour is heavier than air. Beware of accumulation in pits and confined spaces. Keep container tightly closed and in a cool, well-ventilated place. Keep in a cool place. Electrostatic charges will be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk. The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable. Refer to section 15 for any additional specific legislation covering the packaging and storage of this product. Keep in a bunded area with a sealed (low permeability) floor, to provide containment against spillage. Prevent ingress of water.
Product Transfer	:	Avoid splash filling. Wait 2 minutes after tank filling (for tanks such as those on road tanker vehicles) before opening hatches or manholes. Wait 30 minutes after tank filling (for large storage tanks) before opening hatches or manholes. Keep containers closed when not in use. Contamination resulting from product transfer may give rise to light hydrocarbon vapour in the headspace of tanks that have previously contained gasoline. This vapour may explode if there is a source of ignition. Partly filled containers present a greater hazard than those that are full, therefore handling, transfer and sampling activities need special care. Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. Be aware of handling operations that may give rise to additional hazards that result from the accumulation of static charges. These include but are not limited to pumping (especially turbulent flow), mixing, filtering, splash filling, cleaning and filling of tanks and containers, sampling, switch loading, gauging, vacuum truck operations, and mechanical movements. These activities may lead to static discharge e.g. spark formation. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<= 1 m/s until fill pipe submerged to twice its diameter, then <= 7 m/s). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations.
Recommended Materials	:	For containers, or container linings use mild steel, stainless steel. Aluminium may also be used for applications where it does not present an unnecessary fire hazard. Examples of suitable materials are: high density polyethylene (HDPE) and Viton (FKM), which have been specifically tested for compatibility with this product. For container linings, use

SECTION 1: IDENTIFICATION

Product Identifier: Electric & Electronic Detonators

Product Names and Synonyms: Rock*Star series, Time*Star series, Coal Mine Delay Detonators, Coal Mine Construction Delay Detonators, Seismic*Star series, Seis*Star series, 3D*Star series, E*Star Detonators, E*Star Seismic Detonators, Oil*Star Series

Intended Use: As a commercial explosive.

Intended Users: For use only under strictly controlled conditions and only by qualified personnel who are fully trained in the handling and use of this product.

Name, Address, and Telephone of the Manufacturer:

Austin Powder Company
25800 Science Park Dr.
Cleveland, OH 44122
216-464-2400 during normal business hours
877-836-8286 Toll Free 24/7
www.austinpowder.com

In Case of Emergency Call CHEMTREC – TOLL FREE 24/7
800-424-9300 DOMESTIC
1-703-527-3887 INTERNATIONAL AND MARINE

SECTION 2: HAZARDS IDENTIFICATION

Note: All the hazardous materials in these products are completely sealed within the metal detonator capsule.

Classification of the Substance or Mixture – Hazard Statements (GFHS-US)

Physical Hazards:

H201 – May mass explode in a fire, Division 1.1
H228 – Flammable solid, Hazard Category 2

Health Hazards:

H301 – Toxic if swallowed, acute toxicity, Hazard Category 3
H311 – Toxic in contact with skin, acute toxicity, Hazard Category 3
H332 – Harmful if inhaled, acute toxicity, Hazard Category 4
H350 – May cause cancer, Hazard Category 1B
H360 – May damage fertility or the unborn child, Hazard Category 1B
H370 – May cause damage to organs, Specific Target Organ Toxicity, single exposure, Hazard Category 1
H373 – May cause damage to organs through prolonged or repeated exposure, Specific Target Organ Toxicity, repeated exposure, Hazard Category 2

Label Elements

Signal Word: Danger

Hazard Pictograms (GHS-US):

Precautionary Statements (GHS-US):

P210 – Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P250 – Do not subject to grinding, friction, impact or shock.
P270 – Do not eat, drink or smoke when using this product.
P273 – Avoid release to the environment.
P280 – Wear eye protection.
P370+P372+P373 – In case of fire: Extreme risk of explosion. Evacuate area.
DO NOT fight fire when fire reaches explosives.
P401+P403+P405 – Store locked-up in a ventilated space, in accordance with all applicable regulations.
P501 – Dispose of contents/container in accordance with all applicable regulations.

Other Hazards

None expected.

Unknown Acute Toxicity (GHS-US): Not available

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

The hazardous substances in Table 1 are sealed inside the metal detonator capsule. The values in column 3 are shown as a percent of the total detonator shell weight, not including the coated wire to the detonator.

Table 1.

Name	Product Identifier	% (w/w)	Classification (GHS-US)
Metal capsule	--	25-35%	Not classified in this application
Barium chromate	CAS No. 10294-40-3	<2%	H302 – Harmful if swallowed H332 – Harmful if inhaled H350 – May cause cancer
Boron	CAS No. 7440-42-8	<2%	Combustible Dust H302 – Harmful if swallowed
Cyclonite (RDX)	CAS No. 121-82-4	<15%	H201 – Explosive, Division 1.1 H301 – Toxic if swallowed H370 – Causes damage to organs, STOT SE H373 – May cause damage to organs through
Hexanitrostilbene (HNS)	CAS No. 20062-22-0	<15%	H201 – Explosive, Division 1.1 H303 – May be harmful if swallowed H313 – May be harmful in contact with skin H320 – May cause eye irritation H333 – May be harmful if inhaled H371 – May causes damage to organs, STOT SE
Lead Azide	CAS No. 13424-46-9	< 2%	H200 – Unstable explosive H302 – Harmful if swallowed H332 – Harmful if inhaled H360 – May damage fertility or unborn child H373 – May cause damage to organs through prolonged or repeated exposure, STOT RE
Lead tetraoxide	CAS No. 1314-41-6	<2%	H302 – Harmful if swallowed H332 – Harmful if inhaled H350 – May cause cancer H360 – May damage fertility or unborn child H373 – May cause damage to organs through prolonged or repeated exposure, STOT RE H410 – Very toxic to aquatic life with long lasting effects
Pentaerythrite tetranitrate (PETN)	CAS No. 78-11-5	<15%	H201 – Explosive, Division 1.1

Silicon	CAS No. 7440-21-3	<2%	Combustible Dust
Zinc	CAS No. 7440-66-6	45-55%	Combustible Dust H400 – Very toxic to aquatic life H410 – Very toxic to aquatic life with long lasting effects

SECTION 4: FIRST AID MEASURES

General: Never give anything by mouth to an unconscious person. If you feel unwell, get medical attention, show the label where possible.

Inhalation: Not an expected route of exposure.

Skin Contact: Not an expected route of exposure.

Eye Contact: Not an expected route of exposure.

Ingestion: Not an expected route of exposure.

Most Important Symptoms and Effects both Acute and Delayed:

Inhalation: Not an expected route of exposure.

Skin Contact: Not an expected route of exposure.

Eye Contact: Not an expected route of exposure.

Ingestion: Not an expected route of exposure.

SECTION 5: FIRE FIGHTING MEASURES

DO NOT fight fires involving Explosives. There is an extreme risk that explosives involved in a fire may detonate, especially if confined. Evacuate the area in all directions for 1 mile or more if any amount of explosives are involved in a fire. Evacuation is recommended if the initial (incipient) fire, not involving explosives, becomes intense. General extinguishers may be used on the initial fire, not involving explosives, such as electrical equipment fires, tire fires or a general plant fire. Water may be used to cool explosives not involved in the initial fire. Consult the most current Emergency Response Guidebook (ERG), Guide 112 for additional information.

Extinguishing Media

Suitable Extinguishing Media: None.

Unsuitable Extinguishing Media: For fires near explosives, dry chemical, foams, steam and smothering devices are not effective, can lead to possible explosion and must not be used.

Special Hazards Arising From the Substance or Mixture

Fire Hazard: There is an extreme risk that explosives involved in a fire may detonate.

Advice for Firefighters

Precautionary Measures: It is recommended that the amount and location of any explosives stored near a fire be determined prior to committing firefighters to fight the fire.

Firefighting Instructions: When fighting the initial fire, not involving explosives, firefighters should follow standard firefighting procedures for the materials involved.

Hazardous Combustion Products: No unusual combustion products are expected. However, toxic fumes (CO, CO_2 NOx, sulfur oxides and other typical combustion gasses) will be present.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Contact the manufacturer or CHEMTREC. No smoking, open flames or flame/spark producing items in the area.

For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).

Emergency Procedures: Isolate the area from unnecessary personnel.

For Emergency Personnel

Protective Equipment: Provide cleanup crew with proper PPE.

Environmental Precautions: Avoid release to the environment.

Methods and Material for Containment and Cleaning Up

Contact manufacturer or CHEMTREC.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Additional Hazards When Processed: Avoid heating explosives in a confined space. Any proposed use of this product in elevated-temperature processes should be thoroughly evaluated to assure that safe operating conditions are established and maintained. A "hot work" program consistent with OSHA requirements at 29 CFR 1910.252 must be used when preforming hot work on explosive process equipment, storage areas or containers.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures.

Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Smoking, open flames, and unauthorized sparking or flame-producing devices are prohibited.

Incompatible Materials: Strong acids, strong bases and organic solvents.

Storage Conditions: Storage areas should be inspected regularly by an individual trained to identify potential hazards and ensure that all safety and security control measures are being properly implemented. All explosives storage sites must comply with ATF or NRCAN regulations.

Special Rules on Packaging: Packaging in accordance with USDOT or NRCAN regulations.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure limits:

Cyclonite (RDX), CAS No. 121-82-4		
USA ACGIH	ACGIH TWA	0.5 mg/m³
USA NIOSH	NIOSH REL (TWA)	1.5 mg/m³
USA NIOSH	NIOSH REL (STEL)	3 mg/m³
Alberta	OEL TWA	0.5 mg/m³
British Columbia	OEL TWA	0.5 mg/m³
Manitoba	OEL TWA	0.5 mg/m³
New Brunswick	OEL TWA	0.5 mg/m³
Newfoundland & Labrador	OEL TWA	0.5 mg/m³
Nova Scotia	OEL TWA	0.5 mg/m³
Nunavut	OEL STEL	3 mg/m³
Nunavut	OEL TWA	1.5 mg/m³
Northwest Territories	OEL STEL	3 mg/m³
Northwest Territories	OEL TWA	1.5 mg/m³
Ontario	OEL TWA	0.5 mg/m³
Prince Edward Island	OEL TWA	0.5 mg/m³
Québec	VEMP	1.5 mg/m³
Saskatchewan	OEL STEL	1.5 mg/m³
Saskatchewan	OEL TWA	0.5 mg/m³
Yukon	OEL STEL	3 mg/m³
Yukon	OEL TWA	1.5 mg/m³

Silicon, CAS No. 7440-21-3		
USA OSHA	OSHA PEL (TWA)	15 mg/m³ (total dust) 5 mg/m³ (inhalable fraction)
USA NIOSH	NIOSH REL (TWA)	10 mg/m³ (total dust) 5 mg/m³ (inhalable dust)
British Columbia	OEL TWA	10 mg/m³ (total dust) 3 mg/m³ (inhalable)
New Brunswick	OEL TWA	10 mg/m³ (metal dust)
Nunavut	OEL TWA	10 mg/m³ (total dust) 5 mg/m³ (inhalable dust)
Northwest Territories	OEL TWA	10 mg/m³ (total dust) 5 mg/m³ (inhalable dust)
Ontario	OEL TWA	10 mg/m³ (total dust)
Québec	VEMP	10 mg/m³
Saskatchewan	OEL STEL	20 mg/m³ (dust)
Saskatchewan	OEL TWA	10 mg/m³ (dust)

Exposure Controls:

Appropriate Engineering Controls: Product should be handled and used under strictly controlled conditions.

Personal Protective Equipment:

Hand Protection: Not required.

Eye Protection: Safety glasses.

Respiratory Protection: Not required.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Physical and Chemical Properties:

Appearance:	Plastic coated wire attached to a sealed metal detonator capsule
Odor:	None
Odor threshold:	Not relevant
Vapor density:	Not relevant
pH:	Not relevant
Melting point:	Not relevant
Initial boiling point and boiling range:	Not relevant
Flash point (oil):	Not relevant
Evaporation rate:	Not relevant
Flammability:	Not relevant
Upper / lower flammability or explosive limits:	Not relevant
Vapor pressure:	Not relevant
Density:	Not relevant
Solubility:	Not soluble in water
Partition coefficient: n-octol/water:	Not relevant
Auto-ignition temperature:	Not relevant
Decomposition temperature):	Not relevant
Viscosity:	Not relevant
Explosive properties:	Mass detonation hazard when involved in a fire
Explosion Data – Sensitivity to Mechanical Impact:	Sensitive to mechanical impact
Explosion Data – Sensitivity to Static Discharge:	Sensitive to static discharge

SECTION 10: STABILITY AND REACTIVITY

Reactivity and Chemical Stability: Stable and non-reactive under normal conditions of transportation, storage, handling and use.
Possibility of Hazardous Reactions: Polymerization will not occur.
Conditions to Avoid: Open flame and elevated temperatures.
Incompatible Materials: Strong acids, strong bases and organic solvents.
Hazardous Decomposition Products: No unusual fumes or decomposition products expected. However, toxic fumes (CO, CO_2 NOx, and other typical combustion gasses) will be present.

SECTION 11: TOXICOLOGY INFORMATION

Information on Toxicological Effects for the sealed article:
Acute Toxicity: Not classified
LD50 and LC50 Data: Not available for the article
Skin Corrosion/Irritation: Not classified
Eye Damage/Irritation: Not classified
Respiratory or Skin Sensitization: Not classified
Germ Cell Mutagenicity: Not classified
Teratogenicity: Not classified
Carcinogenicity: Not classified
Reproductive Toxicity: Not classified
Specific Target Organ Toxicity (Single Exposure): None
Specific Target Organ Toxicity (Repeated Exposure): None
Aspiration Hazard: Not classified
Symptoms/Injuries after Inhalation: Not an expected route of exposure.
Symptoms/Injuries after Skin Contact: Not an expected route of exposure
Symptoms/Injuries after Eye Contact: Not an expected route of exposure
Symptoms/Injuries after Ingestion: Not a route of expected route of exposure

Chronic Symptoms: None.

Information on Toxicological Effects, Ingredients
LD50 and LC50 Data:

Boron, CAS No. 7440-42-8	
LD50 Oral Rat	650 mg/kg of body weight

Barium Chromate, CAS No. 10294-40-3	
US ATE (oral)	500 mg/kg of body weight
US ATE (dust, mist)	1.5 mg/l/4h
IARC Group	1
Included in OSHA Hazard Communication Carcinogen List	

Cyclonite (RDX), CAS No. 121-84-4	
LD50 Oral Rat	71 mg/kg of body weight

Lead axide, CAS No. 13424-46-9	
LD50 Oral Rat	500 mg/kg of body weight
LC50 Inhalation Rat	1.5 mg/l/4h

Lead tetraoxide, CAS No. 1314-41-6	
LD50 Oral Rat	500 mg/kg of body weight
LC50 Inhalation Rat	1.5mg/l/4h
IARC Group	2A
Included in OSHA Hazard Communication Carcinogen List	

Silicon, CAS No. 7440-21-3	
LD50 Oral Rat	3,160 mg/kg of body weight

Note for SECTIONS 12 - 15: These sections are not required by OSHA or CCOSH. The general information shown is not intended to be a comprehensive listing of all data or information available.

SECTION 12: ECOLOGY INFORMATION

Toxicity Ecology: Materials sealed inside the metal detonator capsule are very toxic to aquatic life.
Persistence and Degradability: Not available
Bioaccumulative Potential: Not available
Mobility in Soil: Not available
Other Adverse Effects: Not available

SECTION 13: DISPOSAL CONSIDERATIONS

Call manufacturer or CHEMTREC.

SECTION 14: TRANSPORTATION INFORMATION

Agency	UN Number	Proper Shipping Name	Hazard Class	Label Codes	PG	Marine Pollutant	Other
US DOT	UN0255	Detonators, electric, *for blasting.*	1.4B	1.4B	II	No	ERG-114
Canadian TDG	UN0255	Detonators, electric, *for blasting.*	1.4B	1.4B	II	No	--
IMDG (Vessel)	UN0255	Detonators, electric, *for blasting.*	1.4B	1.4B	II	No	EmS-No, Fire: F-B Spillage: S-X
IATA (Air)	UN0255	Detonators, electric, *for blasting.*	1.4B	1.4B	II	No	See Note 1

Note 1: Note 1: Aircraft shipment of material is for Cargo Aircraft Only and each shipment not to exceed 75kg (165 lbs) Net Explosive Weight. See 49CFR 172.101 HMT, Column 9.

SECTION 15: REGULATORY INFORMATION

US Federal Regulations:

SARA Section 311/312	Fire hazard Sudden Release of pressure hazard. Immediate (acute) health hazard Delayed (chronic) health hazard
TSCA	All the ingredients are on the United States TSCA (Toxic Substances Control Act) inventory.

Canadian Regulations:

WHMIS Classification	Note: Explosives are regulated by NRCAN and not classified under WHMIS
DSL	All ingredients are listed on the Canadian DSL (Domestic Substances List)

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF LAST REVISION

This SDS was prepared in accordance with US (29 CFR 1900.1200) and Canadian (WHMIS 2015) requirements.

SDS: P-9 Initial Issue Date: 6/1/2015 Last Revision Date: 11/9/2015 Version: 4

Party Responsible for the Preparation of This Document:

Austin Powder Company
Cleveland, OH 44122
216-464-2400

This information is based on Austin Powder Company's current knowledge and is intended to describe the product for the purposes of health and safety requirements only. It should not be construed as guaranteeing any specific property of the product.

SECTION 1: IDENTIFICATION

Product Identifier: Non-Electric Detonators

Product Names and Synonyms Shock*Star series, In-Hole Delays, Surface Delay Connectors, Quick-Relay Connectors, Dual*Delays, Shorty, Long Period Delays, STD (Shock Tube with Detonator), Quick*Start, MS Connector, Lead-in-Line

Intended Use: As a commercial explosive.

Intended Users: For use only under strictly controlled conditions and only by qualified personnel who are fully trained in the handling and use of this product.

Name, Address, and Telephone of the Manufacturer:

Austin Powder Company
25800 Science Park Dr.
Cleveland, OH 44122
216-464-2400 during normal business hours
877-836-8286 Toll Free 24/7
www.austinpowder.com

In Case of Emergency Call CHEMTREC – TOLL FREE 24/7
800-424-9300 DOMESTIC
1-703-527-3887 INTERNATIONAL AND MARINE

SECTION 2: HAZARDS IDENTIFICATION

Note: All the hazardous materials in these products are completely sealed within the metal detonator capsule.

Classification of the Substance or Mixture – Hazard Statements (GFHS-US)

Physical Hazards:

H201 – May mass explode in a fire, Division 1.1
H228 – Flammable solid, Hazard Category 2

Health Hazards:

H301 – Toxic if swallowed, acute toxicity, Hazard Category 3
H311 – Toxic in contact with skin, acute toxicity, Hazard Category 3
H332 – Harmful if inhaled, acute toxicity, Hazard Category 4
H350 – May cause cancer, Hazard Category 1B
H360 – May damage fertility or the unborn child, Hazard Category 1B
H370 – May cause damage to organs, Specific Target Organ Toxicity, single exposure, Hazard Category 1
H373 – May cause damage to organs through prolonged or repeated exposure, Specific Target Organ Toxicity, repeated exposure, Hazard Category 2

Label Elements

Signal Word: Danger

Hazard Pictograms (GHS-US):

Precautionary Statements (GHS-US):

P210 – Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P250 – Do not subject to grinding, friction, impact or shock.
P270 – Do not eat, drink or smoke when using this product.
P273 – Avoid release to the environment.
P280 – Wear eye protection.
P370+P372+P373 – In case of fire: Extreme risk of explosion. Evacuate area.
DO NOT fight fire when fire reaches explosives.
P401+P403+P405 – Store locked-up in a ventilated space, in accordance with all applicable regulations.
P501 – Dispose of contents/container in accordance with all applicable regulations.

Other Hazards

None expected.

Unknown Acute Toxicity (GHS-US): Not available

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

The hazardous substances in Table 1 are sealed inside the metal detonator capsule. The values in column 3 are shown as a percent of the total detonator capsule weight and do not include the tube leading to the detonator capsule.

Table 1.

Name	Product Identifier	% (w/w)	Classification (GHS-US)
Metal capsule	--	25-35%	Not classified in this application
Barium chromate	CAS No. 10294-40-3	<2%	H302 – Harmful if swallowed H332 – Harmful if inhaled H350 – May cause cancer
Boron	CAS No. 7440-42-8	<2%	Combustible Dust H302 – Harmful if swallowed
Cyclonite (RDX)	CAS No. 121-82-4	<15%	H201 – Explosive, Division 1.1 H301 – Toxic if swallowed H370 – Causes damage to organs, STOT SE H373 – May cause damage to organs through
Lead Azide	CAS No. 13424-46-9	< 2%	H200 – Unstable explosive H302 – Harmful if swallowed H332 – Harmful if inhaled H360 – May damage fertility or unborn child H373 – May cause damage to organs through prolonged or repeated exposure, STOT RE
Lead tetraoxide	CAS No. 1314-41-6	<2%	H302 – Harmful if swallowed H332 – Harmful if inhaled H350 – May cause cancer H360 – May damage fertility or unborn child H373 – May cause damage to organs through prolonged or repeated exposure, STOT RE H410 – Very toxic to aquatic life with long lasting effects
Pentaerythrite tetranitrate (PETN)	CAS No. 78-11-5	<15%	H201 – Explosive, Division 1.1
Silicon	CAS No. 7440-21-3	<2%	Combustible Dust
Zinc	CAS No. 7440-66-6	45-55%	Combustible Dust H400 – Very toxic to aquatic life H410 – Very toxic to aquatic life with long lasting effects

The hazardous substances in Table 2 are sealed inside the plastic tube. The values in column 3 are shown as a percent of the total weight of tube. The tube length may vary depending on the specific product.

Table 2.

Name	Product Identifier	% (w/w)	Classification (GHS-US)
Aluminum	CAS No. 7429-90-5	<0.2%	H228 – Flammable solid
Cyclotetramethylene-tetranitramine (HMX)	CAS No. 2691-41-0	<0.4%	H201 – Explosive, Division 1.1 H302 – Harmful if swallowed H311 – Toxic in contact with skin H402 – Harmful to aquatic life
Polyethylene	CAS No. 9002-88-4	60-80%	Combustible Dust
Surlyn	CAS No. 25608-26-6	20-40%	Combustible Dust

SECTION 4: FIRST AID MEASURES

General: Never give anything by mouth to an unconscious person. If you feel unwell, get medical attention, show the label where possible.

Inhalation: Not an expected route of exposure.

Skin Contact: Not an expected route of exposure.

Eye Contact: Not an expected route of exposure.

Ingestion: Not an expected route of exposure.

Most Important Symptoms and Effects both Acute and Delayed:

Inhalation: Not an expected route of exposure.

Skin Contact: Not an expected route of exposure.

Eye Contact: Not an expected route of exposure.

Ingestion: Not an expected route of exposure.

SECTION 5: FIRE FIGHTING MEASURES

DO NOT fight fires involving Explosives. There is an extreme risk that explosives involved in a fire may detonate, especially if confined. Evacuate the area in all directions for 1 mile or more if any amount of explosives are involved in a fire. Evacuation is recommended if the initial (incipient) fire, not involving explosives, becomes intense. General extinguishers may be used on the initial fire, not involving explosives, such as electrical equipment fires, tire fires or a general plant fire. Water may be used to cool explosives not involved in the initial fire. Consult the most current Emergency Response Guidebook (ERG), Guide 112 for additional information.

Extinguishing Media

Suitable Extinguishing Media: None.

Unsuitable Extinguishing Media: For fires near explosives, dry chemical, foams, steam and smothering devices are not effective, can lead to possible explosion and must not be used.

Special Hazards Arising From the Substance or Mixture

Fire Hazard: There is an extreme risk that explosives involved in a fire may detonate.

Advice for Firefighters

Precautionary Measures: It is recommended that the amount and location of any explosives stored near a fire be determined prior to committing firefighters to fight the fire.

Firefighting Instructions: When fighting the initial fire, not involving explosives, firefighters should follow standard firefighting procedures for the materials involved.

Hazardous Combustion Products: No unusual combustion products are expected. However, toxic fumes (CO, CO_2 NOx, sulfur oxides and other typical combustion gasses) will be present.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Contact the manufacturer or CHEMTREC. No smoking, open flames or flame/spark producing items in the area.

For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).

Emergency Procedures: Isolate the area from unnecessary personnel.

For Emergency Personnel

Protective Equipment: Provide cleanup crew with proper PPE.

Environmental Precautions: Avoid release to the environment.

Methods and Material for Containment and Cleaning Up

Contact manufacturer or CHEMTREC.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Additional Hazards When Processed: Avoid heating explosives in a confined space. Any proposed use of this product in elevated-temperature processes should be thoroughly evaluated to assure that safe operating conditions are established and maintained. A "hot work" program consistent with OSHA requirements at 29 CFR 1910.252 must be used when preforming hot work on explosive process equipment, storage areas or containers.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures.

Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Smoking, open flames, and unauthorized sparking or flame-producing devices are prohibited.

Incompatible Materials: Strong acids, strong bases and organic solvents.

Storage Conditions: Storage areas should be inspected regularly by an individual trained to identify potential hazards and ensure that all safety and security control measures are being properly implemented. All explosives storage sites must comply with ATF or NRCAN regulations.

Special Rules on Packaging: Packaging in accordance with USDOT or NRCAN regulations.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure limits:

Cyclonite (RDX), CAS No. 121-82-4		
USA ACGIH	ACGIH TWA	0.5 mg/m³
USA NIOSH	NIOSH REL (TWA)	1.5 mg/m³
USA NIOSH	NIOSH REL (STEL)	3 mg/m³
Alberta	OEL TWA	0.5 mg/m³
British Columbia	OEL TWA	0.5 mg/m³
Manitoba	OEL TWA	0.5 mg/m³
New Brunswick	OEL TWA	0.5 mg/m³
Newfoundland & Labrador	OEL TWA	0.5 mg/m³
Nova Scotia	OEL TWA	0.5 mg/m³
Nunavut	OEL STEL	3 mg/m³
Nunavut	OEL TWA	1.5 mg/m³
Northwest Territories	OEL STEL	3 mg/m³
Northwest Territories	OEL TWA	1.5 mg/m³
Ontario	OEL TWA	0.5 mg/m³
Prince Edward Island	OEL TWA	0.5 mg/m³
Québec	VEMP	1.5 mg/m³

Saskatchewan	OEL STEL	1.5 mg/m³
Saskatchewan	OEL TWA	0.5 mg/m³
Yukon	OEL STEL	3 mg/m³
Yukon	OEL TWA	1.5 mg/m³

Aluminum granules, CAS No. 7429-90-5		
USA ACGIH	ACGIH TWA	1 mg/m³ (inhalable fraction)
USA ACGIH	ACGIH category	Not Classifiable as a Human Carcinogen
USA OSHA	OSHA PEL (TWA)	15 mg/m³ (total dust) 5 mg/m³ (inhalable fraction)
USA NIOSH	NIOSH REL (TWA)	10 mg/m³ (total dust) 5 mg/m³ (inhalable dust)
Alberta	OEL TWA	10 mg/m³ (dust)
British Columbia	OEL TWA	1.0 mg/m³ (inhalable)
Manitoba	OEL TWA	1 mg/m³ (inhalable fraction)
New Brunswick	OEL TWA	10 mg/m³ (metal dust)
Newfoundland & Labrador	OEL TWA	1 mg/m³ (inhalable fraction)
Nova Scotia	OEL TWA	1 mg/m³ (inhalable fraction)
Nunavut	OEL STEL	20 mg/m³
Nunavut	OEL TWA	10 mg/m³
Northwest Territories	OEL STEL	20 mg/m³
Northwest Territories	OEL TWA	10 mg/m³
Ontario	OEL TWA	1 mg/m³ (inhalable)
Prince Edward Island	OEL TWA	1 mg/m³ (inhalable fraction)
Québec	VEMP	10 mg/m³
Saskatchewan	OEL STEL	20 mg/m³ (dust)
Saskatchewan	OEL TWA	10 mg/m³ (dust)

Silicon, CAS No. 7440-21-3		
USA OSHA	OSHA PEL (TWA)	15 mg/m³ (total dust) 5 mg/m³ (inhalable fraction)
USA NIOSH	NIOSH REL (TWA)	10 mg/m³ (total dust) 5 mg/m³ (inhalable dust)
British Columbia	OEL TWA	10 mg/m³ (total dust) 3 mg/m³ (inhalable)
New Brunswick	OEL TWA	10 mg/m³ (metal dust)
Nunavut	OEL TWA	10 mg/m³ (total dust) 5 mg/m³ (inhalable dust)
Northwest Territories	OEL TWA	10 mg/m³ (total dust) 5 mg/m³ (inhalable dust)
Ontario	OEL TWA	10 mg/m³ (total dust)
Québec	VEMP	10 mg/m³
Saskatchewan	OEL STEL	20 mg/m³ (dust)
Saskatchewan	OEL TWA	10 mg/m³ (dust)

Exposure Controls:

Appropriate Engineering Controls: Product should be handled and used under strictly controlled conditions.

Personal Protective Equipment:

Hand Protection: Not required.
Eye Protection: Safety glasses.
Respiratory Protection: Not required.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Physical and Chemical Properties:

Appearance:	Article – long plastic tube that may be attached to a sealed metal capsule
Odor:	None
Odor threshold:	Not relevant
Vapor density:	Not relevant
pH:	Not relevant
Melting point:	Not relevant
Initial boiling point and boiling range:	Not relevant
Flash point (oil):	Not relevant
Evaporation rate:	Not relevant
Flammability:	Not relevant
Upper / lower flammability or explosive limits:	Not relevant
Vapor pressure:	Not relevant
Density:	Not relevant
Solubility:	Not soluble in water
Partition coefficient: n-octol/water:	Not relevant
Auto-ignition temperature:	Not relevant
Decomposition temperature):	Not relevant
Viscosity:	Not relevant
Explosive properties:	Mass detonation hazard when involved in a fire
Explosion Data – Sensitivity to Mechanical Impact:	Sensitive to mechanical impact
Explosion Data – Sensitivity to Static Discharge:	Sensitive to static discharge

SECTION 10: STABILITY AND REACTIVITY

Reactivity and Chemical Stability: Stable and non-reactive under normal conditions of transportation, storage, handling and use.

Possibility of Hazardous Reactions: Polymerization will not occur.

Conditions to Avoid: Open flame and elevated temperatures.

Incompatible Materials: Strong acids, strong bases and organic solvents.

Hazardous Decomposition Products: No unusual fumes or decomposition products expected. However, toxic fumes (CO, CO_2 NOx, and other typical combustion gasses) will be present.

SECTION 11: TOXICOLOGY INFORMATION

Information on Toxicological Effects for the sealed article:

Acute Toxicity: Not classified
LD50 and LC50 Data: Not available for the article
Skin Corrosion/Irritation: Not classified
Eye Damage/Irritation: Not classified
Respiratory or Skin Sensitization: Not classified
Germ Cell Mutagenicity: Not classified
Teratogenicity: Not classified
Carcinogenicity: Not classified
Reproductive Toxicity: Not classified
Specific Target Organ Toxicity (Single Exposure): None
Specific Target Organ Toxicity (Repeated Exposure): None
Aspiration Hazard: Not classified
Symptoms/Injuries after Inhalation: Not an expected route of exposure.
Symptoms/Injuries after Skin Contact: Not an expected route of exposure

Symptoms/Injuries after Eye Contact: Not an expected route of exposure
Symptoms/Injuries after Ingestion: Not a route of expected route of exposure

Chronic Symptoms: None.

Information on Toxicological Effects, Ingredients
LD50 and LC50 Data:

Boron, CAS No. 7440-42-8	
LD50 Oral Rat	650 mg/kg of body weight

Barium Chromate, CAS No. 10294-40-3	
US ATE (oral)	500 mg/kg of body weight
US ATE (dust, mist)	1.5 mg/l/4h
IARC Group	1
Included in OSHA Hazard Communication Carcinogen List	

Cyclotetramethylenetetranitramine (HMX), CAS No. 2691-41-0	
LD50 Oral Rat	1,670 mg/kg
LD50 Dermal Rat	982 mg/kg species: New Zealand White

Cyclonite (RDX), CAS No. 121-84-4	
LD50 Oral Rat	71 mg/kg of body weight

Lead axide, CAS No. 13424-46-9	
LD50 Oral Rat	500 mg/kg of body weight
LC50 Inhalation Rat	1.5 mg/l/4h

Lead tetraoxide, CAS No. 1314-41-6	
LD50 Oral Rat	500 mg/kg of body weight
LC50 Inhalation Rat	1.5mg/l/4h
IARC Group	2A
Included in OSHA Hazard Communication Carcinogen List	

Silicon, CAS No. 7440-21-3	
LD50 Oral Rat	3,160 mg/kg of body weight

SECTIONS 12 - 15: These sections are not required by OSHA or CCOSH. The general information shown is not intended to be a comprehensive listing of all data or information available.

SECTION 12: ECOLOGY INFORMATION

Toxicity Ecology: Materials sealed inside the tube and detonator capsule are very toxic to aquatic life.
Persistence and Degradability: Not available
Bioaccumulative Potential: Not available
Mobility in Soil: Not available
Other Adverse Effects: Not available

SECTION 13: DISPOSAL CONSIDERATIONS

Call manufacturer or CHEMTREC.

SECTION 14: TRANSPORTATION INFORMATION

Depending on product and packaging configuration, these products may be classified as either a 1.1B, 1.4B or 1.4S.

When packaged as a 1.1B:

Agency	UN Number	Proper Shipping Name	Hazard Class	Label Codes	PG	Marine Pollutant	Other
US DOT	UN0360	Detonator assemblies, non-electric, *for blasting.*	1.1B	1.1B	II	No	ERG-112
Canadian TDG	UN0360	Detonator assemblies, non-electric, *for blasting.*	1.1B	1.1B	II	No	--
IMDG (Vessel)	UN0360	Detonator assemblies, non-electric, *for blasting.*	1.1B	1.1B	II	No	EmS-No, Fire: F-B Spillage: S-X
IATA (Air)	Rules and limits apply. USDOT Special Permits may be needed for Air Transportation. Contact the manufacturer.						

When packaged as a 1.4B:

Agency	UN Number	Proper Shipping Name	Hazard Class	Label Codes	PG	Marine Pollutant	Other
US DOT	UN0361	Detonator assemblies, non-electric, *for blasting.*	1.4B	1.4B	II	No	ERG-114
Canadian TDG	UN0361	Detonator assemblies, non-electric, *for blasting.*	1.4B	1.4B	II	No	--
IMDG (Vessel)	UN0361	Detonator assemblies, non-electric, *for blasting.*	1.4B	1.4B	II	No	EmS-No, Fire: F-B Spillage: S-X
IATA (Air)	Rules and limits apply. USDOT Special Permits may be needed for Air Transportation. Contact the manufacturer.						

When packaged as a 1.4S:

Agency	UN Number	Proper Shipping Name	Hazard Class	Label Codes	PG	Marine Pollutant	Other
US DOT	UN0349	Articles explosive n.o.s., (HMX, aluminum powder)	1.4S	1.4S	II	No	ERG-114
Canadian TDG	UN0349	Articles explosive n.o.s., (HMX, aluminum powder)	1.4S	1.4S	II	No	--
IMDG (Vessel)	UN0349	Articles explosive n.o.s., (HMX, aluminum powder)	1.4S	1.4S	II	No	EmS-No, Fire: F-B Spillage: S-X
IATA (Air)	Rules and limits apply. USDOT Special Permits may be needed for Air Transportation. Contact the manufacturer.						

SECTION 15: REGULATORY INFORMATION

US Federal Regulations:

SARA Section 311/312	Fire hazard Sudden Release of pressure hazard. Immediate (acute) health hazard Delayed (chronic) health hazard
TSCA	All the ingredients are on the United States TSCA (Toxic Substances Control Act) inventory.

Canadian Regulations:

WHMIS Classification	Note: Explosives are regulated by NRCAN and not classified under WHMIS
DSL	All ingredients are listed on the Canadian DSL (Domestic Substances List)

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF LAST REVISION

This SDS was prepared in accordance with US (29 CFR 1900.1200) and Canadian (WHMIS 2015) requirements.

SDS: P-10 Initial Issue Date: 6/1/2015 Last Revision Date: 8/1/2015 Version: 3

Party Responsible for the Preparation of This Document:

Austin Powder Company
Cleveland, OH 44122
216-464-2400

This information is based on Austin Powder Company's current knowledge and is intended to describe the product for the purposes of health and safety requirements only. It should not be construed as guaranteeing any specific property of the product.

SAFETY DATA SHEET

Section 1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	ABC Dry Chemical Fire Extinguishant
Other Identifiers:	Multi-purpose Dry Chemical
Product Code(s):	CH550, F15, F18
Model Code(s) for Extinguishers:	411, 417, 419, 423, 424, 425, 441, 443, 450, 456, 461, 464, 467, 470, 473, 476, 481, 487, 488, 491, 495, 500, 564, 567, 573, 581, 589, 592, 594, 668, 692, 720, 760, 763, 781.
Recommended Use:	Fire suppression, not for human or animal drug use.
Manufacturer:	AMEREX CORPORATION
Internet Address:	www.amerex-fire.com
Address:	7595 Gadsden Highway, P.O. Box 81 Trussville, AL 35173-0081
Company Telephone:	(205) 655-3271
E-mail Address:	info@amerex-fire.com
Emergency Contacts:	Chemtrec 1(800) 424-9300 or (703) 527–3887
Revised:	January 2015

Section 2. HAZARDS IDENTIFICATION

GHS – Classification

Health	Environmental	Physical
Acute Toxicity: Category 5	None	None
Skin Corrosion/Irritation: Category 2	None	None
Skin Sensitization: NO	None	None
Eye: Category 2B	None	Warning
Carcinogen: Category None	None	None

GHS – Label Symbol(s): None

GHS – Signal Word(s): **Warning**

Other Hazards Not Resulting in Classification: None

GHS – Hazard Phrases

GHS Hazard	GHS Codes(s)	Code Phrase(s)
Physical	None	
Health	H303	May be harmful if swallowed
	313	May be harmful in contact with skin
	320	Causes eye irritation
	333	May be harmful if inhaled
Environmental	None	
Precautionary:		
General	P101	If medical advice is needed, have product container or label at hand
	102	Keep out of reach of children
Prevention	234	Keep in original container
	251	Pressurized container; do not pierce or burn, even after use
	261	Avoid breathing dust
	264	Wash hands and face thoroughly after handling
	270	Do not eat, drink, or smoke when using this product
	281	Use personal protective equipment as required
	285	In case of inadequate ventilation, wear respiratory protection
Response	P301+322+331	If swallowed, drink 2-3 glasses of water and do not induce vomiting
	302+352	If on skin, wash with soap and water
	304+313+341	If inhaled, and if distress occurs, remove victim to fresh air and keep at rest in a position comfortable for breathing. Seek medical advice/attention
	305+351+338	If in eyes, rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do, and continue to rinse
	308+313	If exposed or concerned, get medical advice/attention
	337+313	If eye irritation persists; get medical advice/attention
Storage	P401+402+403	Store in original container or extinguisher in a dry, well ventilated place

Section 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	EC No.	REACH Reg. No.	CAS-No.	Weight %
Mono-ammonium phosphate	NA	NA	7722-76-1	55-75
Ammonium sulfate	231-984-1	NA	7783-20-2	20-40
Fullers earth magnesium aluminum silicate	NA	Not Available	8031-18-3	<3
Mica- potassium aluminum silicate	NA	Not Available	12001-26-2	1-2
Silicone oil methyl hydrogen polysiloxane	NA	Not Available	63148-57-2	<1
Calcium carbonate	215-279-6	Not Available	1317-65-3	<1
Amorphous silica precipitated synthetic zeolite	262-373-8	Not Available	112926-00-8	<1
Yellow 14 pigment – diazo dye	228-767-9	Not Available	5468-75-7	<1

Emergency overview: Light yellow, fine solid powder, odorless.

Adverse health effects and symptoms: Irritant to the respiratory system; Irritating to eyes and skin. Symptoms may include coughing, shortness of breath, and irritation of the lungs, eyes, and skin.

Ingestion, although unlikely, may cause cramps, nausea and diarrhea.

Cut-off Levels

Chemical Name	Reproductive Toxicity	Carcinogenicity	Mutagenicity	Other Hazard Classes
Mono-ammonium Phosphate	NA	NA	NA	NA
Ammonium Sulfate	NA	NA	NA	NA
Fullers earth magnesium aluminum silicate	NA	NA	NA	NA
Mica- potassium aluminum silicate	NA	NA	NA	NA
Silicone oil methyl hydrogen polysiloxane	NA	NA	NA	NA
Calcium carbonate	NA	NA	NA	NA
Amorphous silica precipitated synthetic zeolite	NA	NA	NA	NA
Yellow 14 pigment – di-azo dye	NA	NA	NA	NA

Section 4. FIRST AID MEASURES

Eye Exposure: May cause irritation. Irrigate eyes with water and repeat until pain free. Seek medical attention if irritation develops, or if vision changes occur.

Skin Exposure: May cause skin irritation. In case of contact, wash with plenty of soap and water. Seek medical attention if irritation persists.

Inhalation: May cause irritation, along with coughing. If respiratory irritation or distress occurs, remove victim to fresh air. Seek medical attention if irritation persists.

Ingestion: Overdose symptoms may include numbness or tingling in hands or feet, uneven heart rate, paralysis, feeling faint, chest pain or heavy feeling, pain spreading to the arm or shoulder, nausea, diarrhea, sweating, general ill feeling, or seizure (convulsions). If victim is conscious and alert, give 2-3 glasses of water to drink. If conscious, do not induce vomiting. Seek immediate medical attention. Do not leave victim unattended. To prevent aspiration of swallowed product, lay victim on side with head lower than waist.

Medical conditions possibly aggravated by exposure: Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema, or bronchitis. Skin contact may aggravate existing skin

disease. Chronic overexposure may cause pneumoconiosis ("dusty lung" disease).

Section 5. FIRE-FIGHTING MEASURES

Flammable Properties:	Not flammable
Flash Point:	Not determined
Suitable Extinguishing Media:	Non-combustible. Use extinguishing media suitable for surrounding conditions.
Hazardous Combustion Products:	Carbon and sulfur oxides
Explosion Data:	
Sensitivity to Mechanical Impact:	Not sensitive
Sensitivity to Static Discharge:	Not sensitive
Unusual fire/explosion hazards:	In a fire this material may decompose, releasing oxides of carbon, sulfur, potassium and nitrogen (see Section 10).
Protective Equipment and Precautions for Firefighters:	As in any fire, wear self-contained breathing apparatus in pressure-demand, NIOSH approved or equivalent and full protective gear.

Section 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:	Avoid contact with skin, eyes, and clothing.
Personal Protective Equipment:	Minimum - safety glasses, gloves, and a dust respirator.
Emergency Procedures:	NA
Methods for Containment:	Prevent further leakage or spillage if safe to do so.
Methods for Clean Up:	Avoid dust formation; clean up released material using vacuum or wet sweep and shovel to minimize generation of dust. Bag and transfer to properly labeled containers. Ventilate area and wash spill site after material pickup is complete.
Environmental Precautions:	Prevent material from entering waterways.
Other:	If product is contaminated, use PPE and containment appropriate to the nature of the most toxic chemical/material in the mixture.

Section 7. HANDLING AND STORAGE

Personal Precautions: Use appropriate PPE when handling or maintaining equipment, and wash thoroughly after handling (see Section 8).

Conditions for Safe Storage/Handling: Keep product in original container or extinguisher. Contents may be under pressure – inspect for extinguisher rust periodically to ensure container integrity.

Incompatible Products: Do not mix with other extinguishing agents, particularly potassium bicarbonate and sodium bicarbonate. Incompatible with strong oxidizing agents and strong acids. Do not store in high humidity. Do not combine with chlorine compounds.

Section 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical Name	OSHA PEL	ACGIH TLV	DFG MAK *	EU BLV
Mono-ammonium phosphate	PNOC** Total dust, 15 mg/m^3 Respirable fraction, 5 mg/m^3	PNOC Total dust, 10 mg/m^3 Respirable fraction, 3 mg/m^3	PNOC Total dust, 4 mg/m^3 Respirable fraction, 1.5 mg/m^3	NA
Ammonium Sulfate	PNOC** Total dust, 15 mg/m^3 Respirable fraction, 5 mg/m^3	PNOC Total dust, 10 mg/m^3 Respirable fraction, 3 mg/m^3	PNOC Total dust, 4 mg/m^3 Respirable fraction, 1.5 mg/m^3	NA
Mica	6 mg/m^3	3 mg/m3	NR	NA
Fullers Earth	PNOC** Total dust, 15 mg/m^3 Respirable fraction, 5 mg/m^3	PNOC Total dust, 10 mg/m^3 Respirable fraction, 3 mg/m^3	PNOC Total dust, 4 mg/m^3 Respirable fraction, 1.5 mg/m^3	
Silicone oil	NR**	NR	NR	NA
Calcium carbonate	PNOC Total dust, 15 mg/m^3 Respirable fraction, 5 mg/m^3	PNOC Total dust, 10 mg/m^3 Respirable fraction, 3 mg/m^3	-------	NA
Amorphous silica	80 mg/m^3 % silica	10 mg/m^3	4 mg/m^3	NA
Yellow 14 pigment	NR	NR	NR	NA

*German regulatory limits **PNOC = Particulates not otherwise classified (ACGIH) also known as Particulates not otherwise regulated (OSHA) *** NR = Not Regulated. All values are 8 hour time weighted average concentrations.

Engineering Controls: Showers
Eyewash stations
Ventilation systems

Personal Protective Equipment – PPE Code E:




Eye/Face Protection:	Tightly fitting safety goggles
Skin and Body Protection:	Wear protective gloves/coveralls
Respiratory Protection:	If exposure limits are exceeded or irritation is experienced, NIOSH approved respiratory protection should be worn. Use N95 dust mask for limited exposure; use air-purifying respirator (APR) with high efficiency particulate air (HEPA) filters for prolonged exposure. Positive-pressure-demand supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations. The need for respiratory protection is not likely for short-term use in well ventilated areas.
Hygiene Measures:	Good personal hygiene practices essential, such as avoiding food, tobacco products, or other hand-to-mouth contact when handling. Wash thoroughly after handling.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Light yellow powder, finely divided odorless solid
Molecular Weight:	$NH_4H_2PO_4$: 115.03; $(NH_4)_2SO_4$: 132.14
Odor:	Odorless
Odor Threshold:	No information available
Decomposition Temperature ^oC:	100 - 120
Freezing Point ^oC:	No information available
Initial Boiling Point ^oC:	No information available
Physical State:	Crystalline Powder

pH:	Mixture approximately 4 to 5; NH4H2PO4: 4.2 in 0.2 molar solution; (NH4)2SO4: 5.5 in 0.1 molar solution
Flash Point ^{o}C:	None
Auto-ignition Temperature ^{o}C:	None
Boiling Point/Range ^{o}C:	Not Applicable
Melting Point/Range ^{o}C:	NH4H2PO4: 190; (NH4)2SO4: 280
Flammability:	Not Flammable
Flammability Limits in Air ^{o}C:	Upper – Not Flammable; Lower-Not Flammable
Explosive Properties:	None
Oxidizing Properties:	None
Volatile Component (%vol)	Not Applicable
Evaporation Rate:	Not Applicable
Vapor Density:	Not Applicable
Vapor Pressure:	Not Applicable
Specific gravity at 25 C:	NH4H2PO4: 1.80; (NH4)2SO4:: 1.77
Solubility:	Coated-Not Immediately Soluble in Water
Partition Coefficient:	NH4H2PO4 Est: -4.11; (NH4)2SO4: Est: -0.48
Viscosity:	Not Applicable

NOTE: NH4H2PO4 – Monoammonium Phosphate; (NH4)2SO4: – Ammonium Sulfate

Section 10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage and handling conditions.
Reactivity:	
Incompatibles:	Strong alkalis (bases), magnesium, strong oxidizers, isocyanuric acids and chlorine compounds.
Conditions to Avoid:	Storage or handling near incompatibles.
Hazardous Decomposition Products:	Heat of fire may release carbon monoxide, carbon dioxide, and sulfur dioxide. Also ammonia, oxides of phosphorous and nitrogen oxides may be released during decomposition.
Possibility of Hazardous Reactions:	Slight
Hazardous Polymerization	Does not occur

Section 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure:	Inhalation, skin, and eye contact.

Symptoms:

Immediate:	
Inhalation:	Irritation, coughing.
Eyes:	Irritation.
Skin:	Irritation.
Delayed:	Symptoms appear to be relatively immediate
Acute Toxicity:	Relatively non-toxic.
Chronic Toxicity:	
Short-term Exposure:	None known.
Long-term Exposure:	As with all dusts, pneumoconiosis, or "dusty lung" disease, may result from chronic exposure.

Acute Toxicity Values - Health

Chemical Name	LD50		LC50 (Inhalation)
	Oral	Dermal	
Mono-ammonium phosphate	5750 mg/kg (rat)	>7940 mg/kg (rabbit)	Not available
Ammonium Sulfate	2840 mg/kg (rat)	Not available	Not available
Mica	None	None	None
Fullers Earth	None	None	None
Silicone oil	None	None	None
Calcium carbonate	6450 mg/kg (rat)	500 mg/24 hr (rabbit)	Not available
Amorphous silica	>5000 mg/kg (rat)	>2000 mg/kg (rabbit)	>2.2 mg/L (rat)
Yellow 14 pigment	>17000 mg/kg (rat)	>3000 mg/kg (rat)	>4448 mg/m3 (rat)

Reproductive Toxicity:	This product's ingredients are not known to have reproductive or teratogenic effects.
Target Organs and Effects (TOST):	Respiratory system irritant). This product is a mild irritant to epithelial tissue, (eyes, mucous membranes, skin) and may aggravate dermatitis. No information was found indicating the product causes sensitization.

Other Toxicity Categories

Chemical Name	Germ Cell Mutagenicity	Carcino-genicity	Repro-ductive	TOST Single Exp	TOST Repeated Exp	Aspiration
Mono-ammonium phosphate	None	None	None	Cat 3	None	None
Ammonium Sulfate	None	None	None	Cat 3	None	None
Fullers earth	None	None	None	None	None	None
Mica	None	None	None	None	None	None
Silicone oil	None	None	None	None	None	None
Calcium carbonate	None	None	None	None	None	None
Amorphous silica	None	None	None	None	None	None
Yellow 14 pigment	None	None	None	None	None	None

MATERIAL SAFETY DATA SHEET

FILE NO. 9636, 9637, 9638, 9616, 11360
NAME OF PRODUCT: AW Hydraulic Oil ISO 46 **MSDS DATE:** December, 2009

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: AW Hydraulic Oil ISO 46
SYNONYMS: hydraulic fluid
PRODUCT CODES: 9616,9636,9637,9637Tray,9638,11360, CG46AWBlue

MANUFACTURER: CGF INC
DIVISION: N/A
ADDRESS: 317 Peoples Avenue Rockford, IL 61104 USA

EMERGENCY PHONE: 800/424-9300
CHEMTREC PHONE: 800/424-9300
OTHER CALLS: 815-967-4400
FAX PHONE: 815-967-4404

PRODUCT USE: Hydraulic Fluid
PREPARED BY: Irena Larson/Denise Brauer

SECTION 1 NOTES:

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT: Petroleum base oils, additive package.

CAS NO.	% WT	% VOL	SARA 313 REPORTABLE
64741-88-4	75-85		None
64742-01-4	15-25		None
Proprietary Additive(s)	0.5-1.5		None

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This material is not considered hazardous according to OSHA criteria.

ROUTES OF ENTRY: Skin contact or inhalation.

POTENTIAL HEALTH EFFECTS

EYES: Contact may cause mild eye irritation including stinging, watering, and redness.

SKIN: Contact may cause mild skin irritation including redness and a burning sensation. Prolonged or repeated contact can defat the skin, causing drying and cracking of the skin and possibly dermatitis (inflammation). No harmful effects from skin absorption are expected.

INGESTION: No harmful effects expected from ingestion.

INHALATION: No information available on acute toxicity.

ACUTE HEALTH HAZARDS: No

CHRONIC HEALTH HAZARDS: No

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Skin disorders may be aggravated by exposure.

CARCINOGENICITY

OSHA: None **ACGIH: None** **NTP:** None **IARC: None**
OTHER:

SECTION 3 NOTES:

SECTION 4: FIRST AID MEASURES

EYES: If irritation or redness develops, flush eyes with clean water. If symptoms persist, seek medical attention.

SKIN: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with a mild soap and water or a waterless hand cleaner. If irritation persists, seek medical attention.

INGESTION: First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

INHALATION: If respiratory symptoms develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention.

NOTES TO PHYSICIANS OR FIRST AID PROVIDERS: High-pressure hydrocarbon injection injuries may produce substantial necrosis of underlying tissue despite an innocuous appearing wound. Often these injuries require emergency surgical debridement and all injuries should be evaluated by a specialist in order to assess the extent of injury.

Acute aspirations of large amounts of mineral oil-laden material may produce serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities.

SECTION 4 NOTES:

SECTION 5: FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Dry chemical, carbon dioxide, foam, or water spray is recommended.

SPECIAL FIRE FIGHTING PROCEDURES:
Water or foam may cause frothing of materials heated above 212 F. Carbon dioxide can displace oxygen. Use caution when applying dioxide in confined spaces.

SPECIAL PROTECTIVE EQUIPMENT: For fires in enclosed areas, fire fighters muct use self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of fire.

HAZARDOUS DECOMPOSITION PRODUCTS: No data

Flash Point: C(F) : >210(410) (ASTM D-92)
Flammable Limits (approx. % vol. in air)- LEL: 0.9%, UEL: 7.0%
NFPA HAZARD ID: Health: 1, Flammability: 1, Reactivity: 0

SECTION 6: ACCIDENTAL RELEASE MEASURES

ACCIDENTAL RELEASE MEASURES:
Personal Precautions:
This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. The use of explosion-proof electrical equipment is recommended. Stay upwind and away from spill/release. Notify persons downwind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant.
Environmental Precautions: Stop spill/release if it can be done with minimal risk. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Contact appropriate agency for spills into or upon navigable waters that cause a sheen or discoloration on the water surface.

Methods for Containment and Clean Up:
Notify fire authorities and appropriate regulatory authorities. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Spilled material may be absorbed into an appropriate absorbent material.

SECTION 7: HANDLING AND STORAGE

HANDLING AND STORAGE:
Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment. High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection

apparatus or from pinhole leaks in tubing of high pressure hydraulic oil equipment. Do not enter confined spaces such as tanks or pits without following proper entry procedures. Do not wear contaminated clothing or shoes. "Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Use and store this material in cool, dry, well-ventilated areas away from heat and all sources of ignition. Keep container(s) tightly closed. Store only in approved containers. Keep away from any incompatible material. Protect container(s) against physical damage.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Componet	**ACGIH**	**OSHA**
Lubricant Base Oil-Petroleum	TWA: 5mg/m^3	TWA: 5mg/m^3
	STEL: 10mg/m^3	as Oil mist, if generated
	As oil mist, if generated	

ENGINEERING CONTROLS: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

RESPIRATORY PROTECTION: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with R or P95 filters may be used. A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (MUC) as directed by regulation or the manufacturer's instructions, in oxygen deficient (less than 19.5 percent oxygen) situations, or other conditions that are immediately dangerous to life and health (IDLH).

EYE PROTECTION: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

SKIN PROTECTION: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the performance of their products. Suggested protective materials: Nitrile

SECTION 8 NOTES: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Clear Blue Liquid

ODOR: mild petroleum

PHYSICAL STATE: Liquid

pH AS SUPPLIED: Not applicable
pH (Other):
BOILING POINT: No data
F: >600
C: >316

FLASH POINT:
F: >410
C: >210
METHOD USED: (ASTM D-92)

AUTOIGNITION TEMPERATURE:
F: 671
C: 355

MELTING POINT: No data
F:
C:
FREEZING POINT: No data
F:

MSDS
INSECT REPELLENT

SECTION 1. CHEMICAL IDENTIFICATION

CHEMINFO RECORD NUMBER : 333
CCOHS CHEMICAL NAME : Permethrin
SYNONYMS :
3-(2,2-Dichloroethenyl)-2,2-dimethylcyclopropanecarboxylic acid, (3-phenoxyphenyl)methyl ester
3-Phenoxybenzyl (1RS)-cis,trans-3-(2,2-dichlorovinyl)-2,2-dimethyl cyclopropanecarboxylate Permethrine
TRADE NAME(S) :
Ambush
Ectiban
Pounce

SECTION 2. DESCRIPTION

APPEARANCE AND ODOUR : Colourless crystals or pale yellow-brown viscous liquid, depending on purity. Partially crystalizes at ambient temperature.
ODOUR THRESHOLD : No information available.
WARNING PROPERTIES : No information available for evaluation.
COMPOSITION/PURITY : Permethrin is a pyrethroid, a man-made chemical which is similar to chemicals occurring naturally in plants (pyrethrins). Commercial permethrin is a mixture of 4 isomers (chemical forms). Most technical material is a mixture of approximately 50-60% trans- and 50-40% cis-isomers, but formulations with 75:25 trans:cis ratio are also available. Permethrin may be formulated as emulsifiable or ultra low volume concentrates, dusts, fogs or wettable powders. This material is often only a small percentage of pesticide formulations. The overall physical, chemical and toxicological characteristics of the product may depend on other ingredients such as solvents.

SECTION 3. HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS

EFFECTS OF SHORT-TERM (ACUTE) disturbances such as nausea, vomiting, irritable behaviour, tremors and muscle weakness might

EXPOSURE : INHALATION : One study reported respiratory tract irritation in a large percentage of workers exposed to permethrin formulations (emulsion or wettable powder). Symptoms included increased nasal secretion, sneezing, coughing and difficulty breathing and varied with the formulation tested.(12) Other components of products may contribute to the irritation.

SKIN CONTACT : Animal tests show that permethrin is readily absorbed through the skin, but is rapidly broken down in the body and has a low toxicity by this route. There is extensive documentation of a unique skin sensory change caused by permethrin and some other pyrethroids. This is described as a stinging, tingling or burning sensation progressing to numbness in some cases. Usually there is a short delay between exposure and onset of symptoms (30 minutes to a few hours) with a peak in about 8 hours and complete clearance within 24 hours. Inflammation (redness, swelling, blistering) is not apparent. Permethrin tends to produce relatively mild effects.(12-16) Of a group of 4 pyrethroids tested (permethrin, cypermethrin, fenvalerate and flucythrinate), permethrin produced the least amount of skin sensation. Forestry workers exposed to permethrin reported symptoms that were mainly irritative, such as itching and burning of the skin. However, it could not be discerned whether this sensation was an irritative one or a sign of peripheral sensory nerve involvement.

EYE CONTACT : Among forestry workers exposed to permethrin, eye irritation was reported for 7% or 18% of planters, depending on formulation used.(12) There are no reports of eye damage from permethrin contact.

INGESTION : No human cases of ingestion have been reported. Animal data indicates relatively low acute oral toxicity for permethrin. Due to its low toxicity and rapid metabolism, toxic effects are not expected unless there is accidental ingestion of large amounts. In this case, nervous system occur.

CARCINOGENICITY : No information available
TERATOGENICITY AND EMBRYOTOXICITY : No human information available. No teratogenic or embryotoxic effects in mice.
REPRODUCTIVE TOXICITY : No information available.
MUTAGENICITY : No human information available. Permethrin was not mutagenic in a variety of short-term tests.
TOXICOLOGICALLY SYNERGISTIC MATERIALS : No information available.
POTENTIAL FOR ACCUMULATION : Animal studies indicate rapid breakdown and excretion of this pyrethroid. Thus, the potential for accumulation in humans is considered to be low.

SECTION 4. FIRST AID MEASURES

INHALATION : If symptoms are experienced, remove source of contamination or move victim to fresh air. Obtain medical advice immediately.
SKIN CONTACT : Symptoms of skin contact are delayed. Therefore, if contact occurs, remove contaminated clothing, shoes and leather goods (e.g. watchbands, belts).
Gently blot or brush away excess chemical quickly. Wash gently and thoroughly with water and non-abrasive soap. If symptoms occur, obtain medical attention immediately. Completely decontaminate clothing, shoes and leather goods before reuse, or discard.
EYE CONTACT : Gently blot or brush away excess chemical quickly. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 20 minutes, by the clock, holding the eyelid(s) open. If irritation persists, obtain medical advice immediately.
INGESTION : Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz.) of water. If vomiting occurs naturally, rinse mouth and repeat administration of water. Obtain medical attention immediately.
FIRST AID COMMENTS : Consult a physician No special procedures required for permethrin. Flash point data is not available, but it is probable the material can burn only if strongly heated. Cool fire-exposed containers. Pesticide formulations may contain combustible ingredients. Select extinguishing media and prepare fire fighting and/or the nearest Poison Control Center for all exposures except minor instances of inhalation or skin contact. All first aid procedures should be periodically reviewed by a physician familiar with the material and its conditions of use in the workplace. NOTE: Other ingredients in permethrin formulations may cause toxic effects and require specific first aid measures.
NOTE TO PHYSICIANS : Studies with permethrin showed that topical Vitamin E acetate (dl-alpha tocopheryl acetate) reduced or eliminated the sensations from skin contact. Mephenesin (a muscle relaxant) has been proposed for use in treatment of pyrethroid poisoning. In tests with rats receiving lethal doses of the pyrethroids cismethrin and deltamethrin, all animals survived when treated with mephenesin.

SECTION 5. FIRE FIGHTING MEASURES

FLASH POINT : No information available. Probably can burn only if strongly heated.
LOWER FLAMMABLE (EXPLOSIVE) LIMIT (LFL/LEL) : Not available
UPPER FLAMMABLE (EXPLOSIVE) LIMIT (UFL/UEL) : Not available
AUTOIGNITION (IGNITION) TEMPERATURE : Not available
EXPLOSION DATA - SENSITIVITY TO MECHANICAL IMPACT : Probably not sensitive.
EXPLOSION DATA - SENSITIVITY TO STATIC CHARGE : Information not available
COMBUSTION AND THERMAL DECOMPOSITION PRODUCTS :Carbon monoxide, carbon dioxide, hydrogen chloride gas.
FIRE HAZARD COMMENTS : Permethrin may emit toxic hydrogen chloride gas at high temperatures.
EXTINGUISHING MEDIA : Carbon dioxide, dry chemical powder, alcohol foam, polymer foam, water fog.
FIRE FIGHTING INSTRUCTIONS :

procedures appropriate for the product as a whole.

SECTION 6. ACCIDENTAL RELEASE MEASURES

PRECAUTIONS : Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. Wear adequate personal protective equipment. Ventilate area. Notify occupational health and safety and environmental authorities.
CLEAN-UP :Prevent material from entering sewers or waterways. Do not touch spilled material. Stop or reduce leak if safe to do so. Contain spill with earth, sand or absorbent material which does not react with spilled material. Small spills (liquid): Soak up spill with absorbent material which does not react with spilled chemical. Put material in suitable, covered, labelled containers. Small spills (solid): Shovel into clean, dry, labelled containers and cover. Large spills: Contact fire and emergency services and supplier for advice.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION GUIDELINES :No specific guidelines are available. Contact manufacturer or supplier for advice.The NIOSH recommendations for PYRETHRUM may be applicable. See CHEMINFO record number 311 (Pyrethrins) for details.
EYE/FACE PROTECTION : No specific requirement, but it is good practice to wear chemical safety goggles. During pesticide application, a full-face shield may also be required to ensure adequate protection.

SKIN PROTECTION : No specific requirement, but it is good practice to prevent skin contact. During pesticide application, this will require the use of impervious gloves, overalls, boots and/or other resistant protective clothing.
RESISTANCE OF MATERIALS FOR PROTECTIVE CLOTHING : No specific information is available. Contact manufacturer/supplier for advice. Polyvinyl alcohol (PVA) provides good resistance to pyrethrins and related materials (higher monobasic carboxylic esters). Consider solvent base when selecting resistant materials for pyrethroid formulations. NOTE: Resistance of specific materials can vary from product to product. Evaluate resistance under conditions of use and maintain clothing carefully.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

MELTING POINT: 34-35 deg C (pure)
BOILING POINT: Very high (approximately 200 deg C at 0.008 mm Hg); probably decomposes on heating.
RELATIVE DENSITY (SPECIFIC GRAVITY) : 1.19-1.27 at 20 deg C (water = 1)
SOLUBILITY IN WATER : Practically insoluble (0.2 mg/L at 20 deg C)
SOLUBILITY IN OTHER LIQUIDS : Readily soluble in common organic solvents such as alcohols, acetone, ether, chloroform, methylene chloride, xylene; moderately soluble in ethylene glycol.
VAPOUR DENSITY: Not applicable
VAPOUR PRESSURE: Very low (3.4 x 10(-7) mm Hg at 25 deg C)
SATURATION VAPOUR CONCENTRATION : Not applicable
EVAPORATION RATE : Practically zero.
pH VALUE: Not available
CRITICAL TEMPERATURE: Not applicable
COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT) : Log P(oct) = 6.5. Also reported as 3.48.

SECTION 10. STABILITY AND REACTIVITY

STABILITY : Stable to heat (more than 2 years at 50 deg C).(2) Relatively stable in sunlight.(17) More stable in acid than alkaline media with optimum stability at about pH 4.(2)
HAZARDOUS POLYMERIZATION : Does not occur
HAZARDOUS DECOMPOSITION PRODUCTS : None known
INCOMPATIBILITY - MATERIALS TO AVOID : STRONG OXIDIZING AGENTS - May increase the risk of fire. STRONG BASES - Cause decomposition of material. CALCIUM NITRATE
CORROSIVITY TO METALS : Not corrosive to aluminum.
STABILITY AND REACTIVITY COMMENTS

Safety Data Sheet

Product Name: Shaped Charges and Tubing/Casing Cutters

* * * Section 1 - Product and Company Identification * * *

Manufacturer Information

Hunting Titan, Ltd.
143 HCR 4361
Milford, TX 76670

Phone: 972-493-2580

Emergency # 800-424-9300 Chemtrec

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Explosives - Division 1.4

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Fire or projection hazard.

Precautionary Statements

Prevention

Do not subject to grinding/shock/impact/flame/heat/electrostatic energy/friction.
No smoking.
Do not attempt to disassemble.
Do not consume food, drink or tobacco in area where they may become contaminated with these materials.
After handling or other exposure, immediately wash thoroughly with soap and water.

Response

Explosion risk in case of fire. Do NOT fight fire when fire reaches explosives; evacuate area for at least 1500 ft. (460 meters).
Detonation produces hazardous fragments.
Gases produced may contain carbon monoxide and nitrogen oxide.
Clean up should be done only be personnel experienced in handling explosives. Isolate area and remove sources of impact, friction, flame, heat, electrostatic energy, RF energy.
Wear safety glasses, gloves and dust respirator (if area is dusty).
Clean up, sweep up with non-sparking tools.

Storage

Store in accordance with local/regional/national/international regulations.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component
121-82-4	Cyclotrimethylene Trinitramine (RDX)
2691-41-0	Cyclotetramethylenetetranitramine (HMX)
20062-22-0	Hexanitrostilbene (HNS)
38082-89-2	2, 6-Bis (Picrylamino)-3, 5-Dinitropyridine (PYX)
7440-33-7	Tungsten
7439-92-1	Lead
7440-50-8	Copper
7782-42-5	Graphite
Not Available	Corrosion Resistant Steel
Not Available	Desensitizing Wax

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

For dust exposure: Immediately flush eyes with plenty of water for at least 15 minutes. If irritation persists get medical attention.

First Aid: Skin

For dust exposure: wash skin with soap and water.

First Aid: Ingestion

Not an expected route of entry under normal product handling conditions.

First Aid: Inhalation

For dust exposure: Remove victim to fresh air.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

May detonate with impact, flame or heat. Detonation causes hazardous fragments. Explosion risk in event of fire.

Hazardous Combustion Products

Hazardous gases, including nitrogen oxides, may be produced in fire.

Extinguishing Media

None

Unsuitable Extinguishing Media

None

Fire Fighting Equipment/Instructions

DO NOT FIGHT FIRES! EXPLOSION MAY OCCUR! Isolate area. Evacuate area for at least 1500 ft. (460 meters). Consult U.S. D.O.T. Emergency Response Guide or local emergency response personnel for further details.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

None

Materials and Methods for Clean-Up

Clean up should be done only by personnel experienced in handling explosives. Isolate area and remove sources of impact, friction, flame, heat, electrostatic energy. Clean up; sweep up with non-sparking tools.

Emergency Measures

Isolate area. Keep unnecessary personnel away.

Personal Precautions and Protective Equipment

Wear safety glasses, gloves and dust respirator (if area is dusty).

Environmental Precautions

None

Prevention of Secondary Hazards

None

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Keep away from impact, friction, flame, heat, electrical, or electrostatic energy. Do not attempt to disassemble. Do not consume food, drink, or tobacco in area where they may become contaminated with these materials. After handling or other exposure, immediately wash thoroughly with soap and water.

Storage Procedures

Store in accordance with local and safety and regulatory requirements.

Incompatibilities

Acids and alkalis.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Component Exposure Limits

Cyclotrimethylene Trinitramine (RDX) (121-82-4)

ACGIH: 0.5 mg/m3 TWA
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 1.5 mg/m3 TWA
Prevent or reduce skin absorption
NIOSH: 1.5 mg/m3 TWA
3 mg/m3 STEL
Potential for dermal absorption

Cyclotetramethylenetetranitramine (HMX) (2691-41-0)

ACGIH: Not Established
OSHA: Not Established
NIOSH: Not Established

Hexanitrostilbene (HNS) (20062-22-0)

ACGIH: Not Established
OSHA: Not Established
NIOSH: Not Established

2, 6-Bis (Picrylamino)-3, 5-Dinitropyridine (PYX) (38082-89-2)

ACGIH: Not Established
OSHA: Not Established
NIOSH: Not Established

Lead (7439-92-1)

ACGIH: 0.05 mg/m3 TWA
OSHA: 30 µg/m3 Action Level (Poison, See 29 CFR 1910.1025); 50 µg/m3 TWA
NIOSH: 0.050 mg/m3 TWA

Tungsten (7440-33-7)

ACGIH: 5 mg/m3 TWA
10 mg/m3 STEL
OSHA: 5 mg/m3 TWA
10 mg/m3 STEL
NIOSH: 5 mg/m3 TWA
10 mg/m3 STEL

Copper (7440-50-8)

ACGIH: 0.2 mg/m3 TWA (fume)
OSHA: 0.1 mg/m3 TWA (dust, fume, mist, as Cu)
NIOSH: 1 mg/m3 TWA (dust and mist); 0.1 mg/m3 TWA (fume)

Graphite (7782-42-5)

ACGIH: 2 mg/m3 TWA (all forms except graphite fibers, respirable fraction)
OSHA: 2.5 mg/m3 TWA (natural, respirable dust); 10 mg/m3 TWA (synthetic, total dust); 5 mg/m3 TWA (synthetic, respirable fraction)
NIOSH: 2.5 mg/m3 TWA (natural, respirable dust)

Engineering Measures

Not required under normal product handling conditions.

Personal Protective Equipment: Respiratory

Not required under normal product handling conditions.

Personal Protective Equipment: Hands

Not required under normal product handling conditions.

Personal Protective Equipment: Eyes

Safety glasses recommended.

Personal Protective Equipment: Skin and Body

Not required under normal product handling conditions. Clothing should not have propensity to build up electrostatic energy.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Explosive shaped charges	**Odor:**	None
Physical State:	Solid	**pH:**	NA
Vapor Pressure:	ND	**Vapor Density:**	ND
Boiling Point:	ND	**Melting Point:**	ND
Solubility (H2O):	ND	**Specific Gravity:**	ND
Evaporation Rate:	ND	**VOC:**	ND
Octanol/H2O Coeff.:	ND	**Flash Point:**	ND
Flash Point Method:	ND	**Upper Flammability Limit (UFL):**	ND
Lower Flammability Limit (LFL):	ND	**Burning Rate:**	ND
Auto Ignition:	ND		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material under normal conditions.

Hazardous Reaction Potential

May explode if subjected to shock, impact, friction, heat or rough handling.

Conditions to Avoid

Detonates with impact, friction, flame, heat or electrostatic discharge.

Incompatible Products

Acids and Alkalis.

Hazardous Decomposition Products

Detonation produces hazardous fragments. Gases produced may contain carbon monoxide and nitrogen oxide.

* * * Section 11 - Toxicological Information * * *

Acute Toxicity

A: General Product Information

Shaped charges do not present a health hazard in normal handling and use. However the product is high explosive and detonation may cause severe physical injury, including death.

B: Component Analysis - LD50/LC50

Cyclotrimethylene Trinitramine (RDX) (121-82-4)

Oral LD50 Rat 100 mg/kg

Cyclotetramethylenetetranitramine (HMX) (2691-41-0)

Oral LD50 Rat 6490 mg/kg; Dermal LD50 Rat >5 g/kg; Dermal LD50 Rabbit 630 mg/kg

Hexanitrostilbene (HNS) (20062-22-0)

Not Established

2, 6-Bis (Picrylamino)-3, 5-Dinitropyridine (PYX) (38082-89-2)

Oral LD50 Rat >5 g/kg

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Dust contact with skin may cause minor skin irritation.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Dust contact with may cause eye irritation.

Potential Health Effects: Ingestion

Not an expected route of entry under normal product use conditions.

Potential Health Effects: Inhalation

Inhalation of powders may cause nervous system irregularities including headaches and dizziness.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any sensitization effects.

Generative Cell Mutagenicity

This product is not reported to have any mutagenic effects.

Carcinogenicity

A: General Product Information

This product is not reported to have any carcinogenic effects.

B: Component Carcinogenicity

Cyclotrimethylene Trinitramine (RDX) (121-82-4)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

Lead (7439-92-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
OSHA: 30 µg/m3 Action Level (Poison, See 29 CFR 1910.1025); 50 µg/m3 TWA
NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)
IARC: Monograph 87 [2006] (evaluates inorganic lead compounds as Group 2A and organic lead compounds as Group 3) (Group 2A (probably carcinogenic to humans))

Reproductive Toxicity

This product is not reported to have any reproductive toxicity effects.

Specified Target Organ General Toxicity: Single Exposure

This product is not reported to have any specific target organ general toxicity single exposure effects.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ general toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

This product is not reported to have any aspiration hazards.

Other Toxicological Information

Lead poisoning can result in damage to central and peripheral nervous systems, the blood forming organs, leading to anemia. Lead may impair the reproductive system of men and women. There is increasing evidence that lead exposure may affect blood pressure in adults.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

No information available for the product.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Cyclotrimethylene Trinitramine (RDX) (121-82-4)

Test & Species		Conditions
96 Hr LC50 Lepomis macrochirus	1.9-6.6 mg/L [static]	
96 Hr LC50 Lepomis macrochirus	5.6-10 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	5.4-7.4 mg/L [static]	
96 Hr LC50 Pimephales promelas	5-8.7 mg/L [flow-through]	
96 Hr LC50 Pimephales promelas	3.0-5.0 mg/L [static]	

Cyclotetramethylenetetranitramine (HMX) (2691-41-0)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	8.8-26 mg/L [static]	7 days old
96 Hr LC50 Lepomis macrochirus	>32 mg/L [static]	
96 Hr LC50 Oncorhynchus mykiss	>32 mg/L [static]	

Lead (7439-92-1)

Test & Species		Conditions
96 Hr LC50 Cyprinus carpio	0.44 mg/L [semi-static]	
96 Hr LC50 Oncorhynchus mykiss	1.17 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	1.32 mg/L [static]	
48 Hr EC50 water flea	600 µg/L	

Copper (7440-50-8)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	0.0068 - 0.0156 mg/L	
96 Hr LC50 Pimephales promelas	<0.3 mg/L [static]	
96 Hr LC50 Pimephales promelas	0.2 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	0.052 mg/L [flow-through]	
96 Hr LC50 Lepomis macrochirus	1.25 mg/L [static]	
96 Hr LC50 Cyprinus carpio	0.3 mg/L [semi-static]	
96 Hr LC50 Cyprinus carpio	0.8 mg/L [static]	
96 Hr LC50 Poecilia reticulata	0.112 mg/L [flow-through]	
72 Hr EC50 Pseudokirchneriella subcapitata	0.0426 - 0.0535 mg/L [static]	
96 Hr EC50 Pseudokirchneriella subcapitata	0.031 - 0.054 mg/L [static]	
48 Hr EC50 Daphnia magna	0.03 mg/L [Static]	

Persistence/Degradability

No information available for the product.

Bioaccumulation

No information available for the product.

Mobility in Soil

No information available for the product.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

US DOT Information

Shipping Name: Charges, Shaped
UN #: 0440 **Hazard Class:** 1.4D **Packing Group:** II

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

A: Component Analysis

None of the components in this article contain chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

B: Component Marine Pollutants

None of the components in this article contain chemicals required by US DOT to be identified as marine pollutants.

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Cyclotrimethylene Trinitramine (RDX)	121-82-4	Yes	Yes	Yes	Yes	Yes	No
Cyclotetramethylenetetranitramine (HMX)	2691-41-0	No	No	No	Yes	No	No
Lead	7439-92-1	Yes	Yes	Yes	Yes	Yes	No
Tungsten	7440-33-7	Yes	Yes	Yes	Yes	Yes	No
Copper	7440-50-8	Yes	Yes	Yes	Yes	Yes	No
Graphite	7782-42-5	Yes	Yes	Yes	Yes	Yes	No

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.
WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects.

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Lead	7439-92-1	0.1 %
Tungsten	7440-33-7	1 %
Copper	7440-50-8	1 %

Additional Regulatory Information

Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Cyclotrimethylene Trinitramine (RDX)	121-82-4	Yes	DSL	EINECS
Hexanitrostilbene (HNS)	20062-22-0	Yes	NDSL	EINECS
Cyclotetramethylenetetranitramine (HMX)	2691-41-0	Yes	DSL	EINECS
2, 6-Bis (Picrylamino)-3, 5-Dinitropyridine (PYX)	38082-89-2	Yes	NDSL	No
Lead	7439-92-1	Yes	DSL	EINECS
Tungsten	7440-33-7	Yes	DSL	EINECS
Copper	7440-50-8	Yes	DSL	EINECS
Graphite	7782-42-5	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

Key/Legend

EPA = Environmental Protection Agency; TSCA = Toxic Substance Control Act; ACGIH = American Conference of Governmental Industrial Hygienists; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration., NJTSR = New Jersey Trade Secret Registry.

Literature References

None

End of Sheet

MATERIAL SAFETY DATA SHEET

I. PRODUCT & COMPANY IDENTIFICATION

Product Name: **Banana Boat® Sport Performance® Lotion SPF 30**

Product Code(s): **92123330**

Product Type: **Sunscreen**

Supplier Address: **Playtex Manufacturing Inc.**
6 Research Dr.
Shelton, CT 06484
USA
Phone: 888-999-6736
Emergency Phone: 888-879-3798

Company Emergency Phone Number: 1-888-879-3798 (Medical Emergency)
1-800-424-9300 (24 hrs. Transportation Information or Spills)
1-703-527-3887 (International Transportation Information or Spills)

II. HAZARDS IDENTIFICATION

Appearance White **Physical State** Lotion **Odor** Characteristic

Emergency Overview

May cause eye irritation

Potential Health Effects: None
Principle Routes of Exposure: Skin contact.

Acute Toxicity

Eyes: May cause irritation.
Skin: Does not pose a potential of skin irritation and sensitization.
Inhalation: No known effect.
Ingestion: No known effect. Ingestion may cause irritation to mucous membranes.

Chronic Effects No known effect.

Aggravated Medical Conditions None known.
Environmental Hazard See Section 12 for additional Ecological Information

III. COMPOSTION INFORMATION

This material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

IV. FIRST AID MEASURES

Eye Contact: Rinse thoroughly with plenty of water, also under the eyelids. If irritation persists, call a physician.

Skin Contact: None under normal use

Inhalation: None under normal use

Ingestion: Rinse mouth with water and afterwards drink plenty of water or milk

Notes to Physician: Treat symptomatically.

V. FIRE-FIGHTING MEASURES

Flash Point: Not Applicable

Suitable Extinguishing Media: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Sensitivity to Static Discharge: Not sensitive to static discharge.

Protective Equipment and Precautions for Firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA: Health Hazard 1 **Flammability 1** **Stability** 0 **Physical and Chemical Hazards** –

VI. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Avoid contact with eyes.

Environmental Precautions: Prevent entry into waterways, sewers basements, or confined areas. Do not flush into surface water or sanitary system.

Methods for Containment: Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up: Keep in suitable and closed containers for disposal

VII. HANDLING & STORAGE

Handling: Handle in accordance with good industrial hygiene and safety practice. Avoid contact with eyes.

Storage: Keep containers tightly.

VIII. EXPOSURE CONTROLS & PERSONAL PROTECTION

Exposure Guidelines:

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
BHT 128-37-0	TWA: 2 mg/m^3	(vacated) TWA: 10 mg/m^3	TWA: 10 mg/m^3

Engineering Measures: Showers, eyewash stations, and ventilation systems.

Personal Protective Equipment

Eye/Face Protection: No special protective equipment required.

Skin and Body Protection: No special protective equipment required.

Respiratory Protection: No protective equipment is needed under normal use conditions

Hygiene Measures: Handle in accordance with good industrial hygiene and safety practice.

IX. PHYSICAL & CHEMICAL PROPERTIES

Physical State:	Lotion		
Appearance:	White	**Odor:**	Characteristic
pH:	5.8 - 6.8		
Flash Point:	None	**Boiling Point/Range:**	No data available
Melting Point/Range:	No data available	**Specific Gravity:**	0.90 - 1.10
Solubility:	No data available	**VOC Content (%):**	Not applicable

Partition Coefficient: n-octanol/water No data available

X. STABILITY & REACTIVITY

Stability: Stable

Incompatible Products: None known.

Conditions to Avoid: Heat, flames and sparks.

Hazardous Decomposition Products: None known

Hazardous Polymerization: Hazardous polymerization does not occur.

XI. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information: Product is safe for its intended use based on the formulation, testing results, and the long history of safe consumer use.

Chronic Toxicity

Chronic Toxicity: No known effect.

Target Organ Effects: None known.

XII. ECOLOGICAL INFORMATION

Ecotoxicity: The environmental impact of this product has not been fully investigated.

XIII. DISPOSAL CONSIDERATIONS

Waste Disposal Methods: This material, as supplied, is a not hazardous waste according to federal regulations (40 CFR 261). The material could become hazardous of it is mixed with or otherwise comes into contact with a hazardous waste, If chemical additions are made to this material or if the material is processed or otherwise altered. Consult 40 CFR 251 to determine whether the altered material is a hazardous waste. Consult the appropriate state, regional or local regulations for additional requirements.

Contaminated Packaging: Dispose of in accordance with local regulations.

XIV. TRANSPORTATION INFORMATION

DOT	Not Regulated
TDG	Not Regulated
MEX	Not Regulated
ICAO	Not Regulated
IATA	Not Regulated
IMDG/IMO	Not Regulated
RID	Not Regulated
ADR	Not Regulated
ADN	Not Regulated

XV. REGULATORY INFORMATION

U.S. Regulations

SARA 311/312 Hazard Categories

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No
California Proposition 65	This product does not contain any Proposition 65 chemicals.

International Regulations

Mexico - Grade Serious risk, Grade 0

WHMIS Hazard Class

Not regulated under CEPA

International Inventories

TSCA	Exempt
DSL	Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

XVI. OTHER INFORMATION

Prepared By	**Global Regulatory Affairs/Product Safety** 75 Commerce Dr. Allendale, NJ 07401 USA
Issuing Date	**13-May-10**
Revision Date	**N/A**
Revision Note	**N/A**

Disclaimer

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The Information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

SAFETY DATA SHEET

SDS ID NO.: 0127MAR019
Revision Date: 05/14/2015

1. IDENTIFICATION

Product Name: Marathon Petroleum Regular Unleaded Gasoline

Synonym: Conventional Regular Unleaded Gasoline
Chemical Family: Complex Hydrocarbon Substance

Recommended Use: Fuel.
Use Restrictions: All others.

Supplier Name and Address:

MARATHON PETROLEUM COMPANY LP
539 South Main Street
Findlay, OH 45840

SDS information: 1-419-421-3070

Emergency Telephone: 1-877-627-5463

2. HAZARD IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is considered hazardous according to the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 1
Skin corrosion/irritation	Category 2
Germ cell mutagenicity	Category 1B
Carcinogenicity	Category 1B
Reproductive toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Aspiration toxicity	Category 1
Acute aquatic toxicity	Category 2
Chronic aquatic toxicity	Category 2

Hazards Not Otherwise Classified (HNOC)
Static accumulating flammable liquid

Label elements

EMERGENCY OVERVIEW

Danger

EXTREMELY FLAMMABLE LIQUID AND VAPOR
May accumulate electrostatic charge and ignite or explode

May be fatal if swallowed and enters airways
Causes skin irritation
May cause genetic defects
May cause cancer
Suspected of damaging fertility or the unborn child
May cause respiratory irritation
May cause drowsiness or dizziness
Toxic to aquatic life with long lasting effects

Appearance Clear or Colored Liquid **Physical State** Liquid **Odor** Strong Hydrocarbon

Precautionary Statements - Prevention
Keep away from heat/sparks/open flames/hot surfaces. — No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Wear protective gloves/protective clothing/eye protection/face protection
Do not eat, drink or smoke when using this product
Do not breathe mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wash hands thoroughly after handling
Avoid release to the environment

Precautionary Statements - Response
IF exposed or concerned: Get medical attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
If skin irritation occurs: Get medical attention
Wash contaminated clothing before reuse
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor if you feel unwell
IF SWALLOWED: Immediately call a POISON CENTER or doctor
Do NOT induce vomiting
In case of fire: Use water spray, fog or regular foam for extinction

Precautionary Statements - Storage
Store in a well-ventilated place. Keep container tightly closed
Keep cool
Store locked up

Precautionary Statements - Disposal
Dispose of contents/container at an approved waste disposal plant

3. COMPOSITION/INFORMATION ON INGREDIENTS

Gasoline is a complex combination of hydrocarbons consisting of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons having molecular chains ranging in length from four to ten carbons. May contain small amounts of dye and other additives (>0.02%) which are not considered hazardous at the concentrations used.

Composition Information:

Name	CAS Number	Weight %
Gasoline	86290-81-5	100
Toluene	108-88-3	1-15
Xylene (mixed isomers)	1330-20-7	2-10
1,2,4-Trimethylbenzene	95-63-6	1-5
Benzene	71-43-2	0.5-3.5
n-Hexane	110-54-3	0-3
Ethylbenzene	100-41-4	0.5-2.0
Naphthalene	91-20-3	0.1-0.5

4. FIRST AID MEASURES

First Aid Measures

General advice In case of accident or if you feel unwell, seek medical advice immediately (show directions for use or safety data sheet if possible).

Inhalation: Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear, give oxygen and continue to monitor. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Skin Contact: Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. May be absorbed through the skin in harmful amounts. Get medical attention if irritation persists. Any injection injury from high pressure equipment should be evaluated immediately by a physician as potentially serious (See NOTES TO PHYSICIAN).

Place contaminated clothing in closed container until cleaned or discarded. If clothing is to be laundered, inform the person performing the operation of contaminant's hazardous properties. Destroy contaminated, non-chemical resistant footwear.

Eye Contact: Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Gently remove contacts while flushing. Get medical attention if irritation persists.

Ingestion: Do not induce vomiting because of danger of aspirating liquid into lungs, causing serious damage and chemical pneumonitis. If spontaneous vomiting occurs, keep head below hips, or if patient is lying down, turn body and head to side to prevent aspiration and monitor for breathing difficulty. Never give anything by mouth to an unconscious person. Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Most important signs and symptoms, both short-term and delayed with overexposure

Adverse Effects: Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.
Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Indication of any immediate medical attention and special treatment needed

NOTES TO PHYSICIAN:

INHALATION: This material (or a component) sensitizes the myocardium to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided.

SKIN: Leaks or accidents involving high-pressure equipment may inject a stream of material through the skin and initially produce an injury that may not appear serious. Only a small puncture wound may appear on the skin surface but, without proper treatment and depending on the nature, original pressure, volume, and location of the injected material, can compromise blood supply to an affected body part. Prompt surgical debridement of the wound may be necessary to prevent irreversible loss of function and/or the affected body part. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES.

INGESTION: This material represents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small fires, Class B fire extinguishing media such as CO2, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFF/ATC) can be used. Firefighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Unsuitable extinguishing media
Do not use straight water streams to avoid spreading fire.

Specific hazards arising from the chemical
This product has been determined to be an extremely flammable liquid per the OSHA Hazard Communication Standard and should be handled accordingly. May accumulate electrostatic charge and ignite or explode. Vapors may travel along the ground or be moved by ventilation and ignited by many sources such as pilot lights, sparks, electric motors, static discharge, or other ignition sources at locations distant from material handling. Flashback can occur along vapor trail. For additional fire related information, see NFPA 30 or the North American Emergency Response Guide 128.

Hazardous combustion products
Smoke, carbon monoxide, and other products of incomplete combustion.

Explosion data
Sensitivity to Mechanical Impact No.
Sensitivity to Static Discharge Yes.

Special protective equipment and precautions for firefighters
Firefighters should wear full protective clothing and positive-pressure self-contained breathing apparatus (SCBA) with a full face-piece, as appropriate. Avoid using straight water streams. Water may be ineffective in extinguishing low flash point fires, but can be used to cool exposed surfaces. Avoid excessive water spray application. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Keep run-off water out of sewers and water sources.

NFPA:	Health 1	Flammability 3	Instability 0	Special Hazards -

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources.

Protective Equipment: Use personal protection measures as recommended in Section 8.

Emergency Procedures: Advise authorities and National Response Center (800-424-8802) if the product has entered a water course or sewer. Notify local health and pollution control agencies, if appropriate.

Environmental precautions: Avoid release to the environment. Avoid subsoil penetration.

Methods and materials for containment:	Contain liquid with sand or soil.
Methods and materials for cleaning up:	Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids. Recover and return free product to proper containers. When recovering free liquids ensure all equipment is grounded and bonded. Use only non-sparking tools.

7. HANDLING AND STORAGE

Safe Handling Precautions:

NEVER SIPHON THIS PRODUCT BY MOUTH. Use appropriate grounding and bonding practices. Static accumulating flammable liquid. Bonding and grounding may be insufficient to eliminate the hazard from static electricity. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. No smoking. Avoid repeated and prolonged skin contact. Use personal protection measures as recommended in Section 8. Use only non-sparking tools. Do not cut, drill, grind or weld on empty containers since explosive residues may remain. Refer to applicable EPA, OSHA, NFPA and consistent state and local requirements.

Hydrocarbons are basically non-conductors of electricity and can become electrostatically charged during mixing, filtering, pumping at high flow rates or loading and transfer operations. If this charge reaches a sufficiently high level, sparks can form that may ignite the vapors of flammable liquids. Sudden release of hot organic chemical vapors or mists from process equipment operating under elevated temperature and pressure, or sudden ingress of air into vacuum equipment may result in ignition of vapors or mists without the presence of obvious ignition sources. Nozzle spouts must be kept in contact with the containers or tank during the entire filling operation.

Portable containers should never be filled while in or on a motor vehicle or marine craft. Containers should be placed on the ground. Static electric discharge can ignite fuel vapors when filling non-grounded containers or vehicles on trailers. The nozzle spout must be kept in contact with the container before and during the entire filling operation. Use only approved containers.

A buildup of static electricity can occur upon re-entry into a vehicle during fueling especially in cold or dry climate conditions. The charge is generated by the action of dissimilar fabrics (i.e., clothing and upholstery) rubbing across each other as a person enters/exits the vehicle. A flash fire can result from this discharge if sufficient flammable vapors are present. Therefore, do not get back in your vehicle while refueling.

Cellular phones and other electronic devices may have the potential to emit electrical charges (sparks). Sparks in potentially explosive atmospheres (including fueling areas such as gas stations) could cause an explosion if sufficient flammable vapors are present. Therefore, turn off cellular phones and other electronic devices when working in potentially explosive atmospheres or keep devices inside your vehicle during refueling.

High-pressure injection of any material through the skin is a serious medical emergency even though the small entrance wound at the injection site may not initially appear serious. These injection injuries can occur from high-pressure equipment such as paint spray or grease or guns, fuel injectors, or pinhole leaks in hoses or hydraulic lines and should all be considered serious. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES (See First Aid Section 4).

Storage Conditions:	Store in properly closed containers that are appropriately labeled and in a cool, well-ventilated area.
Incompatible materials	Strong oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Name	ACGIH TLV	OSHA PELS:	OSHA - Vacated PELs	NIOSH IDLH
Gasoline 86290-81-5	300 ppm TWA 500 ppm STEL	-	300 ppm TWA 900 mg/m³ TWA 500 ppm STEL 1500 mg/m³ STEL	-
Toluene 108-88-3	20 ppm TWA	TWA: 200 ppm Ceiling: 300 ppm	100 ppm TWA 375 mg/m³ TWA 150 ppm STEL 560 mg/m³ STEL	500 ppm
Xylene (mixed isomers) 1330-20-7	100 ppm TWA 150 ppm STEL	TWA: 100 ppm TWA: 435 mg/m³	100 ppm TWA 435 mg/m³ TWA 150 ppm STEL 655 mg/m³ STEL	900 ppm
1,2,4-Trimethylbenzene 95-63-6	25 ppm TWA	-	25 ppm TWA 125 mg/m³ TWA	-
Benzene 71-43-2	0.5 ppm TWA 2.5 ppm STEL Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 10 ppm (applies to industry segments exempt from the benzene standard at 29 CFR 1910.1028) TWA: 1 ppm STEL: 5 ppm (see 29 CFR 1910.1028)	25 ppm Ceiling 1 ppm TWA 5 ppm STEL	500 ppm
n-Hexane 110-54-3	50 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 500 ppm TWA: 1800 mg/m³	50 ppm TWA 180 mg/m³ TWA	1100 ppm
Ethylbenzene 100-41-4	20 ppm TWA	TWA: 100 ppm TWA: 435 mg/m³	100 ppm TWA 435 mg/m³ TWA 125 ppm STEL 545 mg/m³ STEL	800 ppm
Naphthalene 91-20-3	10 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 10 ppm TWA: 50 mg/m³	10 ppm TWA 50 mg/m³ TWA 15 ppm STEL 75 mg/m³ STEL	250 ppm

Notes: The manufacturer has voluntarily elected to provide exposure limits contained in OSHA's 1989 air contaminants standard in its SDSs, even though certain of those exposure limits were vacated in 1992.

Engineering measures: Local or general exhaust required in an enclosed area or when there is inadequate ventilation. Use mechanical ventilation equipment that is explosion-proof.

Personal protective equipment

Eye protection: Use goggles or face-shield if the potential for splashing exists.

Skin and body protection: Use nitrile rubber, viton or PVA gloves for repeated or prolonged skin exposure. Glove suitability is based on workplace conditions and usage. Contact the glove manufacturer for specific advice on glove selection and breakthrough times.

Respiratory protection: Approved organic vapor chemical cartridge or supplied air respirators should be worn for exposures to any components exceeding the established exposure limits. Observe respirator assigned protection factors (APFs) criteria cited in federal OSHA 29 CFR 1910.134. Self-contained breathing apparatus should be used for fire fighting.

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State	Liquid
Appearance	Clear or Colored Liquid
Color	Clear or Colored
Odor	Strong Hydrocarbon
Odor Threshold	No available data.

Property	**Values (Method)**
Melting Point / Freezing Point	No available data.
Initial Boiling Point / Boiling Range	32-225 °C / 90-437 °F
Flash Point	-45.5 °C / -50 °F
Evaporation Rate	No available data.
Flammability (solid, gas)	Not applicable.
Flammability Limit in Air (%)	
Upper Flammability Limit:	7.6
Lower Flammability Limit:	1.4
Vapor Pressure	403-776 mm Hg@ 100°F
Vapor Density	3-4
Specific Gravity / Relative Density	0.70-0.77
Water Solubility	Negligible
Solubility in other solvents	No available data.
Partition Coefficient	2.13-4.5
Decomposition temperature:	No available data.
pH:	Not applicable
Autoignition Temperature	C.A. 257 °C / 495 °F
Kinematic Viscosity	No available data.
Dynamic Viscosity	No available data.
Explosive Properties	No available data.
Softening Point	No available data.
VOC Content (%)	100%
Density	5.9-6.3 lbs/gal
Bulk Density	Not applicable.

10. STABILITY AND REACTIVITY

Reactivity	The product is non-reactive under normal conditions.
Chemical stability	The material is stable at 70°F, 760 mmHg pressure.
Possibility of hazardous reactions	None under normal processing.
Hazardous polymerization	Will not occur.
Conditions to avoid	Excessive heat, sources of ignition, open flame.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	None known under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

Potential short-term adverse effects from overexposures

Inhalation	Irritating to the respiratory system. May cause drowsiness or dizziness. Breathing high concentrations of this material in a confined space or by intentional abuse can cause irregular heartbeats which can cause death.
Eye contact	Causes mild eye irritation.

Skin contact Causes skin irritation. Effects may become more serious with repeated or prolonged contact. May be absorbed through the skin in harmful amounts.

Ingestion May be fatal if swallowed or vomited and enters airways. May cause irritation of the mouth, throat and gastrointestinal tract.

Acute Toxicological data

Name	Oral LD50	Dermal LD50	Inhalation LC50
Gasoline 86290-81-5	14000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 5.2 mg/L (Rat) 4 h
Toluene 108-88-3	> 2000 mg/kg (Rat)	8390 mg/kg (Rabbit)	12.5 mg/L (Rat) 4 h
Xylene (mixed isomers) 1330-20-7	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 5.04 mg/L (Rat) 4 h
1,2,4-Trimethylbenzene 95-63-6	3280 mg/kg (Rat)	> 3160 mg/kg (Rabbit)	18,000 mg/m^3 (Rat) 4 h
Benzene 71-43-2	> 2000 mg/kg (Rat)	> 5000 mg/kg (Rabbit)	> 20 mg/l (Rat) 4 h
n-Hexane 110-54-3	15000 mg/kg (Rat)	3000 mg/kg (Rabbit)	48000 ppm (Rat) 4 h
Ethylbenzene 100-41-4	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	17.2 mg/L (Rat) 4 h
Naphthalene 91-20-3	490 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 340 mg/m^3 (Rat) 1 h

Delayed and immediate effects as well as chronic effects from short and long-term exposure

BENZENE: Studies of workers exposed to benzene show clear evidence that overexposure can cause cancer and other diseases of the blood forming organs including Acute Myelogenous Leukemia (AML), and Aplastic Anemia (AA), an often fatal disease. Some studies suggest overexposure to benzene may also be associated with Myelodysplastic Syndrome (MDS). Findings from a case control study of workers exposed to benzene was reported during the 2009 Benzene Symposium in Munich included an increase in Acute Myeloid Leukemias and Non-Hodgkins Lymphoid Neoplasms (NHLN) of the subtype follicular lymphoma (FL) in some occupational categories. Some studies of workers exposed to benzene have shown an association with increased rates of chromosome aberrations in circulating lymphocytes. One study of women workers exposed to benzene suggested a weak association with irregular menstruation. However, other studies of workers exposed to benzene have not demonstrated clear evidence of an effect on fertility or reproductive outcome in humans. Benzene can cross the placenta and affect the developing fetus. Cases of AA have been reported in the offspring of persons severely overexposed to benzene. Studies in laboratory animals indicate that prolonged, repeated exposure to high levels of benzene vapor can cause bone marrow suppression and cancer in multiple organ systems. Studies in laboratory animals show evidence of adverse effects on male reproductive organs following high levels of exposure but no significant effects on reproduction have been observed. Embryotoxicity has been reported in studies of laboratory animals but effects were limited to reduced fetal weight and minor skeletal variations. Benzene has been classified as a proven human carcinogen by OSHA and a Group 1 (Carcinogenic to Humans) material by IARC. The current proposed IARC classification for benzene is summarized as follows: Sufficient evidence for Acute Myeloid Leukemia; limited evidence for Acute Lymphatic Leukemia, Chronic Lymphatic Leukemia, Non-Hodgkin Lymphoma, and Multiple Myeloma.

NAPHTHAS: In a large epidemiological study on over 15,000 employees at several petroleum refineries and amongst residents located near these refineries, no increased risk of kidney cancer was observed in association with gasoline exposures (a similar material). In a similar study, no increased risk of kidney cancer was observed among petroleum refinery workers, but there was a slight trend in the incidence of kidney cancers among service station employees, especially after a 30-year latency period. Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage (so-called Petrol Sniffer's Encephalopathy), delirium, seizures, and sudden death have been reported from repeated overexposure to some hydrocarbon solvents, naphthas, and gasoline.

ISOPARAFFINS: Studies in laboratory animals have shown that long-term exposure to similar materials (isoparaffins) can cause kidney damage and kidney cancer in male laboratory rats. However, in-depth research indicates that these findings are unique to the male rat, and that these effects are not relevant to humans.

TOLUENE: Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Abuse of toluene at high concentrations (e.g., glue sniffing and solvent abuse) has been associated with adverse effects on the liver, kidney and nervous system, and can cause CNS depression, cardiac arrhythmias, and death. Studies of workers indicate longterm exposure may be related to impaired color vision and hearing. Some studies of workers suggest longterm exposure may be related to neurobehavioral and cognitive changes. Some of these effects have been observed in laboratory animals following repeated exposure to high levels of toluene. Several studies of workers suggest longterm exposure may be related to small increases in spontaneous abortions and changes in some gonadotropic hormones. However, the weight of evidence does not indicate toluene is a reproductive hazard to humans. Studies in laboratory animals indicate some changes in reproductive organs following high levels of exposure, but no significant effects on mating performance or reproduction were observed. Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Findings in laboratory animals have been largely negative. Positive findings include small increases in minor skeletal and visceral malformations and developmental delays following very high levels of maternal exposure. Studies of workers indicate long-term exposure may be related to effects on the liver, kidney and blood, but these appear to be limited to changes in serum enzymes and decreased leukocyte counts. Adverse effects on the liver, kidney, thymus and nervous system were observed in animal

studies following very high levels of exposure. The relevance of these findings to humans is not clear at this time.

ETHYLBENZENE: Findings from a 2-year inhalation study in rodents conducted by NTP were as follows: Effects were observed only at the highest exposure level (750 ppm). At this level the incidence of renal tumors was elevated in male rats (tubular carcinomas) and female rats (tubular adenomas). The incidence of tumors was also elevated in male mice (alveolar and bronchiolar carcinomas) and female mice (hepatocellular carcinomas). IARC has classified ethyl benzene as "possibly carcinogenic to humans" (Group 2B). Studies in laboratory animals indicate some evidence of post-implantation deaths following high levels of maternal exposure. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals indicate limited evidence of renal malformations, resorptions, and developmental delays following high levels of maternal exposure with evidence of maternal toxicity. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals have demonstrated evidence of ototoxicity (hearing loss) following exposure levels as low as 300 ppm for 5 days. Studies in laboratory animals indicate some evidence of adverse effects on the liver, kidney, thyroid, and pituitary gland.

XYLENES, ALL ISOMERS: Overexposure to xylene may cause upper respiratory tract irritation, headache, cyanosis, blood serum changes, nervous system damage and narcosis. Effects may be increased by the use of alcoholic beverages. Evidence of liver and kidney impairment were reported in workers recovering from a gross overexposure. Effects from Prolonged or Repeated Exposure: Impaired neurological function was reported in workers exposed to solvents including xylene. Studies in laboratory animals have shown evidence of impaired hearing following high levels of exposure. Studies in laboratory animals suggest some changes in reproductive organs following high levels of exposure but no significant effects on reproduction were observed. Studies in laboratory animals indicate skeletal and visceral malformations, developmental delays, and increased fetal resorptions following extremely high levels of maternal exposure with evidence of maternal toxicity. The relevance of these observations to humans is not clear at this time. Adverse effects on the liver, kidney, bone marrow (changes in blood cell parameters) were observed in laboratory animals following high levels of exposure. The relevance of these observations to humans is not clear at this time.

C9 AROMATIC HYDROCARBONS: A developmental inhalation study was conducted in laboratory mice. Increased implantation losses, reduced fetal weights, delayed ossification and an increased incidence of cleft palate were observed at the highest exposure level (1,500 ppm). This exposure level was extremely toxic to pregnant female mice (44% mortality). Reduced fetal body weights were also observed at 500 ppm. A multi-generation reproduction inhalation study was conducted in laboratory rats. Reductions in pup weights, pup weight gain, litter size, and pup survival were observed at 1,500 ppm, an exposure level at which significant maternal toxicity was observed. Reduced pup weight gain was also observed at 500 ppm.

NAPHTHALENE: Severe jaundice, neurotoxicity (kernicterus) and fatalities have been reported in young children and infants as a result of hemolytic anemia from overexposure to naphthalene. Persons with glucose 6-phosphate dehydrogenase (G6PD) deficiency are more prone to the hemolytic effects of naphthalene. Adverse effects on the kidney have been reported in persons overexposed to naphthalene but these effects are believed to be a consequence of hemolytic anemia, and not a direct effect. Hemolytic anemia has been observed in laboratory animals exposed to naphthalene. Laboratory rodents exposed to naphthalene vapor for 2 years (lifetime studies) developed non-neoplastic and neoplastic tumors and inflammatory lesions of the nasal and respiratory tract. Cataracts and other adverse effects on the eye have been observed in laboratory animals exposed to high levels of naphthalene. Findings from a large number of bacterial and mammalian cell mutation assays have been negative. A few studies have shown chromosomal effects (elevated levels of Sister Chromatid Exchange or chromosomal aberrations) in vitro. Naphthalene has been classified as Possibly Carcinogenic to Humans (2B) by IARC, based on findings from studies in laboratory animals.

N-HEXANE: Long-term or repeated exposure to n-hexane can cause peripheral nerve

damage. Initial symptoms are numbness of the fingers and toes. Also, motor weakness can occur in the digits, but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. Testicular atrophy and partial to full loss of the germ cell line were observed in sub-chronic high-dose inhalation studies of laboratory rodents. These effects appeared irreversible. Rodent reproduction studies have shown evidence of reduced fetal weight but no frank malformations.

PENTANES: Studies of pentane isomers in laboratory animals indicate exposure to extremely high levels (roughly 10 vol.%) may induce cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

CARBON MONOXIDE: is a chemical asphyxiant with no warning properties (such as odor). At 400-500 ppm for 1 hour headache and dyspnea may occur. If activity is increased, symptoms of overexposure may include nausea, irritability, increased respiration, tinnitus, sweating, chest pain, confusion, impaired judgement, dizziness, weakness, drowsiness, ataxia, irregular heart beat, cyanosis and pallor. Levels in excess of 1000 ppm can result in collapse, loss of conciousness, respiratory failure and death. Extremely high concentrations (12,800 ppm) can cause immediate unconsciousness and death in 1-3 minutes. Repeated anoxia can lead to central nervous system damage and peripheral neuropathy, with loss of sensation in the fingers, amnesia, and mental deterioration and possible congestive heart failure. Damage may also occur to the fetus, lung, liver, kidney, spleen, cardiovascular system and other organs.

COMBUSTION ENGINE EXHAUST: Chronic inhalation studies of gasoline engine exhaust in mice, rats and hamsters did not produce any carcinogenic effects. Condensates/extracts of gasoline engine exhaust produced an increase in tumors compared to controls when testing by skin painting, subcutaneous injection, intratracheal instillation or implantation into the lungs.

Adverse effects related to the physical, chemical and toxicological characteristics

Signs & Symptoms Nausea, vomiting, signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Sensitization Not expected to be a skin or respiratory sensitizer.

Mutagenic effects May cause genetic defects.

Carcinogenicity Cancer designations are listed in the table below.

Name	ACGIH (Class)	IARC (Class)	NTP	OSHA
Gasoline 86290-81-5	Confirmed animal carcinogen (A3)	Possibly Carcinogenic (2B)	Not Listed	Not Listed
Toluene 108-88-3	Not Classifiable (A4)	Not Classifiable (3)	Not Listed	Not Listed
Xylene (mixed isomers) 1330-20-7	Not Classifiable (A4)	Not Classifiable (3)	Not Listed	Not Listed
1,2,4-Trimethylbenzene 95-63-6	Not Listed	Not Listed	Not Listed	Not Listed
Benzene 71-43-2	Confirmed human carcinogen (A1)	Carcinogenic to humans (1)	Known to be human carcinogen	Known carcinogen
n-Hexane 110-54-3	Not Listed	Not Listed	Not Listed	Not Listed
Ethylbenzene 100-41-4	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Not Listed	Not Listed
Naphthalene 91-20-3	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Reasonably anticipated to be a human carcinogen	Not Listed

Reproductive toxicity Suspected of damaging fertility or the unborn child.

Specific Target Organ Toxicity (STOT) - single exposure Respiratory system. Central nervous system.

Specific Target Organ Toxicity (STOT) - repeated exposure Not classified.

Aspiration hazard May be fatal if swallowed or vomited and enters airways.

12. ECOLOGICAL INFORMATION

Ecotoxicity This product should be considered toxic to aquatic organisms, with the potential to cause long lasting adverse effects in the aquatic environment.

Name	Algae/aquatic plants	Fish	Toxicity to Microorganisms	Crustacea
Gasoline 86290-81-5	72-hr EC50 = 56 mg/l Algae	96-hr LC50 = 11 mg/l Rainbow trout (static)	-	48-hr LC50 = 7.6 mg/l Daphnia magna
Toluene 108-88-3	72-hr EC50 = 12.5 mg/l Algae	96-hr LC50 <= 10 mg/l Rainbow trout	-	48-hr EC50 = 5.46-9.83 mg/l Daphnia magna 48-hr EC50 = 11.5 mg/l Daphnia magna (Static)
Xylene (mixed isomers) 1330-20-7	72-hr EC50 = 11 mg/l Algae	96-hr LC50 = 8 mg/l Rainbow trout	-	48-hr LC50 = 3.82 mg/l Daphnia magna
1,2,4-Trimethylbenzene 95-63-6	-	96-hr LC50 = 7.19-8.28 mg/l Fathead minnow (flow-through)	-	48-hr EC50 = 6.14 mg/L Daphnia magna
Benzene 71-43-2	72-hr EC50 = 29 mg/l Algae	96-hr LC50 = 5.3 mg/l Rainbow trout (flow-through)	-	48-hr EC50 = 8.76-15.6 mg/l Daphnia magna (Static)
n-Hexane 110-54-3	-	96-hr LC50 = 2.5 mg/l Fathead minnow	-	-
Ethylbenzene 100-41-4	72-hr EC50 = 1.7-7.6 mg/l Algae	96-hr LC50 = 4 mg/L Rainbow trout	-	48-hr EC50 = 1-4 mg/L Daphnia magna
Naphthalene 91-20-3	-	96-hr LC50 = 0.91-2.82 mg/l Rainbow trout (static) 96-hr LC50 = 1.99 mg/l Fathead minnow (static)	-	48-hr LC50 = 1.6 mg/l Daphnia magna

Persistence and degradability Expected to be inherently biodegradable.

Bioaccummulation Has the potential to bioaccumulate.

Mobility in soil May partition into air, soil and water.

Other adverse effects No information available.

13. DISPOSAL CONSIDERATIONS

Description of Waste Residues
This material may be a flammable liquid waste.

Safe Handling of Wastes
Handle in accordance with applicable local, state, and federal regulations. Use personal protection measures as required. Use appropriate grounding and bonding practices. Use only non-sparking tools. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. No smoking.

Disposal of Wastes / Methods of Disposal
The user is responsible for determining if any discarded material is a hazardous waste (40 CFR 262.11). Dispose of in accordance with federal, state and local regulations.

Methods of Contaminated Packaging Disposal
Empty containers should be completely drained and then discarded or recycled, if possible. Do not cut, drill, grind or weld on empty containers since explosive residues may be present. Dispose of in accordance with federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT (49 CFR 172.101):

UN Proper shipping name:	Gasoline
UN/Identification No:	UN 1203
Transport Hazard Class(es):	3
Packing group:	II

TDG (Canada):

UN Proper shipping name:	Gasoline
UN/Identification No:	UN 1203
Transport Hazard Class(es):	3
Packing group:	II

15. REGULATORY INFORMATION

US Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product does not contain any component(s) included on EPA's Extremely Hazardous Substance (EHS) List.

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Gasoline	NA
Toluene	NA
Xylene (mixed isomers)	NA
1,2,4-Trimethylbenzene	NA
Benzene	NA
n-Hexane	NA
Ethylbenzene	NA
Naphthalene	NA

SARA Section 304: This product may contain component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	CERCLA/SARA - Hazardous Substances and their Reportable Quantities
Gasoline	NA
Toluene	1000 lb final RQ 454 kg final RQ
Xylene (mixed isomers)	100 lb final RQ 45.4 kg final RQ
1,2,4-Trimethylbenzene	NA
Benzene	10 lb final RQ 4.54 kg final RQ
n-Hexane	5000 lb final RQ 2270 kg final RQ
Ethylbenzene	1000 lb final RQ 454 kg final RQ

Naphthalene	100 lb final RQ 45.4 kg final RQ

SARA: The following EPA hazard categories apply to this product:

Acute Health Hazard
Chronic Health Hazard
Fire Hazard

SARA Section 313: This product may contain component(s), which if in exceedance of the de minimus threshold, may be subject to the reporting requirements of SARA Title III Section 313 Toxic Release Reporting (Form R).

Name	CERCLA/SARA 313 Emission reporting:
Gasoline	None
Toluene	1.0 % de minimis concentration
Xylene (mixed isomers)	1.0 % de minimis concentration
1,2,4-Trimethylbenzene	None
Benzene	0.1 % de minimis concentration
n-Hexane	1.0 % de minimis concentration
Ethylbenzene	0.1 % de minimis concentration
Naphthalene	0.1 % de minimis concentration

State and Community Right-To-Know Regulations:
The following component(s) of this material are identified on the regulatory lists below:

Gasoline

Louisiana Right-To-Know:	Not Listed.
California Proposition 65:	Not Listed.
New Jersey Right-To-Know:	SN 0957
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed.
Michigan Critical Materials Register List:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed.
California - Regulated Carcinogens:	Not Listed.
Pennsylvania RTK - Special Hazardous Substances:	Not Listed.
New Jersey - Special Hazardous Substances:	Carcinogen; Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 0957 TPQ: 10000 lb (Under N.J.A.C. 7:1G, environmental hazardous substances in mixtures such as gasoline or new and used petroleum oil may be reported under these categories)
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed.

Toluene

Louisiana Right-To-Know:	Not Listed.
California Proposition 65:	Developmental toxicity, initial date 1/1/91 Female reproductive toxicity, initial date 8/7/09
New Jersey Right-To-Know:	SN 1866
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan Critical Materials Register List:	100 lb Annual usage threshold
Massachusetts Extraordinarily Hazardous Substances:	Not Listed.
California - Regulated Carcinogens:	Not Listed.
Pennsylvania RTK - Special Hazardous Substances:	Not Listed.
New Jersey - Special Hazardous Substances:	Flammable - third degree; Teratogen

New Jersey - Environmental Hazardous Substances List:	SN 1866 TPQ: 500 lb
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

Xylene (mixed isomers)

Louisiana Right-To-Know:	Not Listed.
California Proposition 65:	Not Listed.
New Jersey Right-To-Know:	SN 2014
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan Critical Materials Register List:	100 lb Annual usage threshold all isomers
Massachusetts Extraordinarily Hazardous Substances:	Not Listed.
California - Regulated Carcinogens:	Not Listed.
Pennsylvania RTK - Special Hazardous Substances:	Not Listed.
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 2014 TPQ: 500 lb
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

1,2,4-Trimethylbenzene

Louisiana Right-To-Know:	Not Listed.
California Proposition 65:	Not Listed.
New Jersey Right-To-Know:	SN 1929
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic
Michigan Critical Materials Register List:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed.
California - Regulated Carcinogens:	Not Listed.
Pennsylvania RTK - Special Hazardous Substances:	Not Listed.
New Jersey - Special Hazardous Substances:	Not Listed.
New Jersey - Environmental Hazardous Substances List:	Not Listed.
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed.

Benzene

Louisiana Right-To-Know:	Not Listed.
California Proposition 65:	Carcinogen, initial date 2/27/87 Developmental toxicity, initial date 12/26/97 Male reproductive toxicity, initial date 12/26/97
New Jersey Right-To-Know:	SN 0197
Pennsylvania Right-To-Know:	Environmental hazard; Special hazardous substance
Massachusetts Right-To Know:	Carcinogen; Extraordinarily hazardous
Florida Substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin); Carcinogen (skin)
Michigan Critical Materials Register List:	100 lb Annual usage threshold
Massachusetts Extraordinarily Hazardous Substances:	Carcinogen; Extraordinarily hazardous
California - Regulated Carcinogens:	Not Listed.
Pennsylvania RTK - Special Hazardous Substances:	Present
New Jersey - Special Hazardous Substances:	Carcinogen; Flammable - third degree; Mutagen
New Jersey - Environmental Hazardous Substances List:	SN 0197 TPQ: 500 lb

Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	10 lb RQ (air); 1 lb RQ (land/water)

n-Hexane

Louisiana Right-To-Know:	Not Listed.
California Proposition 65:	Not Listed.
New Jersey Right-To-Know:	SN 1340
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed.
California - Regulated Carcinogens:	Not Listed.
Pennsylvania RTK - Special Hazardous Substances:	Not Listed.
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 1340 TPQ: 500 lb
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1 lb RQ (air); 1 lb RQ (land/water)

Ethylbenzene

Louisiana Right-To-Know:	Not Listed.
California Proposition 65:	Carcinogen, initial date 6/11/04
New Jersey Right-To-Know:	SN 0851
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed.
California - Regulated Carcinogens:	Not Listed.
Pennsylvania RTK - Special Hazardous Substances:	Not Listed.
New Jersey - Special Hazardous Substances:	Carcinogen; flammable - Third degree
New Jersey - Environmental Hazardous Substances List:	SN 0851 TPQ: 500 lb
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

Naphthalene

Louisiana Right-To-Know:	Not Listed.
California Proposition 65:	Carcinogen, initial date 4/19/02
New Jersey Right-To-Know:	SN 1322 SN 3758
Pennsylvania Right-To-Know:	Environmental hazard Present (particulate)
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed.
California - Regulated Carcinogens:	Not Listed.
Pennsylvania RTK - Special Hazardous Substances:	Not Listed.
New Jersey - Special Hazardous Substances:	Carcinogen
New Jersey - Environmental Hazardous Substances List:	SN 1322 TPQ: 500 lb (Reportable at the de minimis quantity of >0.1%)
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	100 lb RQ (air); 1 lb RQ (land/water)

Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Canadian Regulatory Information: "This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the (M)SDS contains all the information required by the Controlled Products Regulations."

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
Gasoline	B2,D2A,D2B	0.1%
Toluene	B2,D2A,D2B	0.1%
Xylene (mixed isomers)	B2,D2A,D2B	m-, o-isomers 1.0%; p-isomer 0.1%
1,2,4-Trimethylbenzene	B3	1
Benzene	B2,D2A,D2B	0.1%
n-Hexane	B2,D2A,D2B	1%
Ethylbenzene	B2,D2A,D2B	0.1%
Naphthalene	B4,D2A	0.1%

NOTE: Not Applicable.

16. OTHER INFORMATION

Prepared By Toxicology and Product Safety
Revision Date: 05/14/2015

Revision Note:

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is intended as guidance for safe handling, use, processing, storage, transportation, accidental release, clean-up and disposal and is not considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Free Flow -
Rockford, L.L.C.
A Free Flow Technologies, Ltd. Company

MATERIAL SAFETY DATA SHEET

SECTION 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MSDS Name: **Free Flow 100®**
Product CAS: None

Company Identification:

Free Flow Technologies, Inc.
9918 N. Alpine Road
Machesney Park, Illinois 61115

For information call: (815) 636-0166 or (866) 677-0166
Emergency Contact: Mike Slattery
Fax: (815) 636-0560

MSDS Effective:	1/14/2011	5/13/2003
Supersedes:	11/20/08	1/3/2003
	8/11/2008	4/20/2001
	2/7/2007	7/1/2000
	2/10/2006	9/4/1998
	3/28/2005	8/1/1998

Mix Design Reference: #1, 2, 3, 4, 5, 6, 8, 9

SECTION 2 – COMPOSITION, INFORMATION ON INGREDIENTS

Chemical Name	CAS	Approximate % (w/w)
Phosphate Compounds	7758-23-8	10 - 80
Calcium Oxide	1305-78-8	10 - 60
Sulfur	7704-34-9	10 - 25
Silicon Dioxide	60676-86-0	5 - 10
Aluminum Oxide - Non- fibrous	1344-28-1	1 - 5
Iron Oxide	1309-37-1	1 - 5

SECTION 3 – HAZARDS IDENTIFICATION

Hazards Ratings	HMIS
Health	1
Fire	0
Reactivity	1
Special Protection	0

POTENTIAL HEALTH EFFECTS

Target Organs: Eyes, respiratory passages, skin, digestive tract. Pre-existing respiratory diseases including asthma and emphysema may also be aggravated.

Eye: May cause irritation/inflammation and tissue damage.

SECTION 3 – HAZARDS IDENTIFICATION (CONT.)

Skin: May cause irritation to moist skin.

Ingestion: May cause ulceration to the digestive tract.

Inhalation: May cause irritation/inflammation to nasal and upper respiratory passages.

SECTION 4 – FIRST AID MEASURES

Eye: Flush eyes with water while lifting lids. Seek medical attention.

Skin: Wash skin with soap and water, remove contaminated clothing and shoes. If irritation develops, seek medical attention.

Ingestion: Dilute with water, fruit juice or vinegar. Seek medical attention.

Inhalation: Remove to fresh air, if irritation develops, seek medical attention.

SECTION 5 – FIRE FIGHTING MEASURES

Unusual Fire and Explosion Hazards: Noncombustible

Special Fire Fighting Procedures: Do not use water on adjacent fires. Extinguish adjacent fires with dry chemical or CO_2.

Extinguishing Media: N/A

Auto ignition Temperature: N/A

Flash Point: N/A

Flammable Limits

Lower Limit: N/A

Upper Limit: N/A

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Disposal: Dispose as a non-hazardous solid waste in accordance with all Local, State and Federal regulations.

Spills/Leaks: Use appropriate protective equipment while using dry cleanup methods (sweep/shovel) which minimize dusting. Reclaim in watertight containers. Small amounts may be flushed with water to drain.

SECTION 7 – HANDLING AND STORAGE

Handling: Swells when wet, may burst containers. Keep eyewash bottles available throughout work area.

Storage: Store away from water or acids.

SECTION 8 – EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls:	Use general and local exhaust to keep dust levels within acceptable limits.
Eyes:	Wear tight fitting goggles.
Skin:	Wear long sleeves, gloves, and pant cuffs over shoes to minimize skin contact.
Respirators:	Use NIOSH approved dust respirator when exposure limits exceeded.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Odor:	White-gray powder. No odor.	Boiling Point:	N/A
pH:	6.0 – 12.0	Freezing/Melting Point:	N/A
Density:	80 – 85 lbs/ft^3	Viscosity:	N/A
Vapor Pressure:	N/A	Decomposition Temp.:	N/A
Vapor Density:	N/A	Evaporation Rate:	N/A
Molecular Formula:	Mixture		

SECTION 10 – STABILITY AND REACTIVITY

Chemical Stability:	Stable, keep dry.
Incompatibility:	Contains calcium oxide and may react with water or acid to produce sufficient heat to ignite combustible materials.
Hazardous Decomposition Products:	Could possibly release minor amounts of irritating fluoride if heated to extreme temperatures.
Hazardous Polymerization:	No.
Conditions to Avoid:	Extreme temperatures.

SECTION 11 – TOXICOLOGICAL INFORMATION

Toxicological Information:

Component	Formula	% Wt.	CAS	PEL	TLV
Phosphate Compounds	$Ca(H_2PO_4)_2H_2O$	10 – 80	7758-23-8	Not established	Not established
Calcium Oxide	CaO	10 – 60	1305-78-8	5 mg/m^3	2 mg/m^3
Sulfur	SO_3	10 – 25	7704-34-9	15 mg/m^3	10 mg/m^3
Silicon Dioxide	SiO_2	5 – 10	60676-86-0	0.1 mg/m^3*	0.1 mg/m^3*
Aluminum Oxide	Al_2O_3	1 - 5	1344-28-1	10 mg/m^3+	10 mg/m^3+
Iron Oxide	Fe_2O_3	1 - 5	1309-37-1	15 mg/m^3	5 mg/m^3

* Respirable Dust
+ 5 mg/M^3 as Respirable Fraction

Silicon Dioxide and Iron Oxide are listed by IARC as potential carcinogens.

SECTION 12 – ECOLOGICAL INFORMATION

Ecological Information: None available

SECTION 13 – OTHER PRECAUTIONS

Other Precautions: None

SECTION 14 – TRANSPORT INFORMATION

DOT Label No: N/A

SECTION 15 – REGULATORY INFORMATION

SARA Title III - Section 302 Extremely Hazardous Material - None

SARA Title III – Section 31/312 – Hazard Categories:
Fire Hazard – No
Sudden Release of Pressure – No
Reactivity Hazard – Yes
Immediate Health Hazard – Yes
Delayed Health Hazard - Yes

SARA Title III – Section 313 - This material is not subject to the toxic chemical reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

SECTION 16 – ADDITIONAL INFORMATION

Information herein is based on data believed to be accurate at the time of the preparation. No warranty or representation, express or implied, is made to the accuracy or completeness of the MSDS. No responsibility can be assumed by vendor for any damage or injury resulting from misuse, failure to follow recommended practices, or from any hazards inherent in the nature of the product.

Attachment 7

Corporate Radiation Protection Program

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EA Engineering, Science, and Technology, Inc.

225 Schilling Circle, Suite 400
Hunt Valley, MD 21031
Telephone: 410-584-7000
Fax: 410-771-1625
www.eaest.com

14 August 2014

MEMORANDUM

TO: EA Personnel – Hunt Valley, Maryland

FROM: Amy Jo Sponaugle, Radiation Safety Officer

Cc: Pete Garger**,** Health and Safety Director

SUBJECT: Radiation Protection Program

The purpose of the Memorandum is to notify personnel about EA's Radiation Protection Program (RPP) for the Hunt Valley Office, which establishes the procedures for handling and control of company-owned equipment containing radioactive materials and x-ray tubes. Authorized users of the equipment need to understand and comply with EA's stated policy in the RPP, which is included as Attachment 1 of this memorandum.

The use of radioactive materials and x-ray generating equipment is highly regulated by Federal and State agencies. Licensees of radioactive materials and x-ray generating equipment are required to follow regulatory guidance and are subject to periodic inspections. Licensees may face disciplinary action by Federal or State agencies if determined to be out of compliance with regulations.

EA's Hunt Valley (MD) office possesses licenses and registrations in order to possess, use, and transfer both radioactive materials and x-ray equipment. EA has designated Pete Garger, the corporate Health and Safety Director, as the company officer in charge of ensuring compliance with applicable Federal and State regulations. Pete Garger has designated Amy Jo Sponaugle as the Radiation Safety Officer (RSO) for Maryland licenses/registrations, and she is responsible for maintaining EA's radiological health and safety procedures for the Hunt Valley office.

If you have any questions or require additional information, please do not hesitate to contact me at 410-329-5103.

Amy Jo Sponaugle

cc: G. Porter
F. Barranco
S. Yankay

Attachments:
(1) Radiation Protection Program

EA Engineering, Science, and Technology, Inc.

225 Schilling Circle, Suite 400
Hunt Valley, MD 21031
Telephone: 410-584-7000
Fax: 410-771-1625
www.eaest.com

RADIATION PROTECTION PROGRAM

EA Engineering, Science, and Technology, Inc. (EA) currently has Maryland licenses and registrations to possess, use, and transfer radioactive material and x-ray generating equipment in Maryland. Radiological materials and equipment are stored and managed at EA's Hunt Valley office, which is located at 225 Schilling Circle, Suite 400, Hunt Valley, Maryland. EA has designated Mr. Pete Garger, the corporate Health and Safety Director, as the company officer in charge of ensuring compliance with applicable Federal and State regulations for this equipment. Mr. Garger has designated Ms. Amy Sponaugle as the Radiation Safety Officer (RSO) for the Hunt Valley office. This Radiation Protection Program (RPP) establishes the responsibilities of the Health and Safety Director, the RSO and authorized users of radioactive material and x-ray generating equipment; the protocol for using company-owned equipment in Maryland and other out-of-state locations; and the protocol for renting radioactive material and x-ray generating equipment. Figure 1 (at the end of this RPP) shows the organization chart and contact information for EA health and safety personnel identified in this RPP.

EA personnel that anticipate using radioactive materials or equipment that produces ionizing radiation must follow the protocols in this RPP so that the appropriate regulatory and safety steps are followed. Failure to do so could result in unsafe activities, disciplinary action by State or Federal agencies, or revocation of EA's licenses, reciprocity agreements, or registrations. Since regulations for radioactive material and x-ray generating equipment will vary by State, the Health and Safety Director or RSO should be contacted to confirm regulatory requirements prior to using company-owned or rental equipment. EA personnel failing to comply with this policy may face disciplinary actions.

1.0 Responsibilities of the Health and Safety Director

Pete Garger is the corporate Health and Safety Director and is responsible for the following:

- Ensuring that all EA personnel are aware of EA's health and safety policies and procedures.
- Providing oversight and technical/management support to the RSO.
- Reviewing and approving this RPP and any modifications to this program.
- If unsafe practices are identified, suspend or stop work pending resolution of the condition.

Mr. Garger reports directly to Mr. Ian D. MacFarlane, EA's President and Chief Executive Officer (Figure 1).

2.0 Responsibilities of the Radiation Safety Officer

Amy Jo Sponaugle has been designated as the RSO for the Hunt Valley office. Ms. Sponaugle has completed 24-hour Radiation Safety Officer Training and subsequent 8-hour Radiation Safety Officer Refresher Training. Ms. Sponaugle reports directly to Mr. Pete Garger, EA's corporate Health and Safety Director (Figure 1). The primary responsibilities of the RSO are the following:

- Control access to regulated radiological materials and x-ray equipment that are stored or used at the offices;
- Ensure that only authorized EA personnel use regulated radiological materials and x-ray generating equipment;
- Provide dosimetry to authorized users of the regulated radiological materials and x-ray generating equipment and track personnel exposure;
- Obtain permission from other State or Federal agencies (either through reciprocity agreements, licensing, or registration) to use regulated radiological materials and x-ray generating equipment.
- Coordinate with the Health and Safety Director regarding RPP implementation and any radiological health and safety issues.
- If unsafe practices are identified, suspend or stop work pending resolution of the condition with the Health and Safety Director.

The following EA staff has been designated as RSO support personnel for implementation of the RPP: Mr. Steven Yankay. Mr. Yankay has experience with radiation safety and extensive field experience with company-owned radioactive material and x-ray generating equipment. Mr. Yankay assists Ms. Sponaugle with leak testing, training, and tracking equipment (Figure 1).

3.0 Responsibilities of Authorized Users

"Authorized Users" are EA personnel that have appropriate radiological and operator training and are authorized to use specific company-owned (or rented) regulated radioactive materials and x-ray generating equipment at EA job sites. Authorized Users are responsible for the following:

- Following the protocols in this RPP so that the appropriate regulatory and safety steps are followed;
- If unsafe practices are identified, suspend or stop work pending resolution of the condition with the RSO and/or Health and Safety Director.

4.0 Company-Owned Radioactive Material and X-Ray Generating Equipment – Possession and Use in Maryland

EA possesses a Maryland Radioactive Materials License (#MD-05-179-01) in order to possess and use the following radioactive material in Maryland:

- Cadmium-109 (^{109}Cd), which is utilized in a portable X-ray Fluorescence (XRF) analyzer for multi-element analysis of paint.

EA also possesses a Maryland Radiation Machine Registration (#05-2082) in order to possess and use the following equipment in Maryland:

- 40 KeV X-ray tube, which is utilized in a portable XRF analyzer for multi-element analysis of soil.

In order to retain EA's Maryland License and Registration, EA is required to comply with guidance outlined in the Code of Maryland Regulations (COMAR) 26.12.01.01 "Regulations for the Control of Ionizing Radiation". A copy of EA's Radioactive Materials License, Radiation Machine Registration, and the COMAR regulations are on file in the RSO's office.

Storage Area - The radiological materials and x-ray generating equipment listed above are stored within a locked storage cabinet at the Hunt Valley main office (Figure 2). Signs are posted on the cabinet door to ensure that company personnel and visitors are aware that regulated materials and equipment are stored in that area. Biannual radiological surveys (ambient surveys and leak tests) are performed to ensure that the radiological materials are being properly maintained. For x-ray generating equipment, periodic inspections are conducted by a MD-licensed inspector to verify that x-ray generating equipment is being maintained properly. Documentation of bi-annual surveys and periodic inspections is on file in the RSO's office.

Authorized Use Areas – The company-owned radiological materials and x-ray generating equipment are authorized for use at temporary job sites within Maryland. Under no circumstances will radiological materials and x-ray equipment be used in personal offices or in common areas of the Hunt Valley office, such as the lunchroom. Permission to use an XRF at the EA Annex (231 Schilling Circle) must be obtained from the RSO and will be on a case-by-case basis.

Authorized Users - Only EA personnel that have appropriate radiological and operator training are authorized to use regulated materials and equipment. The list of authorized users is on file in the RSO's office.

Control of Work Area - Authorized users must maintain control of the equipment on job sites at all times. When not actively in use at the job site, the equipment must be kept within a locked cabinet or office at the job site or within the locked trunk of a vehicle. When the equipment is being operated, other site personnel and visitors (i.e., personnel not authorized to use the equipment) must be kept away from the work area (minimum of 15 feet).

Utilization of Dosimetry - Dosimetry is required for use of regulated radiological materials and x-ray generating equipment and is provided by the RSO on an as-needed basis to authorized EA personnel. A memorandum outlining the proper use of dosimetry and the responsibilities of dosimetry users is provided to first-time users and is on file in the RSO's office.

Emergency procedures – In case of emergency, such as accidents involving damage or potential exposure to radiological materials, authorized users shall follow these procedures:

A. Secure the area around the incident and keep unauthorized persons away. Alert people in the vicinity of the presence of radiological materials. Call 911 for local police or fire department if required.
B. Contact the following personnel:
    - Amy Sponaugle, RSO, at 410-329-5103 (office) or 443-695-3129 (cell)
    - Pete Garger, H&S Director, at 410-329-2425 (office) or 410-790-6338 (cell)

    The RSO or H&S Director will then notify the Maryland Department of the Environment (MDE) Radiological Health Program at 1-800-633-6101, and will provide the following

information:

a. Nature of the emergency
b. Date and time emergency began
c. Number of injured people
d. Actions taken
e. Emergency agencies notified and/or present on scene
f. Present status of emergency

C. The authorized user should not leave the area/site until qualified experts arrive, unless the user is injured or incapacitated, and must be removed from the area/site for medical treatment.

The RSO and H&S Director must be notified immediately if radiological materials or equipment are stolen or lost. The RSO and H&S Director will then notify MDE Radiological Health Program.

Authorized users are required to have these emergency procedures on hand during field activities. A copy of the procedures is also posted at the radiological storage area and in the RSO's office (Figure 2).

Protocol for Reserving/Using Company-Owned Equipment in Maryland – The company-owned equipment listed in Section 4.0 of this RPP can be reserved for use by utilizing the "Equipment Tracker" module on inside.ea. The RSO must be notified that equipment is being reserved for use in order to confirm the name of the authorized user, confirm that the location of use is within Maryland, and issue dosimetry. The protocol for renting radioactive material and x-ray generating equipment for use in Maryland is discussed in Section 5.0 of this RPP. For use of company-owned and rental equipment at out-of-state (non-Maryland) job sites, the protocols in Sections 6.0 and 7.0, respectively, must be followed.

5.0 Rental Radioactive Material and X-Ray Generating Equipment – Possession and Use in Maryland

Under Maryland regulations, all rental equipment utilizing a regulated radioactive source or x-ray tube must be registered/licensed for use in Maryland prior to use. EA personnel that anticipate renting equipment must verify with the vendor that the equipment is licensed/registered for use in Maryland prior to taking possession of the equipment. In addition, personnel must notify the RSO that equipment is being rented, provide a copy of the rental agreement showing confirmation of appropriate registration/licensing, and provide training certification (e.g., manufacturer's training) for the equipment being rented. Upon receipt of this information, the RSO will provide dosimetry to the authorized users of the rental equipment. Authorized users will follow the same protocols for work area control, dosimetry, and emergencies that are provided in Section 4.0 of this RPP.

6.0 Company-Owned Radioactive Material and X-Ray Generating Equipment – Possession and Use at Job Sites Not in Maryland

Obtaining permission to use company-owned radioactive material and x-ray generating

equipment at job sites not located in Maryland requires coordination with other State or Federal agencies. Obtaining permission from other State or Federal agencies can take up to 4 weeks to process and may involve a fee. In addition to obtaining formal permission to use regulated materials and equipment, written notification is typically required at least 2 days prior to the start of fieldwork. For all out-of-state work, the RSO must be contacted to confirm the specific State requirements for utilizing the equipment at the job site and prepare any reciprocity agreements or registrations required by the regulator. The RSO will ensure that emergency protocols are specified for the specific job location.

7.0 Rental Radioactive Material and X-Ray Generating Equipment – Possession and Use at Job Sites Not in Maryland

Regulations governing the use of rental radioactive material and x-ray generating equipment in other states will vary, and the State or Federal regulator must be contacted to confirm the specific requirements for using this equipment at a job site. It is important to note that while a vendor may possess a 'general license' for renting radioactive material and/or x-ray generating equipment, that license coverage may not extend to the utilization of the equipment by EA personnel; as such, additional licensing (with a potential fee) may be required to cover EA usage.

Note: it is EA policy that dosimetry must be worn while using regulated radiological materials and x-ray generating equipment, even if it is not specifically required by State or Federal regulations for a given work location.

FIGURES

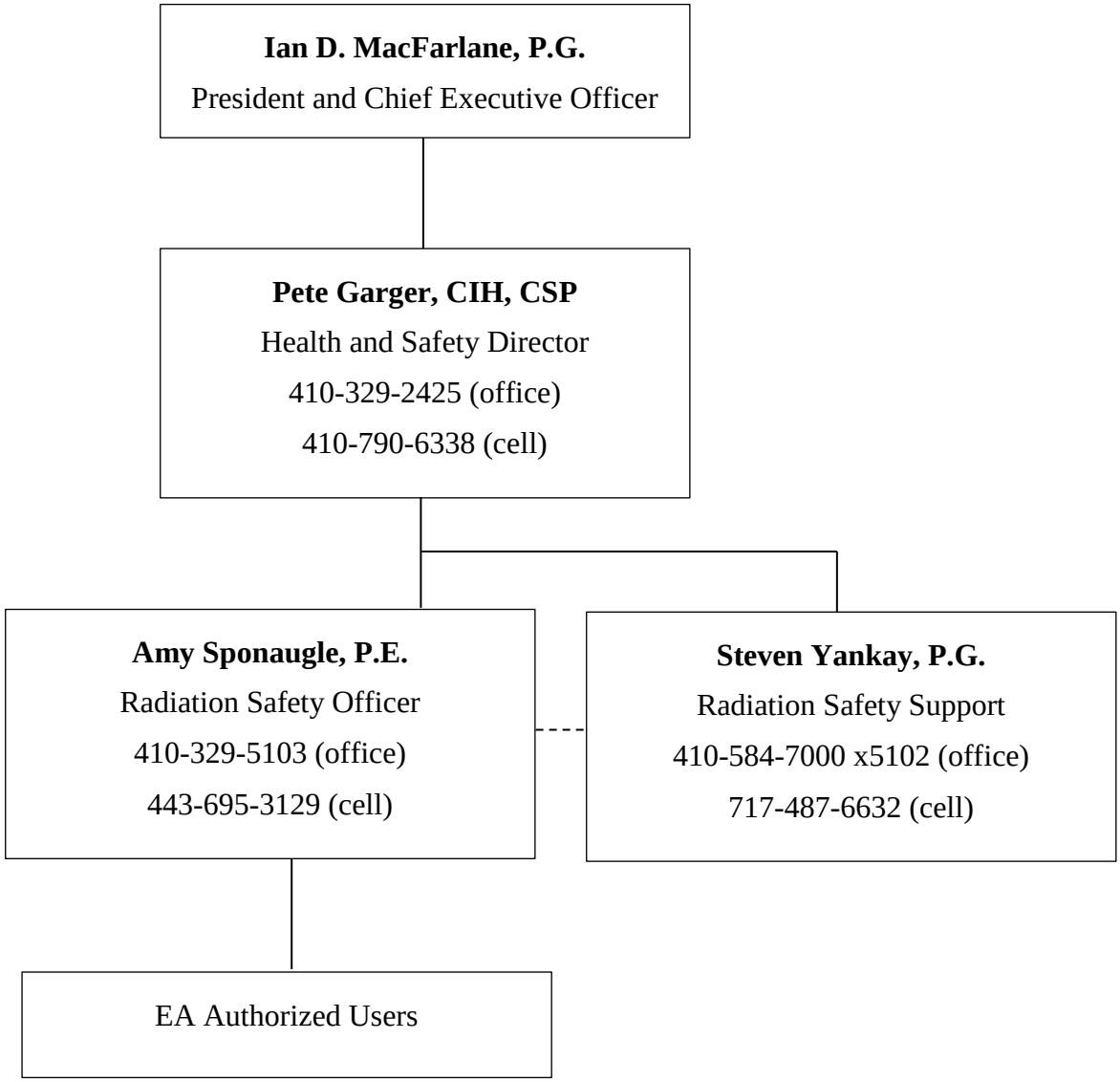

Figure 1 – Organization Chart and Contact Information for Health and Safety Personnel

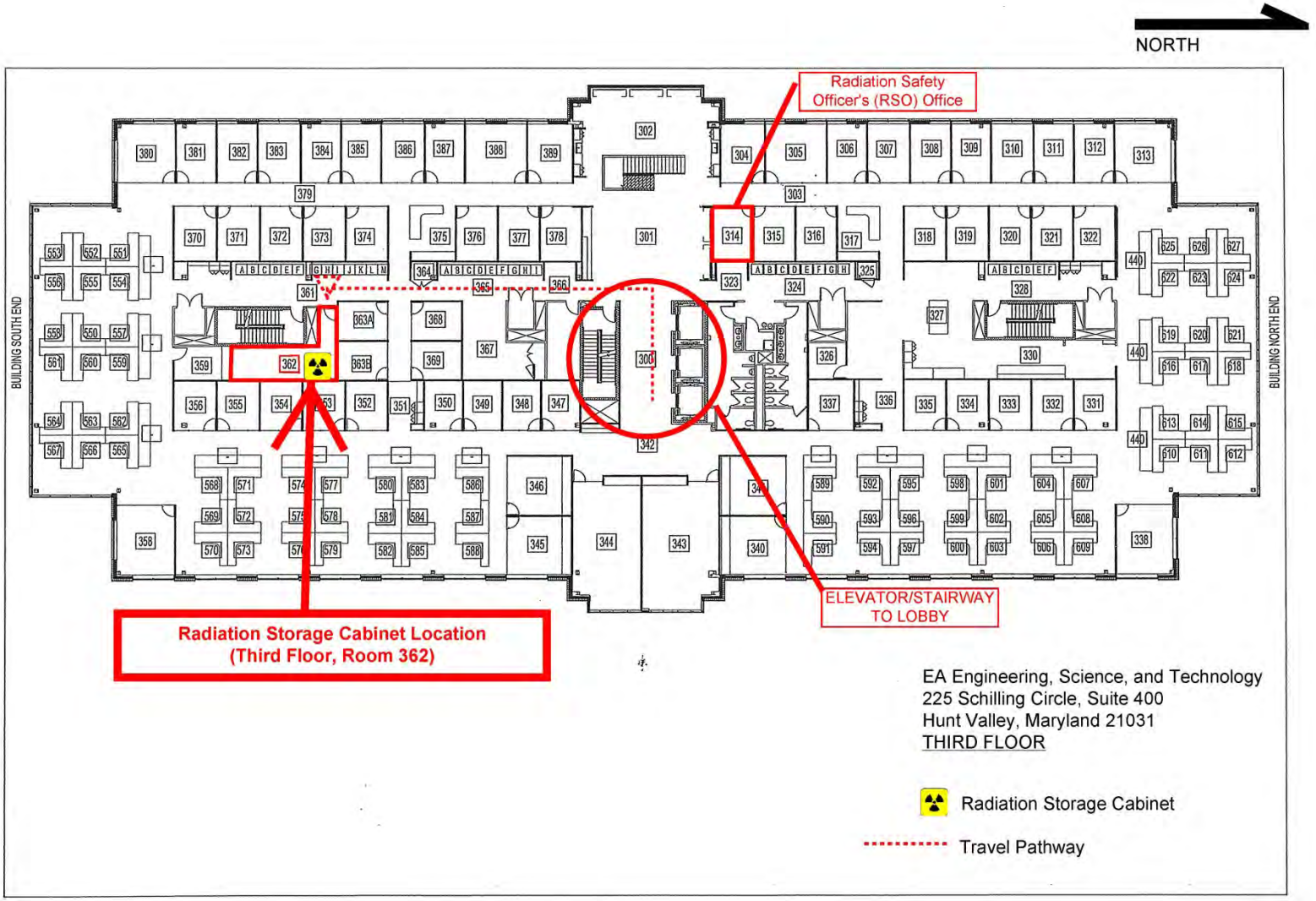

Figure 2 – Location of Radioactive Material Storage Cabinet and RSO Office

Standard Operating Procedure No. 056
for
X-Ray Fluorescence Analysis of Soil

Prepared by

EA Engineering, Science, and Technology, Inc., PBC
225 Schilling Circle, Suite 400
Hunt Valley, Maryland 21031

Revision 1
January 2018

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PROJECT-SPECIFIC VARIANCE FORM

This form is to be completed to indicate if there are any client-, project-, or site-specific variances to this Standard Operating Procedure (SOP) (**also check Box A**), or if this SOP is being used with no changes (**only check Box B**).

A. ☐ **Variances required; cite section(s) of the SOP to which there is a variance (add additional pages if necessary)**

B. ☐ **No variances**

SOP No. 056	
SOP Section	**Variance**

Project Manager (Name) Date

Project Manager (Signature) Date

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CONTENTS

DOCUMENT REVISION HISTORY

ORIGINAL (MASTER) DOCUMENT REVISION HISTORY				
Revision Number	**Revision Date**	**Revision Summary**	**Revised By**	**Reviewed By**
1	January 2018	Updated protocols/information in Sections 2, 3, 4, 5, and 7.	Caron Mierczak	Amy Sponaugle Steve Yankay Pete Garger Matthew Bowman

1. SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to describe protocols for using an Innov-X Systems Alpha 4000SL or Niton XL3t GOLDD tube-based x-ray fluorescence (XRF) analyzer for field analysis of soil samples for metals. Quality control protocols in this SOP are consistent with the protocols identified in U.S. Environmental Protection Agency (EPA) Method 6200 (EPA 2007). Client-specific quality control protocols regarding sample preparation and analysis for the U.S. Army Corps of Engineers (USACE)–Omaha District have been included in this SOP.

Any client-, project-, or site-specific variances to this SOP (if any) are documented on the Project-Specific Variance Form, located immediately after the SOP title page. Prior to using this SOP, field personnel should refer to the Project-Specific Variance Form to verify whether any variances are required.

Use of brand names in this SOP is not intended as endorsement or mandate that a given brand be used. Alternative equivalent brands of detectors, sensors, meters, etc. are acceptable.

2. MATERIALS

The following materials may be required:

Innov-X Systems x-ray tube-based XRF with Compaq personal data assistant (PDA) that includes appropriate expansion card and Innov-X Software OR ThermoScientific/Niton XL3t GOLDD XRF with Mini-USB to USB cable	
Laptop computer	Plastic zipper-type bags (1-mil thickness)
Battery for XRF	Containers (for sample collection and storage)
Battery charger for personal computer	2-mm mesh sieve(s)
Standard Reference Material (SRM) for calibration check of XRF	Silicon blank
Soil test stand/bulk sample analyzer sled	Paper towels
Mylar, Kapton, Spectroleen, polypropylene, or equivalent film	Paperwork (applicable regulations and licenses, XRF Operators' Manual, and emergency contacts)
Polyethylene sample cups (31- to 40-millimeters [mm] in diameter with collar)	Proper site-specific personal protective equipment and dosimetry

3. GENERAL

Procedures for handling and control of company-owned and rented equipment containing radioactive materials and x-ray tubes are specified in the EA Engineering, Science, and Technology, Inc., PBC (EA) Radiation Protection Program (EA 2014), which is administered by the Radiation Safety Officer (RSO), under direct supervision of EA's Corporate Health and Safety Director. Personnel using this SOP must be familiar with the procedures identified in the Radiation Protection Program (EA 2014).

The use of radioactive materials and x-ray generating equipment is highly regulated by federal and state agencies. Licensees of radioactive materials and x-ray generating equipment are required to follow regulatory requirements and are subject to periodic inspections. Licensees may face disciplinary action by federal or state agencies if determined to be out of compliance with regulations. The RSO must be informed about any XRF usage (rental or company-owned) prior to use, including the scheduled timeframe of use; the state within which the XRF will be used; and the safety and security measures that will be enforced during transportation (either over land or by air), storage, and use of the instrument. Licensing, registration, or reciprocity may be required prior to using the XRF (i.e., a certificate of reciprocity or license/registration might be required from the destination state). In addition, per EA policy, the RSO will assign dosimetry badges to the operators (regardless of whether the instrument is EA-owned or rented) to measure potential radiation dose. Dosimetry is personnel-specific (i.e., cannot be shared by multiple personnel), and must be replaced every 3 months.

The XRF shall be operated by a trained operator, knowledgeable in aspects of radiation safety. Operators need to complete the manufacturer's-specific operator's training, transport of lithium-ion batteries training, and EA's Radiation Safety Training and Hands-On XRF Operational Training. All certificates of training completion must be received and documented by the RSO prior to using the XRF.

The XRF should be operated in a clean environment, out of direct sunlight, and without significant concentrations of dust.

The XRF shall be in direct control of a trained XRF operator at all times. When not in use, the XRF shall be placed within a locked case, and stored in a locked storage area (i.e., cabinet), in a locked room or building when not in use ("triple locked").

Batteries are provided for portable operation of the XRF; however, the batteries have a limited operating time. It is highly recommended to connect the unit to an alternating current power source, especially for operating times exceeding 4 hours. Failure of the batteries during a screening session may result in data loss. After each portable operation, the instrument batteries must be recharged before resuming operations.

4. QUALITY CONTROL

The RSO will ensure that the XRF adheres to manufacturer's specifications for calibration. Onsite calibration verification checks will be performed by the operator. The quality control protocols specified in this section are consistent with the protocols identified in EPA Method 6200 (EPA 2007).

The accuracy of the XRF can be evaluated by performing calibration verification checks. These checks are performed by analyzing SRMs traceable to the National Institute of Standards and Technology (NIST). A minimum of two SRMs will be analyzed daily: once at the beginning of the day and end of the day, or at the beginning of the day and after every 20th sample, whichever occurs first. The actual (NIST-certified) concentration of the SRM as well as the concentration

displayed by the XRF will be recorded (NIST certified concentrations can be obtained from the RSO or the NIST website: https://www-s.nist.gov/srmors/viewTableH.cfm?tableid=86).

The relative percent difference (RPD) between the actual and displayed concentrations will be calculated as follows:

$$RPD = [2(SRM-R)/(SRM+R)] \times 100$$

where

SRM = Concentration of the standard reference material.
R = Displayed concentration from XRF.

The result will be compared to the project data quality objectives (DQOs), if applicable, to evaluate if the XRF accuracy is within project limits. A typical DQO for this indicator is +/20 percent. Note that a site-specific sample with a known concentration of the compound(s) of interest may be used in lieu of an SRM to perform the calibration verification checks; however, this SOP deviation should be noted on the Project-Specific Variance Form.

To assess the precision of the XRF, a precision analysis may be performed. If project DQOs do not require a precision analysis, it will be noted on the Project-Specific Variance Form. The precision analysis is performed by running 10 replicate analyses on the same site sample and calculating the relative standard deviation (RSD) of the sample mean as follows:

$$RSD = (SD/Mean\ Concentration) \times 100$$

where

RSD = Relative standard deviation for the precision measurement for the analyte.
SD = Standard deviation of the reported analyte concentration for the precision sample.
Mean Concentration = Mean analyte concentration of the seven replicate analyses.

The site sample should have detectable concentrations of metals (i.e., above the instrument's detection limits). Precision analysis should be performed at a minimum of once per day, but may be required more often depending upon the project DQOs (the Project-Specific Variance Form will document if this analysis is not required). A typical DQO for this indicator is <20 percent.

Duplicate analysis (or triplicate) is another quality control check that may be performed on the XRF (the Project-Specific Variance Form will document if this analysis is not required). A typical duplicate analysis scheme would require the preparation and analysis of a duplicate sample at a rate of 1 per every 20 normal site samples. A duplicate is a second sample collected and prepared as a normal sample would be. The duplicate is analyzed and the results compared to the normal sample by calculating the RPD. The DQO for duplicate samples is project specific; however, a typical objective is an RPD of no more than 30 percent.

An alternative to duplicate sample analysis would be replicate sample analysis. Replicate sample analyses are two analyses of the same prepared sample. Generally, the sample is moved/rotated; re-homogenized; or, if prepared in a sample cup, inverted (on a double open-ended cup) for the second analysis. This approach assesses comparability between results without interference from field sampling variability. The replicate sample results are compared to the normal sample results in the same manner as a duplicate sample analysis.

Blank analyses may be performed to assess whether equipment cross contamination is occurring. Two types of blank sample analyses are typical: instrument blank and method blank.

The instrument blank is performed by analyzing silicon dioxide (or clean sand), a Teflon block, or a quartz block. The frequency of blank analysis is dependent upon project DQOs but is typically performed twice daily, prior to and after sample analyses for that day (the Project-Specific Variance Form will document if this analysis is not required). Typically, the instrument blank analysis is performed concurrently with the SRM calibration verification analysis. Instrument blanks may also be performed after every 20 samples; again, depending on project DQOs. Results should be below detection.

Method blanks are performed to monitor decontamination efficiency on equipment that is not dedicated. The blank is performed by substituting clean sand in the sample preparation process, and analyzing in the same manner as a site sample. Results should be below the instrument's detection limits.

5. SITE SAMPLE PREPARATION AND ANALYSIS

Sample preparation is dependent upon project DQOs and may be different than the preparation described herein (the Project-Specific Variance Form will document any deviations to this protocol). More rigorous sample preparation protocols are available (e.g., EPA Method 6200 [EPA 2007]). The project planning document and DQOs should be referenced to determine if the method described herein is adequate for any specific project.

- Don appropriate personal protective equipment as required by the project health and safety plan; at a minimum, gloves and radiation dosimetry will be utilized.

- Collect soil sample as described in the project planning documents, including a minimum of 50 grams of soil for XRF analysis.

- If the sample is noticeably wet (>20 percent moisture), dry the sample in an oven. Alternatively, the samples may be dried with paper towels and/or by allowing the sun to evaporate the moisture. Microwave drying is not recommended; field studies have shown that microwave drying can increase variability between XRF data and confirmatory analysis, and metal fragments in the sample can cause arcing to occur in a microwave.

- Inspect the sample to ensure no foreign (non-soil) materials are present in the sample (i.e., paint chips, lead shot, concrete chips, leaves, rocks, or asphalt). Note the presence of foreign matter in the project log. If the quantity of foreign material is such that removal is impractical, note in the project log that the foreign material could not be removed.

- Pass soil through a decontaminated 2-mm mesh sieve collecting the soil in a dedicated zipper-type plastic bag, labeled with the sample identification. This step may be eliminated in lieu of hand processing (removal of stone, debris, lead shot, paint chips, and organic material) of the sample simultaneously with the following step, but should be noted on the Project-Specific Variance Form if this method is performed.

- Homogenize the soil by rolling the soil within the bag, being sure to break up large clumps of soil.

- Assemble a sample cup, label with sample identification, and pack the soil tightly into the cup. Cover the cup with polypropylene (or equivalent) film and use the collar to secure in place. This step may be eliminated for the analysis of the sample through the zipper-type plastic bag, but should be noted on the Project-Specific Variance Form if this method is performed.

- Place the sample cup/zipper-type bag onto the soil test platform. Inconsistent positioning of samples in front of the probe window is a potential source of error because the x-ray signal decreases as the distance from the radioactive source increases. This error is minimized by maintaining the same distance between the window and each sample. For the best results, the window of the probe should be in direct contact with the sample, which means that the sample should be flat and smooth to provide a good contact surface.

- Initiate the XRF reading using the trigger or start button on the PDA.

- Allow the analyzer to run and collect data for a nominal sample time of 60 seconds; a project-specific variation to the nominal sample time will be noted on the Project-Specific Variance Form.

- Record the sample designation and result(s) in either a field logbook or on appropriate data sheets.

- Retain the cupped/bagged sample for possible laboratory confirmatory analysis.

- Use the same procedure for the analysis of method blank, duplicate, replicate, SRMs, and precision analysis samples.

- Download the XRF data daily to a computer (if possible). Back up the data to a server, disc, or compact disc.

The comparability and quality of the XRF analysis are determined by submitting XRF-analyzed samples for confirmatory analysis to a laboratory. The confirmatory samples must be splits of the homogenized sample material. A minimum of 1 sample for each 10 XRF-analyzed samples should be submitted for confirmatory analysis (for USACE–Omaha projects, they request a minimum of 12 samples for confirmation). Note on the Project-Specific Variance Form if there is a deviation from this frequency. The confirmatory samples should be selected from the lower, middle, and upper range of concentrations measured by the XRF. They should also include samples with analyte concentrations at or near the site action levels or project remedial goals. The results of the confirmatory analysis and XRF analyses should be evaluated with a least-squares linear regression analysis. If the measured concentrations span more than one order of magnitude, the data should be log-transformed to standardize variance that is proportional to the magnitude of measurement. The correlation coefficient (r) for the results should be 0.7 or greater for the XRF data to be considered screening level data (EPA 2007). If the r is 0.9 or greater and inferential statistics indicate the XRF data and the confirmatory data are statistically equivalent at a 99 percent confidence level, the data could potentially meet definitive level data criteria.

6. PRECAUTIONS

The XRF produces ionizing radiation in the x-ray spectrum. This SOP and the precautions herein are applicable to the Innov-X Systems Alpha 4000SL or the ThermoScientific/Niton NL3t GOLDD tube-based instruments. Additional precautions not contained herein are necessary if utilizing a radioactive source-based XRF (e.g., cadmium-109). The tube-based instrument is capable of producing x-rays when the instrument is powered and an analysis initiated. The instrument has a red light near the shutter that will flash when the instrument is emitting x-rays. When the shutter is open, and the light is flashing, the instrument is emitting x-rays. At this time, the following must be observed:

- Always be aware of the location of the tube and direction of the x-ray beam.
- Open the shutter only to conduct a test.
- The person conducting the XRF analysis must be a trained operator in accordance with the requirements in Section 3 and is required to wear dosimetry.

The XRF is able to function as a handheld screening tool by wielding the detector by hand and pressing it to the sample for analysis. For soil screening, this action has the potential of exposing the operator to inadvertent x-ray radiation. For this reason, it is highly recommended that the operator make use of the manufacturer-specific stand that incorporates x-ray shielding, automatic x-ray beam shut-off safety features, and protects the operator from exposure. Any deviation from use of the soil test stand must be approved by the RSO.

EA's emergency procedures for the XRF (in the event that the XRF unit is damaged, destroyed, lost, or stolen) are provided to authorized users and will be used in the event of an emergency.

Decontamination of the soil test stand is to be restricted to wiping the test stand with a damp cloth. Any additional decontamination procedures must be approved by the RSO.

7. REFERENCES

EA Engineering, Science, and Technology, Inc. (EA). 2014. Radiation Protection Program. August.

U.S. Environmental Protection Agency (EPA). 2007. Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment. Method 6200. February.

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Appendix E

Fact Sheet

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Hancock Field Air National Guard Base (ANGB) FACT SHEET

Military Munitions Response Program

Non-Time Critical Removal Action MARCH 2019

The Air Force

- Is dedicated to protecting human health and the environment by making MRAs/MRSs safe to reuse.
- Is developing the MMRP by maximizing efficiencies and lessons learned from 20 years of environmental restoration experience.
- Will prioritize MRAs/MRSs according to environmental, health, and safety considerations; current and future planned resource use; and site attributes.

FOR MORE INFORMATION Please contact:

Mr. Jason Preston
State Environmental Officer
315-233-2111
Jason.m.preston3.nfg@mail.mil

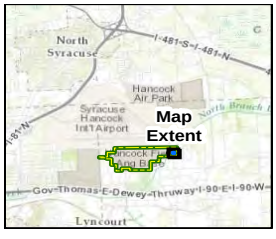
Hancock Field ANGB Munitions Response Site

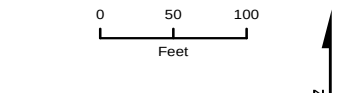
Introduction

In addressing environmental concerns at military installations, the Department of Defense (DoD) follows the procedures of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) as authorized by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA). The DoD cleanup program covers Hazardous, Toxic, and Radioactive Waste (HTRW) sites and those addressed under the Military Munitions Response Program (MMRP). The Air Force's vision is to make Munitions Response Areas (MRAs) / Munitions Response Sites (MRSs) safe and clean for reasonable anticipated future use.

The MMRP addresses the unique munitions and explosives of concern (MEC) issues associated with the MRS, as well as hazardous substances, pollutants, and contaminants of concern (COCs) on non-operational ranges.

The purpose of this Non-Time Critical Removal Action (NTRCA) is to fully remove all debris associated with military training from the Firing-In Buttress (MRS SR002) located at Hancock Field Air National Guard Base, Syracuse, New York (Hancock Field). After all debris has been removed and properly disposed of, the Firing-In Buttress (FIB) will be demolished and the area will be graded to blend in with natural topography.





Hancock Field ANGB FACT SHEET

Acronyms:

ANG	Air National Guard
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Contaminant of Concern
DoD	Department of Defense
EA	EA Engineering, Science, and Technology, Inc., PBC
FIB	Firing-In Buttress
HTRW	Hazardous, Toxic, and Radiological Waste
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MMRP	Military Munitions Response Program
MRA	Munitions Response Area
MRS	Munitions Response Site
NCP	National Contingency Plan
NTCRA	Non-Time Critical Removal Action
SAA	Small Arms Ammunition
SARA	Superfund Amendments and Reauthorization Act
SCO	**Soil Cleanup Objectives**
TP	Target Practice
USACE	U.S. Army Corps of Engineers

Introduction to the Non-Time Critical Removal Action

Background

Hancock Field is an active military installation located in central New York and is home to the 174th Fighter Wing of the New York Air National Guard (ANG). The current mission of Hancock Field is to maintain well trained and well equipped ANG units for prompt mobilization; however, military use of Hancock Field dates back to 1942. The base was originally built and activated as a staging area for warplanes bound for England during World War II. Since then, Hancock Field has been used for multiple purposes including small arms munitions training such as test firing and boresight alignment of gun systems of up to 0.50-caliber ammunition and 20-mm target practice (TP) projectiles. Additionally, the base has been reduced in size since its initial activation to its current footprint of 356 acres. The majority of the land which used to make up Hancock Field was transferred to Onondaga County to expand the Syracuse-Hancock International Airport.

Summary of Recent Related Studies

A NTCRA was completed in 2014 that excavated, stabilized, and transported off-site soils from the FIB which contained elevated levels of lead and copper. Approximately 600 pounds of munitions debris (MD), primarily 20-mm practice rounds, and a ballistic nose cone from a 3.5 inch High Explosive Anti-tank rocket were removed.

As part of the Air Force MMRP, the U.S. Army Corps of Engineers (USACE) – Omaha District contracted with EA Engineering, P.C. (EA) to complete an Engineering Evaluation/Cost Analysis to evaluate alternatives to address unacceptable risk at the MRS. EA has also completed an Action Memorandum that documents the selected alternative that EA will implement to mitigate the risk at the MRS. EA has proposed to conduct an additional NTCRA at the Firing-In Buttress to remove all debris associated with previous military training. Soil is the only constituent of concern at the site.

NTCRA

The NTCRA is planned to be completed in early 2019 and will take approximately one month to complete. The NTCRA will consist of mag and dig, and soil sifting operations to remove MEC, MD and Small Arms Ammunition (SAA) from surface and subsurface soil located within the confines of the FIB. The FIB is approximately 85-ft long by 25-ft deep with a height of 15-ft. The exterior and interior wooden timbers of the FIB will also be inspected for any MEC, MD, and SAA and removed from the FIB structure. Any identified MEC, MD, or SAA will be removed from the soil and wooden timbers. The metal debris will then be appropriately recycled. The concrete structure of the FIB will then be demolished and recycled off-site at a local quarry. The sifted soil will be sampled to ensure lead and copper concentrations do not exceed residential use soil cleanup objectives (SCOs). The soil will then be returned to the excavated area and will be used to re-grade the area to match existing topography. If lead and/or copper concentrations in soil exceed the residential use SCOs and meet requirements for non-hazardous disposal, then the soil will be disposed of off-site. If soil does not meet the requirements for non-hazardous disposal based on lead concentrations, then the soil will be chemically stabilized to meet requirements for non-hazardous disposal.

Following completion of the NTCRA field work, reports will be written, including a Site Specific Final Report and an After Action Report, to document the activities completed and the objectives that were achieved.

Questions

For further information regarding the Hancock Field NTCRA activities, please contact Mr. Jason Preston at (315) 233-2111 or by email at Jason.m.preston3.nfg@mail.mil

Appendix F

Standard Operating Procedures

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STANDARD OPERATING PROCEDURES

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STANDARD OPERATING PROCEDURE – SOP 01
FIELD LOGBOOKS

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for recording field activity information in the Field Logbook.

2.0 MATERIALS

The following materials may be required:

- Field Logbook (Teledyne 415 Level Book, or equivalent)
- Indelible ink pen

3.0 PROCEDURE

All information pertinent to field activities will be recorded in a bound logbook. Each page/form will be consecutively numbered, dated, and signed. All entries will be made in indelible ink and all corrections will consist of line-out deletions that are initialed and dated. The person making the correction will provide a brief explanation for the change. There should be no blank lines on a page. A single blank line or a partial blank line (such as at the end of a paragraph) should be lined to the end of the page. If only part of a page is used, the remainder of the page should have an "X" drawn across it. At a minimum, entries in the logbook will include but not be limited to the following:

- Project number
- Unique, sequential field sample number
- Purpose of sampling
- Location, description, and log of photographs
- Name and address of field contact
- Identification of crew members
- References such as maps of the site
- Field observations (e.g., incidental odors, etc.)
- Any field measurements made
- Signature and date by the personnel responsible for observations
- Decontamination procedures, if applicable.

No general rules can specify the extent of information that must be entered in a logbook. However, records should contain sufficient information so that someone can reconstruct the field activity without relying on the collector's memory. The Project Manager will keep a master list of all field logbooks assigned to the Team Leaders. One logbook kept by the Project Manager will be a master site log of daily activities and will contain the list of field logbooks assigned to Team Leaders.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCES

U.S. Environmental Protection Agency. 1980. *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans*, QAMS-005/80.

STANDARD OPERATING PROCEDURE – SOP 02
VEGETATION REMOVAL OPERATIONS

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide EA Engineering, P.C. (EA) employees and subcontractors with the minimum procedures and safety and health requirements applicable to perform vegetation removal operations on sites contaminated with munitions and explosives of concern (MEC).

2.0 SCOPE

This SOP applies to all EA site personnel, including contractor and subcontractor personnel, involved in the conduct of vegetation removal operations on a site potentially contaminated with MEC. This policy is not a stand-alone document; rather, it is to be used together with the applicable project-specific Work Plan; Accident Prevention Plan (APP); Quality Assurance Project Plan (QAPP); applicable federal, state, and local regulations; and contract restrictions and guidance. Consult the documents listed in Section 11.0 of this SOP for additional compliance issues.

3.0 MAINTENANCE

The Project Manager (PM), in collaboration with the Site Supervisor and or Senior Unexploded Supervisor (SUXOS) is responsible for the maintenance of this procedure. Approval authority rests with the Program Quality Control Manager (PQCM).

4.0 PERSONNEL REQUIREMENTS AND RESPONSABILITIES

4.1 PROJECT MANAGER

The PM shall be responsible for ensuring the availability of the resources needed to implement this SOP and will also ensure that this SOP is incorporated into plans, procedures, and training for sites where this SOP is to be implemented.

4.2 RESPONSIBLE PERSONNEL

Only those personnel that meet the requirements set forth by the Client and EA will be utilized at the project site to facilitate safe and efficient vegetation removal operations.

5.0 TRAINING

All training on equipment will be either formal or on-the-job training. This training will be documented by site personnel and subject to review for accuracy and completeness.

6.0 PERSONAL PROTECTIVE EQUIPMENT

Level D personal protective equipment (PPE) is required for all personnel engaged in vegetation removal operations. Clothing includes, but is not limited to:

- Coveralls or work clothing as prescribed
- Work gloves, leather or canvas as appropriate
- Safety Glasses
- Hard Hats (if necessary)
- Hearing protection, noise attenuators, or ear plugs (if necessary)
- Dust mask, as required by wind conditions and/or the presence of airborne particulate matter
- Other PPE as needed. (e.g., face shield, chainsaw chaps, etc.).

7.0 TEAM COMPOSITION

The Vegetation Removal Team will consist of two qualified personnel, with a UXO Tech II at a minimum in areas that MEC/UXO may be or suspected to be present. The remaining personnel may include any or all of the following:

- UXO Technician II or I
- Operator

The operator(s) will be qualified and trained on the equipment being utilized (e.g., skid steer, mower/brush hog, brush trimmer, chainsaw, etc.) and will operate the equipment in a safe and efficient manner. The operator performs daily inspections and maintenance functions as recommended in the operator's manual for each piece of equipment. The equipment operator will perform other duties as needed or directed.

8.0 SAFETY

Safety is paramount and all personnel will observe those safety precautions/warnings that apply or may apply to vegetation removal operations. The precautions listed below are general in nature and personnel will need to review applicable publications for the equipment being used (e.g., skid steer, mulcher, brush trimmer, chainsaw, etc.) for more specific safety precautions/warnings. Distances listed are the minimum required.

- Maintain safe separation distance from UXO personnel engaged in intrusive work.
- Distances may be increased by the UXO Safety Officer (UXOSO) as determined by site history, UXO items encountered, terrain features, and other factors that may apply.
- Use equipment safety features.

- Safety precautions and warnings found in the operator's manual or manufacture's publications will be observed.
- Maintain 6 inches of ground clearance during vegetation removal operations.
- Communications will be maintained between the SUXOS and operator at all times.
- Maintain site control.
- Observe UXO safety precautions for items encountered or suspected.
- Ensure PPE is appropriate, serviceable, and worn/used in a proper manner.

9.0 OPERATIONAL PROCEDURES

Personnel will not enter within a minimum of 10 feet (ft.) of the Vegetation Removal Team while vegetation removal equipment (e.g., skid steer, mower/brush hog, brush trimmer, chainsaw, etc.) is in operations. If at any time personnel enter closer than 10 ft., the operator will immediately stop, return the engine to idle speed, and cease operations. Prior to operations commencing, a communications check with all team personnel will be conducted. Hand signals will be devised and used as a means of communication. All team personnel must know these hand signals prior to operations commencing. The hand signals will be documented on the tailgate safety-briefing sheet each morning of operations and at each change of team personnel.

The UXO Technician II will be responsible for the direction and manner in which the vegetation is to be removed. Prior to removal operations commencing, a visual search / survey is conducted to determine the hazards that may be encountered, which may include MEC, terrain slope, vegetation, wildlife, or environmental concerns, and will dictate PPE requirements. The UXO Technician II will perform a visual search for MEC, ordnance scrap, surface debris, and any other obstruction / object that may pose a hazard to team personnel. Hazardous items, impassable terrain, or vegetation that may affect operations will be marked and team personnel notified.

When using brush trimmers or chain saws the following safety controls must be employed:

- Brush trimmer or chain saw must have an automatic chain brake of kickback device
- PPE, including eye, ear, hand, foot (safety shoes), and leg protection are required to be worn by the Vegetation Removal Team
- Brush trimmer or chain saws will not be fueled while running, while hot, or near an open flame
- Operator will hold the brush trimmer or chain saw with both hands during cutting operations
- Brush trimmers and chain saws will not be used to cut above the operators' shoulder height.

The Vegetation Removal Team are to ensure that a 6-inch ground clearance is maintained during vegetation removal operations. Those areas marked as hazards are to be avoided. The manner in which operations are accomplished will follow safe work practices and procedures. Areas of

concern will be addressed to the SUXOS and/or UXO Quality Control Specialist (UXOQCS) / UXOSO as needed. All MEC items encountered are marked and avoided. Notification of these items will be made to the appropriate personnel.

10.0 SUMMARY

EA personnel will conduct vegetation removal operations in a safe, efficient, and productive manner and will use this SOP and references, which include changes and revisions.

11.0 REFERENCES

EA Corporate Safety and Health Program (CSHP)

Project APP

Occupational Safety and Health Administration (OSHA) Regulations

U.S. Army Corps of Engineers (USACE), Engineer Manual 385-1-1

USACE, Engineer Manual 385-1-97

Operator's Manual(s) and Manufacture's Publications

STANDARD OPERATING PROCEDURE – SOP 03
HAND AND POWER TOOL OPERATION

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide all EA Engineering, P.C. (EA) employees and subcontractors with the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of power and hand tools.

2.0 SCOPE

This SOP applies to all site personnel, to include contractor and subcontractor personnel, involved in the conduct of operations that require the use of power and hand tools. This SOP is not intended to contain all the requirements needed to ensure regulatory compliance. Consult the documents listed in Section 6.0 of this SOP for additional compliance issues.

3.0 MAINTENANCE

The Project Manager (PM), in collaboration with the Site Supervisor and or Senior Unexploded Supervisor (SUXOS) is responsible for the maintenance of this procedure. Approval authority rests with the Program Quality Control Manager (PQCM).

4.0 PERSONNEL REQUIREMENTS AND RESPONSIBILITIES

4.1 PROJECT MANAGER

The PM shall be responsible for ensuring the availability of the resources needed to implement this SOP and shall also ensure that this SOP is incorporated into plans, procedures, and training for sites where this SOP is to be implemented.

4.2 SENIOR UXO SUPERVISOR

The SUXOS will ensure that this SOP is reviewed prior to power and hand tool operations. The SUXOS will also ensure that relevant sections of this SOP are discussed in the tailgate safety briefings, and that information related to its daily implementation is documented in the Site Daily Field Report (provided in Appendix G to the Work Plan).

4.3 UXO TECHNICIAN III

The unexploded ordnance Technician III (UXOTIII) shall be responsible for the field implementation of this SOP and for implementing the safety and health requirements outlined in Section 5.1 of this SOP. In the absence of a SUXOS, the UXOTIII shall be responsible for implementing the SUXOS's responsibilities.

4.4 UXO SAFETY OFFICER

The UXO Safety Officer (UXOSO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily tailgate safety briefings. The UXOSO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in power and hand tool operations shall be familiar with the potential safety and health hazards associated with their usage, and with the work practices and control techniques to be used to reduce or eliminate those hazards.

5.1 SAFETY AND HEALTH OPERATIONAL CONTROL TECHNIQUES

5.1.1 Power Tools

Power tools have great capability for inflicting serious injury upon personnel, if they are not used and maintained properly. To control the hazards associated with power tool operation, the safe work practices listed below shall be observed when using power tools:

- Operation of power tools shall be conducted by authorized personnel familiar with the tool, its operation, and the manufacturer's recommended safety precautions.
- Power tools shall be inspected prior to use, and defective equipment shall be removed from service until repaired.
- Power tools designed to accommodate guards shall have such guards properly in place.
- Loose fitting clothing or long hair shall not be permitted around moving parts.
- Hands, feet, and other appendages shall be kept away from all moving parts.
- Maintenance and/or adjustments to equipment shall not be conducted while it is in operation or connected to a power source.
- An adequate operating area shall be provided, allowing sufficient clearance for operation.
- Good housekeeping practices shall be followed at all times.

5.1.2 Hand Tools

Use of improper or defective tools can contribute significantly to the occurrence of accidents on site. Therefore, the work practices listed below shall be observed when using hand tools:

- Hand tools shall be inspected for defects prior to each use.
- Defective hand tools shall be removed from service and repaired or properly discarded.
- Tools shall be selected and used in the manner for which they were designed.
- Be sure of footing and grip before using any tool.
- Do not use tools that have split handles, mushroom heads, worn jaws, or other defects.
- Gloves shall be worn to increase gripping ability and/or if cut, laceration, or puncture hazards exist during the use of the tool.
- Safety glasses or a face shield shall be used, if the use of tools presents an eye/face hazard.
- Do not use makeshift tools or other improper tools.
- When working overhead, tools shall be secured to prevent them from falling.
- Use non-sparking tools in the presence of explosive vapors, gases, or residue.
- If hand tools become contaminated, they must be properly decontaminated, bagged, marked, and held for disposition by the UXOQCS / UXOSO.
- Tools used in the exclusion zone (EZ) that have porous surfaces, such as wooden or rubber coated handles, shall be discarded as contaminated upon termination of site activities, unless testing can prove the absence of contamination.

5.2 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

The following safety measures and personal protective equipment (PPE) shall be used in preventing or reducing exposures associated with power and hand tool operations. These requirements will be implemented, unless superseded by specific requirements stated in the Accident Prevention Plan (APP).

- Hard hat and safety boots shall be worn when working with power or hand tools.
- Safety glasses with side shields shall be worn at all times when operating, servicing, or working around hand or power tools.
- Hearing protection shall be worn if hand/power tool operation has the potential for noise exposures greater than 85 decibels (dBA) Time Weighted Average.
- Leather, or other protective, gloves shall be worn when using hand/power tools.

- Protective face shields shall be worn for all operations that have the potential for generating flying fragments, objects, chips, particles, or similar.

6.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards and U.S. Army Corps of Engineers (USACE) requirements directly apply to the conduct of operations associated with this SOP. In the event that other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed:

- OSHA Construction Standard 29 CFR, Part 1910, Subpart O
- OSHA General Industry Standard 29 CFR, Part 1926, Subpart I
- USACE Engineer Manual 385-1-1, Section 13.

STANDARD OPERATING PROCEDURE – SOP 04
MUNITIONS DEBRIS INSPECTION

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the munitions potentially possessing explosive hazards procedures at EA Engineering, P.C. (EA). This SOP is not meant to be all inclusive, nor is it applicable in all situations. This policy is not a standalone document; rather, it is to be used in conjunction with the applicable project-specific Work Plan (WP); Accident Prevention Plan (APP)/Site Safety and Health Plan (SSHP); applicable federal, state, and local regulations; contract restrictions; and guidance.

2.0 SCOPE

This SOP applies to all site personnel, including subcontractor personnel, involved in the conduct of operations on munitions response sites requiring munitions debris (MD) / non-munitions related debris (NMRD) (e.g., scrap) inspection and certification activities. This SOP is not intended to contain all of the requirements needed to ensure compliance. Consult the documents listed in the reference sections of the WP and APP/SSHP.

3.0 MAINTENANCE

The Project Manager (PM), in collaboration with the Site Supervisor and or Senior Unexploded Ordnance Supervisor (SUXOS) is responsible for the maintenance of this procedure. Approval authority rests with the Program Quality Control Manager (PQCM).

4.0 MPPEH INSPECTION AND CERTIFICATION

EA MEC Projects will comply with the following procedures for collection, inspection, and certification and final disposal of Material Potentially Presenting an Explosive Hazard (MPPEH), MD, Range Related Debris (RRD) and NMRD.

MPPEH must be controlled and managed (e.g., sorted, segregated, stored, secured from the time of recovery through the release from DoD control to prevent its unauthorized use, transfer or release, and to protect personnel and property from uncontrolled exposures to potential explosive hazards. This must be accomplished by ensuring the chain-of-custody remains intact during the entire process from discovery to final disposition. See Attachment 1—Figure 1: MPPEH Process that depicts the flow of the MPPEH process from recovery to release from DoD control.

4.1 ROLES AND RESPONSIBILITIES

The following outlined section addresses the roles and responsibilities for each position normally involved in military munitions response (MMR) projects in regard to the planning, recovery, inspection process, handling, and storage of MPPEH, MD, RRD and NMRD on MMR projects.

4.1.1 PM:

a. Ensure that current and thorough MPPEH Management procedures are contained in the project plans.

b. Ensure that the MPPEH Management, inspection and certification procedures are being followed in accordance with the Site-Specific work plan and SOP.

c. Coordinate final disposition of all Materials Documented as Safe (MDAS) with the EA approved recyclable facility.

4.1.2 SITE SUPERVISOR AND SENIOR UNEXPLODED ORDNANCE SUPERVISOR (SUXOS):

a. Responsible for ensuring work and QC plans specify the procedures and responsibilities for processing MPPEH for final disposition as MD, RRD and NMRD.

d. Ensure a requisition and turn-in document, DD Form 1348-1A is completed for all MD and RRD to be transferred for final disposition to an approved EA recycle facility.

b. Perform a daily inspection (with the UXOQCS) of all MPPEH collected (100%) and released by the UXOTIII to ensure no items with explosive hazards, engine fluids, illuminating dials and other visible liquid hazards, toxic or radiological waste (HTRW) materials are identified as MD, RRD or NMRD.

c. Maintain <u>one of two</u> keys to the lockable container.

d. Certify all MD and RRD is free of explosive hazards, engine fluids, illuminating dials and other visible liquid HTRW materials.

e. Be responsible for ensuring that the daily inspected debris is secured in a closed, lockable container.

f. Maintain the MDAS Container Log (Attachment 2, Form 005) for all lockable containers of certified MDAS.

4.1.3 UXO Safety Officer (UXOSO):

a. Ensures all procedures for processing MPPEH are being performed safely and consistent with applicable regulations the Site-Specific Work Plan and associated guidance/planning documents.

4.1.4 UXO Quality Control Specialist (UXOQCS):

a. Conduct daily audits of the procedures used by UXO personnel to assess whether the processes and procedures as stated in the Site-Specific Work Plan and this SOP for MPPEH are being followed.

b. Perform a daily inspection (with the SUXOS) of all MPPEH collected (100%) and released by the UXOTIII to ensure no items with explosive hazards, engine fluids, illuminating dials and other visible liquid HTRW materials are identified as munitions debris or range-related debris or NMRD.

c. Ensure that the daily inspected MD and RRD is placed in a closed lockable container. All NMRD is to be placed in a second closed lockable container.

d. Maintain one of two keys for each lockable container.

4.1.5 UXO Technician III (UXOTIII):

a. Performs a 100% daily re-inspection of all recovered items prior to departing the work area to determine if items are free of explosives hazards or other dangerous fillers and engine fluids, illuminating dials and other visible liquid HTRW materials.

b. Ensures that segregation is appropriate for all items not requiring demilitarization or venting from those items that do require demilitarization or venting.

c. Segregates all MD, NMRD, and RRD prior to the SUXOS and UXOQCS inspection at the MPPEH collection point.

d. If at any time an item is questionable, cannot be 100% identified, or its condition undetermined, it will remain at the location discovered prior to being transported to the MPPEH collection point, pending evaluation and disposition by the SUXOS, UXOQCS, UXOSO, and OESS.

4.1.6 UXO Technician II (UXOTII):

a. Weigh each item and perform a 100% inspection of each item as it is discovered and determine the following:

   (1) Whether the item is an UXO, MD, RRD or NMRD.

   (2) Whether the item contains explosives hazards or other dangerous fillers.

   (3) If the item is suspected to be unacceptable to move and requires detonation.

   (4) Whether the item requires demilitarization or venting to expose dangerous fillers.

   (5) Whether the item requires draining of engine fluids, illuminating dials and other visible liquid HTRW materials.

b. Segregate all items not requiring demilitarization or venting from those items that do require demilitarization or venting.

c. The SUXOS and UXOSO will be notified immediately if items are found to contain other dangerous fillers. Items will not be moved pending assessment by the SUXOS and UXOSO.

4.1.7 UXO Technician I:

UXO Technician I (UXOTI) can tentatively identify a located item as MPPEH, followed by a required confirmation by a UXOTII or UXOTIII.

4.1.8 Unexploded Ordnance Sweep Personnel (UXOSP):

Unexploded Ordnance Sweep Personnel (UXOSP) will only mark suspected items and will not be allowed to perform any assessment of suspect items to determine its status.

4.2 MUNITIONS DEBRIS (MD) CERTIFICATION AND VERIFICATION

The SUXOS will certify (prior to off-site release) that all munitions debris and range-related debris is free of explosive hazards and the OESS will verify the MPPEH inspection process has been followed. If an OESS is not on-site, the UXOQCS, or a similarly trained individual can be delegated to verify the MPPEH process.

DD Form 1348-1A (Attachment 2, Form 001) will be used as certification/verification documentation. All DD 1348-A forms must clearly show the type or printed names of the SUXOS and the OESS, organization, signature, and EA home office and field office phone number(s) of the personnel certifying and verifying the debris as free of explosive hazards.

4.2.1 Data Elements for DD Form 1348-1A

In addition to the data elements required and any locally agreed to directives, the DD 1348-1A form must clearly indicate the following for NMRD:

a. Basic material content (Type of metal; e.g., steel or mixed)

b. Estimated weight

c. Unique identification of each of the containers and seals stated as being turned over

d. Location where munitions debris or range-related debris was obtained

e. Seal identification, if different from the unique identification of the sealed container.

4.2.2 Certification/Verification Statement (HTRW)

The following certification/verification will be entered on each DD 1348-1A for turnover of munitions debris or range-related debris and will be signed by the SUXOS and the USACE OESS (if present). This statement will be used on any ranges where RRD is being processed along with MD;

"This certifies that the material listed has been 100 present properly inspected and, to the best of our knowledge and behalf is free of explosive hazards, engine fluids, illumination dials and other visible liquid HTRW materials"

4.2.3 Certification/Verification Statement (Munitions Debris only)

The following certification/verification will be entered on each DD 1348-1A for turnover of munitions debris and will be signed by the SUXOS on properties where only munitions debris is being processed:

"This certifies and verifies that the material listed has been 100 percent inspected and to the best of our knowledge and belief, is inert and/or free of explosives or related materials"

4.3 MAINTAINING THE CHAIN OF CUSTODY AND FINAL DISPOSITION

All certified and verified MDAS is no longer considered MPPEH as long as the chain of custody remains intact. The EA PM and SUXOS will arrange for maintaining the chain of custody of all MDAS while being transported offsite for final disposition. See Attachment 2, Form 002 for a copy of the MDAS chain of custody that is to be completed throughout the process. The certified and verified material will only be released to an organization approved by EA beforehand that agree to the following procedure:

a. Upon receiving the unopened labeled containers each with its unique identified and unbroken seal ensuring a continued chain of custody, and after reviewing and concurring with all the provided supporting documentation, sign for having received and agreeing with the provided documentation that the sealed containers contained no explosive hazards when received. This will be signed on company letterhead and stating that the contents of these sealed containers will not be sold, traded or otherwise given to another party until the contents have been smelted and are only identifiable by their basic content. See Attachment 2, Form 003 as an example.

b. Send notification and supporting documentation to EA documenting the seal containers to the PM that the material has been smelted and are now only identifiable by their basic content. See Attachment 2, Form 004 as an example.

This document will be incorporated by EA into the Final Report and maintained within the corporate office for a period of no less than three years as documentation supporting the final disposition of MDAS and RRD. A legible copy of inspection, re-inspection, and documentation must accompany the material through final disposition and be maintained for a period of three (3) years thereafter and incorporated by EA into any final action reports or the like.

4.3.1 Unsecured MDAS Container or Broken Seal on Container

If the MDAS container is discovered to be unsecured or if a Custody Seal has been applied and is discovered to be broken, the contents must undergo a second 100 % re-inspection. The re-inspection will be conducted and be documented to verify its explosives safety status (identified as either munitions debris or range-related debris).

A legible copy of the re-inspection, and documentation must accompany the material through final disposition and be maintained for a period of three (3) years thereafter.

Attachment 1

MPPEH Process

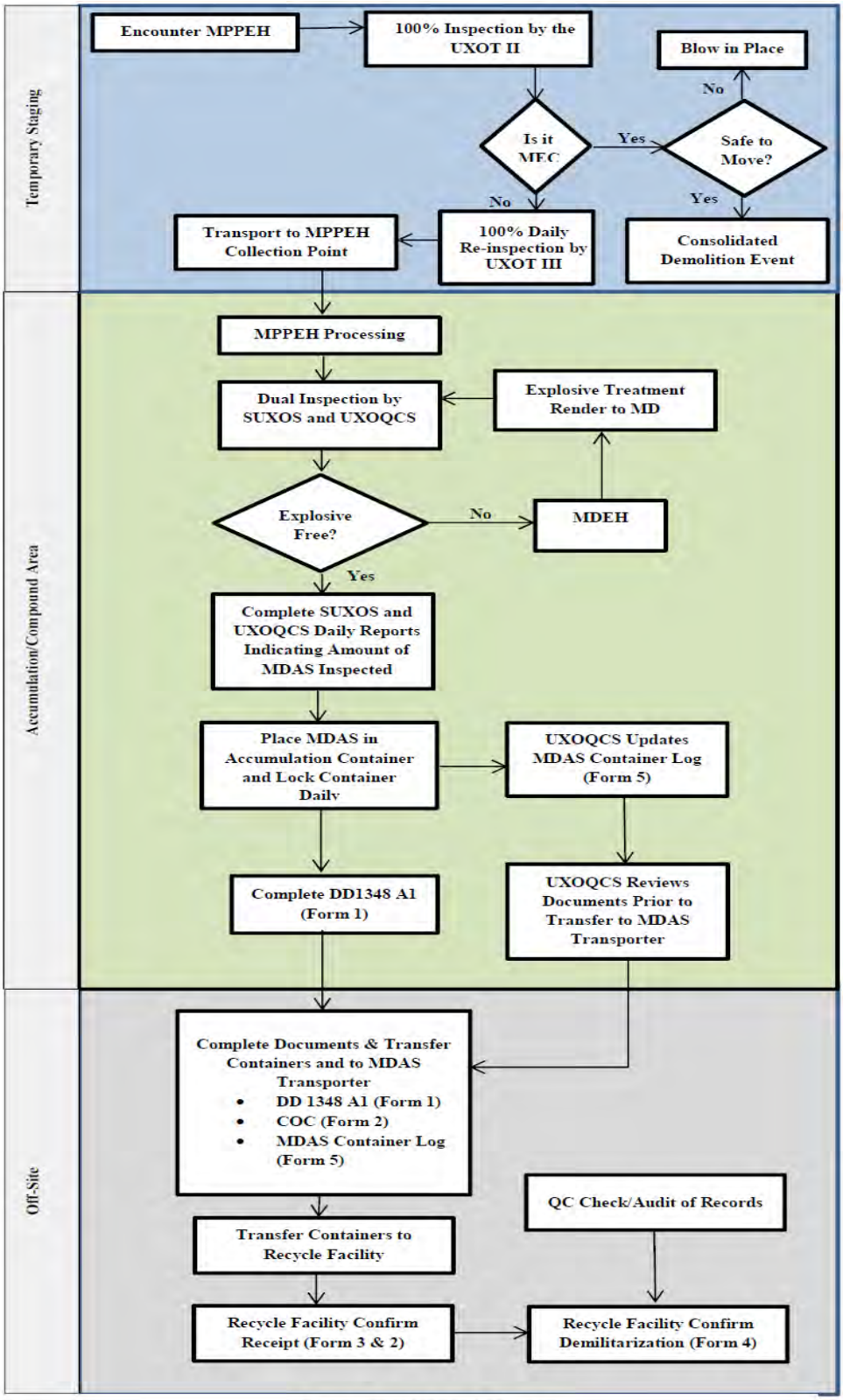


Figure 1: MPPEH Process

Attachment 2

Documentation Forms

Form 001 - DD 1348-1A

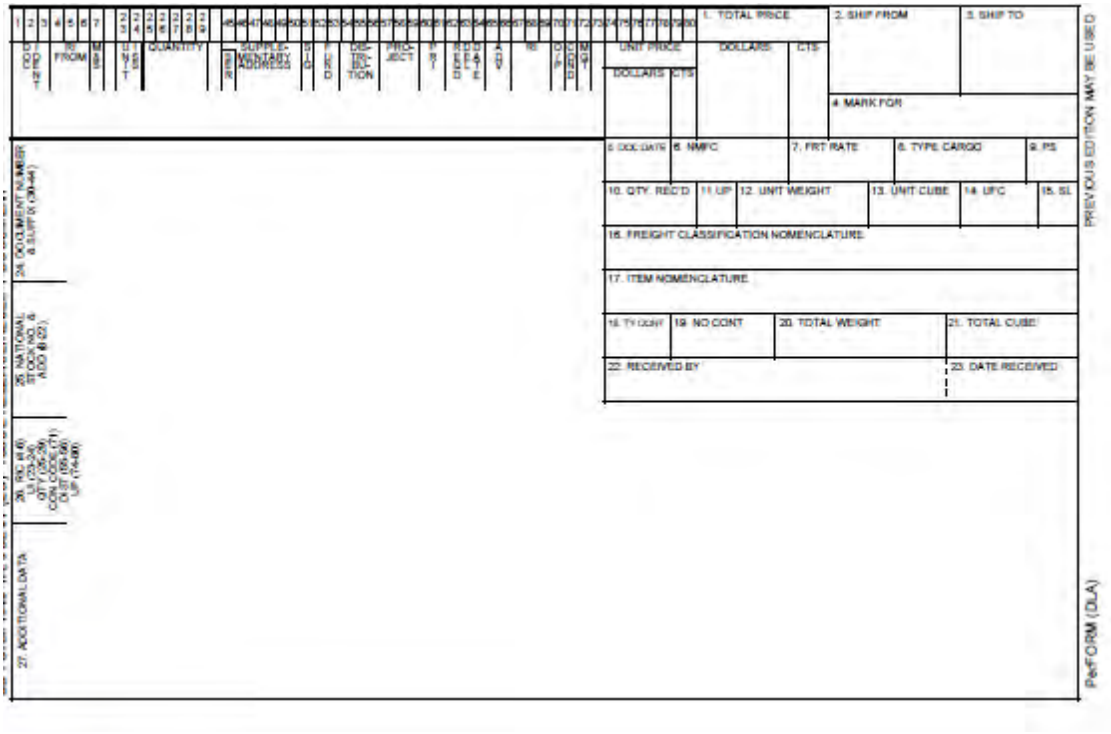
Form 002 - Material Documented as Safe (MDAS) Chain of Custody

Form 003 - Example Material Documented as Safe (MDAS) Receipt Form

Form 004 - Example Material Documented as Safe (MDAS) Disposal Confirmation Form

Form 005 - Material Documented as Safe (MDAS) Container Log

Form 001
DD 1348-1A



Form 002
Material Documented as Safe (MDAS) Chain of Custody Form

General	**Material Documented as Safe Certification Chain of Custody**			
	1. Generator's Name and Mailing Address			1.a Generator's Ph # ( )
	2. Project Location			2.a Project Ph # ( )
	3. MPPEH Contractor Name and Mailing Address			3.a MPPEH Contractor Ph# ( )
	4. Government Assigned Verification Name and Mailing Address (if used)			4.a Verifier Ph # ( )
	5. Transporter Name and Mailing Address			5.a Transporter Ph # ( )
	6. Recycler Name and Mailing Address			6.a Recycler Ph # ( )
	7. Container ID #	8. Security Seal #	9. Manifest #	10. Date
Explosives Safety Status Certification and Verification	11. Description	12. Material	13. QTY	14. Unit (i.e., drum)
	15. MATERIAL DOCUMENTED AS SAFE CERTIFICATION: This certifies and verifies that the material listed has been 100 percent inspected and to the best of our knowledge and belief, is inert and/or free of explosives or related materials.			
	16. SUXOS Certification			
	Signature	Address	Date	
	Printed/Typed Name		Phone	
	17. OESS Verification			
	Signature	Address	Date	
	Printed/Typed Name	Phone		
Transporter	**18. Transporter Acknowledgement of Receipt of Materials** (Receiving Signature Verifies that Container was Received with Seal Intact)			
	Signature	Address	Date	
	Printed/Typed Name		Phone	
	19. EA Acknowledgement of Transfer of Materials (Signature verifies that Container was Transferred to Transporter with Seal Intact)			
	Signature	Address	Date	
	Printed/Typed Name		Phone	
	20. Discrepancy Indication Space			
	Signature	Address	Date	
	Printed/Typed Name		Phone	
	21. Recycler Acknowledgement of Receipt of Materials (Receiving Signature Verifies that Drums were Received with Seal Intact)			
	Signature	Address	Date	
	Printed/Typed Name		Phone	
Demil. and/or Recycle Facility	**22. DEMILITARIZATION/RECYCLING CONFIRMATION:** This certifies and verifies that each item or items contained have been demilitarized to the minimum requirements of DOD Instruction 4160.21-M-1, *Defense Demilitarization Manual*. (**To be signed by person performing the demilitarization – Recycler or UXO Technician**)			
	23. Recycler			
	Signature	Address	Date	
	Printed/Typed Name		Phone	
	24. Senior UXO Supervisor Verification			
	Signature	Address	Date	
	Printed/Typed Name		Phone	
	25. Final Disposition (If other than recycling)			

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Form 003
Example Material Documented as Safe (MDAS) Receipt Form

Company XXXX Recycles Letterhead

Date: *DDMMYY*

Dear *Mr/Ms:*

On *DDMMYY*, the contents of sealed container/*s #EA 000X, Seal Serial Number XXXX* were received from EA Engineering, P.C., *SOMEWHERE* project site.

Company XXXX Recycles has received and inspected the sealed container/s and agree that the material received is MD and contains no explosive hazards.

The contents of the sealed container/s are to be processed in accordance with DoD 4160-21 M-1, and will not be sold, traded or otherwise given to another party until the contents have been smelted and only identifiable by their basic content.

Enclosed is the signed Chain of Custody that was received along with the containers.

Signed:

Name:

Point of Contact Information:

Form 004
Example Material Documented as Safe (MDAS) Disposal Confirmation Form

Company XXXX Recycles Letterhead

Date: *DDMMYY*

Dear *Mr/Ms:*

I certify that the contents of sealed container/*s #EA 000X, Seal Serial Number XXXX* received on *DDMMYY* from EA Engineering, P.C. from *SOMEWHERE* project site were demilitarized in accordance with guidelines in DoD 4160.21-lVI-l and have been smelted and are only identifiable by their basic content.

Signed:

Name:

Point of Contact Information:

Form 005
Material Documented as Safe (MDAS) Container Log

Date	MDAS Type (Steel, Iron…)	Quantity	Certifier	Verifier	Container ID	Seal Number	COC Number	Total Items

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STANDARD OPERATING PROCEDURE – SOP 05
INTRUSIVE OPERATIONS

1. PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide all EA Engineering, P.C. (EA) employees and subcontractors with the minimum procedures and safety and health requirements applicable to the conduct of analog detection and removal actions at sites potentially containing munitions and explosives of concern (MEC). This SOP can also be used following reacquisition of digitally collected geophysical anomalies.

2. SCOPE

This SOP applies to all EA site personnel, including contractor and subcontractor personnel, involved in the conduct of analog detection and removal actions on an MEC-contaminated site. The following EA policies and procedures are not all inclusive nor are they applicable in all situations. This SOP is not a stand-alone document and is to be used together with the entire Work Plan, other EA SOPs, applicable Federal, State, and local regulations, and contract restrictions and guidance. Consult the documents listed in Section 8.0 of this SOP for additional compliance issues.

3. MAINTENANCE

The Project Manager (PM), in collaboration with the Site Supervisor and/or Senior Unexploded Supervisor (SUXOS) is responsible for the maintenance of this procedure. Approval authority rests with the Program Quality Control Manager (PQCM).

4. PERSONNEL REQUIREMENTS AND RESPONSIBILITIES

4.1 PROJECT MANAGER

The PM is responsible for ensuring availability of resources to safely and effectively implement this SOP.

4.2 SENIOR UXO SUPERVISOR

The SUXOS will ensure that this SOP is implemented in plans, procedures, and training. In addition, he is responsible for oversight and supervision of field personnel and ensuring compliance with this SOP.

4.3 UXO QUALITY CONTROL SPECIALIST

The Unexploded Ordnance Quality Control Specialist (UXOQCS) ensures compliance with the Project Quality Assurance Project Plan and performs analog magnetometer quality control checks of completed digs in the grids / transects in accordance with the Work Plan.

4.4 UXO SAFETY OFFICER

The Unexploded Ordnance Safety Officer (UXOSO) ensures that all magnetometer and intrusive activities are conducted in a safe manner, in accordance with the approved Work Plan, the Accident Prevention Plan (APP), this SOP, and all applicable regulatory guidance. The UXOSO's duties shall include, but are not limited to: analyzing MEC, explosives operational risk, hazards, and safety requirements; establishing and ensuring compliance with all site-specific safety requirements for MEC and explosives operations; enforcing personnel limits and safety exclusion zones (EZ) for MEC clearance operations; and all activities associated with MEC and explosives transportation, storage, and destruction.

5. OPERATIONS

5.1 INTRUSIVE ACTIVITIES

All intrusive activities at MEC sites will be under the supervision of UXO-qualified personnel. Non-essential personnel will not be allowed in the EZ during intrusive operations unless prior approval is given by the contracting officer representative. If access is required by non-essential personnel and all work will stop while they are in the EZ.

Work may continue if authorized essential personnel are in the EZ. This authorizing process will include approval by the EA PM, EA Corporate Safety and Health Director, the UXOSO, and the Ordnance and Explosives Safety Specialist (OESS). Project personnel listed in the APP, including the UXO team, surveying teams, and the field sampling teams, do not require this approval process. All authorized visitors will be given a safety briefing prior to entering EZ and will be provided a UXO-qualified escort regardless of their qualifications.
During operations, EA personnel will strictly adhere to the APP and the following general safety practices:

- Operations will be conducted during daylight hours only.
- Access to operating areas will be limited to only those personnel necessary to accomplish the specific operation.
- MEC/UXO will only be handled by qualified UXO Technicians.
- During MEC operations the minimum separation distance (MSD) between UXO and non-UXO operations is hazardous fragmentation distance (HFD) of the munition with the greatest fragmentation distance (MGFD), as stated in the Explosive Safety Submission.
- During demolition operations personnel remaining on site will be limited to those personnel needed to safely and efficiently prepare the item(s) for destruction.

- All personnel will attend the daily safety briefing (tailgate safety briefing) or a supplemental safety briefing provided by the UXOSO prior to entering the operating area.
- Anyone can stop operations for an unsafe act or situation.

- Safety violations and/or unsafe acts will be immediately reported to the UXOSO and SUXOS.

- Failure to comply with safety rules/procedures may result in termination of employment.

5.2 GRID LAYOUT

Depending on the method selected and approved by the customer, the site layout and search grids will be established using a Global Positioning System (GPS) or compass and measuring tape. Grid establishment will consist of GPS operators and at least one UXO Technician II or above who will provide UXO avoidance including checking the intended survey stake locations with a magnetometer prior to driving stakes into the ground. This will prevent driving stakes into potential subsurface MEC.

5.3 INTRUSIVE PROCEDURES

Intrusive operations require a minimum of a UXO Technician III and a UXO Technician II. During intrusive operations UXO Technicians I will operate under the supervision of UXO Technicians II or III. UXO operations will only be performed by qualified UXO Technicians, which are defined as:

- MEC/UXO identification.
- Access procedures such as excavation, either by hand or using heavy equipment.
- Handling of MEC, explosives, or explosive items.
- Disposal, including movement, transportation, and final disposal of MEC.

5.3.1 Pre-Survey Field Operations

Magnetometers, metal detectors and other electronic equipment will be maintained and tested in accordance with the manufacturer's instructions. Each piece of field equipment scheduled for that day's use will always be tested daily in a clean area and the adequacy of its power supply verified prior to commencement of work. Routine testing procedures will be identified, including the criteria for acceptable performance, and the action to be taken if the equipment fails to meet the criteria standards. A maintenance / test log will be maintained for each unit showing the manufacturer, model, serial number, and dates of repair, maintenance and calibration. Instrumentation used in the field will be tested with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the manufacture’s specifications. The method for measuring the instrument response will be to pass the instrument over a daily test area, or instrument verification strip (IVS), and compare the response to the

expected response. Testing, repair, or replacement records will be filed and maintained by the SUXOS and may be subject to audit at any time.

The manufacturer's written maintenance schedule shall be followed to minimize the downtime of the measurement systems. The operator's responsibility will be to adhere to this maintenance schedule and to arrange necessary and prompt service as required. At a minimum, equipment used daily will be cleaned at the end of each work day and kept in good operating condition. Service to the equipment, instrument, tools, etc. shall be performed by qualified personnel. In the absence of manufacturer's recommended maintenance criteria, a maintenance procedure will be developed based upon previous use of the equipment.

Equipment pre-operation procedures will be observed by the SUXOS and/or UXOQCS and recorded in the daily log. If equipment field checks indicate that a piece of equipment is not operating correctly and field repair cannot be made, the equipment will be tagged and removed from service. The SUXOS and/or UXOQCS will request repair or replacement from logistics. Replacement equipment will meet the same specifications for accuracy and sensitivity as the equipment removed from service. Metal detectors will be field tested each day on a known target to ensure they are operating properly. Fisher and Schonstedt (and similar) metal detectors do not require calibration; they have a simple "Go/No Go" field operational check. Failure to detect the test target is reason to reject the instrument and return it to the manufacturer for repairs. During daily operations, random checks of metal detectors will be performed to ensure the equipment is operating correctly. Daily maintenance will include cleaning, minor repairs to the equipment, and battery changes when needed. Repairs may include replacing control knobs and tightening connections as the stated in the manufacturer's manual. Major repairs will be accomplished by returning the equipment to the manufacturer. Batteries will be removed from metal detectors when stored for more than 24 hours and before shipment. Documentation of the status of the metal detectors will be recorded on the Team Leader's (Technician III's) daily journal/logbook.

5.3.2 Survey Field Operations

Initially, individual search lanes will be established approximately 5 feet (ft) wide. Each lane will be surveyed using a magnetometer. The operation will begin at one end of each lane and move in a forward direction toward the opposing baseline. During the forward movement the technician moves the magnetometer back and forth from one side of the lane to the other. Both forward movement and the swing of the magnetometer are performed at a pace that ensures the entire lane is searched and that the instrument is able to appropriately respond to subsurface anomalies. When a subsurface anomaly or metallic surface object is encountered, the UXO Technician halts and investigates the anomaly at that time. Throughout this operation the team leader closely monitors the team's individual performance to ensure these procedures are being performed correctly.

5.4 SURFACE MEC

Upon encountering a surface MEC it will be identified by two UXO Technicians and marked in accordance with the approved Work Plan for future disposition. If the item is unacceptable to

move or disposal operations cannot be arranged the same day as the MEC is identified, a guard will be posted during the non-working hours to ensure the item is not disturbed.

5.5 SUBSURFACE ANOMALIES

5.5.1 Manual Excavations

Subsurface anomalies detected using a magnetometer via the analog sweep process will be investigated by UXO personnel (with at least a UXO Technician II providing supervision) as they are identified during the analog sweep. Subsurface anomalies identified using DGM will be investigated by UXO personal (with at least a UXO Technician II providing supervision) following the data review and anomaly reacquisition processes. All reacquired anomalies (identified for investigation) within the grid will be intrusively investigated. Excavations for individual anomalies will be conducted using the magnetometers to assist the team in determining the location and orientation of the target item. The UXO Technicians excavating anomalies shall initially remove no more than a 6-inch layer of soil alongside the location of the anomaly, being careful not to impact the anomalous feature. The UXO Technician will conduct a visual and electronic search of the excavation to further pinpoint the anomaly source as needed. This process shall be repeated until the audible signal from the magnetometer indicates the object is close to the surface. Once this determination has been made, soil will be removed by hand until the source of the anomaly is located. If ground water is encountered during intrusive investigation the UXO Team(s) will record on the dig sheet or grid sheet as well in the UXO Team leaders log book.

5.5.2 Earth Moving Equipment

Earth Moving Equipment (EME) may be used to excavate large anomalies (e.g., pits) or deep anomalies if required (e.g., to confirm the anomaly is not a MEC). EME will not excavate within 12 inches of the suspected MEC or material potential presenting an explosive hazard (MPPEH). The excavation will proceed slowly to ensure the item is not broached by the EME. If the excavated material is considered to be an MEC, it shall be uncovered sufficiently by hand to obtain a positive identification of the item. While excavating with EME, a UXO Technician will be stationed in a position that is out of the reach of the excavation equipment but affords a view of the excavation site.

6. RECORD KEEPING

The team leader (UXO Technician III) will maintain a field logbook, which at a minimum will contain a record of the following:

- Weather
- Instrument details and serial number
- Team personnel
- Grids worked
- Start and stop times

- MEC items encountered

The data to be recorded for each item discovered during anomaly excavation will include the following (as applicable):

- Type (e.g., munitions debris, MPPEH, UXO, and non-MEC Scrap)
- Description (e.g., "projo, 20-millimeter [mm], practice, MK105" and "base, coupling, firing device")
- Initial Condition (e.g., expended, inert, live, and to be determined)
- Approximate length
- Approximate width
- Depth
- Approximate weight
- Found in a pit?
- Piece of fragmentation?
- Initial disposition (e.g., left in place and removed to scrap pile)
- Requires demolition?

7. DISPOSAL OPERATIONS

MEC items determined to be unacceptable to move, as per the SUXOS and UXOSO, will be blown in place (BIP) and MEC items determined to be acceptable to move will be consolidated whenever possible in accordance with USACE Engineer Pamphlet 1110-1-17, Establishing a Temporary Open Burn and Open Detonation Site for Conventional Ordnance and Explosives Projects, dated 16 July 1999, Appendix D. In no case shall the SUXOS authorize or undertake destruction of MEC when there is sufficient reason to believe that the disposal action will result in personnel casualties or property damage. The contractor officer representative and an USACE OESS will be consulted for guidance in the event that there is sufficient reason to believe that the disposal action will result in personnel casualties or property damage.

8. REFERENCES

EA Corporate Safety and Health Program (CSHP)

OSHA, 29 CFR 1910, Occupational Safety and Health Standards

OSHA, 29 CFR 1926, Construction Standards

Applicable sections of EPA, 40 CFR Parts 260 to 299, Protection of Environment

Applicable sections of DOT, 49 CFR Parts 100 to 199, Transportation

USACE EM 385-1-1, Safety and Health Requirements Manual

USACE ER 385-1-92, Safety and Occupational Health Document Requirements for Hazardous Waste Remedial Actions

USACE EM 385-1-97, Explosives Safety and Health Requirements Manual

DOD 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives

DOD Manual 6055.09, DOD Ammunition and Explosives Safety Standards

DOD 4160.21-M, Defense Reutilization and Marketing Manual

DA PAM 385-64, Ammunition and Explosives Safety Standards

AR 385-64, Ammunition and Explosives Safety Standards

AR 200-1, Environmental Protection and Enhancement

AR 385-10, The Army Safety Program

AR 385-16, System Safety Engineering and Management

AR 385-40 w/USACE supplement, Accident Reporting and Records

TM 9-1300-200, Ammunition General

TM 9-1300-214, Military Explosives

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STANDARD OPERATING PROCEDURE – SOP 06
DEMOLITION / DISPOSAL OPERATIONS

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide all EA Engineering, P.C. (EA) employees and subcontractors the minimum safety and health requirements applicable to the conduct of demolition / disposal of munitions and explosives of concern (MEC).

2.0 SCOPE

This SOP applies to all site personnel, including contractor and subcontractor personnel, involved in the conduct of MEC demolition / disposal operations on MEC-contaminated sites. This SOP is not intended to contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with approved project plans and applicable referenced regulations.

3.0 MAINTENANCE

The Project Manager (PM), in collaboration with the Site Supervisor and or Senior Unexploded Supervisor (SUXOS) is responsible for the maintenance of this procedure. Approval authority rests with the Program Quality Control Manager (PQCM).

4.0 PERSONNEL REQUIRMENTS AND RESPONSIBILITIES

4.1 PROJECT MANAGER

The PM shall be responsible for ensuring the availability of the resources needed to implement this SOP, and will also ensure that this SOP is incorporated into plans, procedures, and training for sites where this SOP is to be implemented.

4.2 SENIOR UXO SUPERVISOR

The SUXOS will be responsible for ensuring that adequate safety measures and housekeeping are performed during all phases of site operations, to include demolition activities, and will visit site demolition locations, as deemed necessary, to ensure that demolition operations are carried out in a safe, clean, efficient, and economic manner. The Demolition Supervisors Check List and Brief for Hancock Field (Attachment A of this SOP) will be completed to ensure appropriate procedures are followed. The demolition activities will then be conducted under the direct control of the SUXOS, who will have the responsibility of supervising all demolition operations within the area.

The SUXOS will be responsible for training all on-site unexploded ordnance (UXO) personnel regarding the nature of the materials handled, the hazards involved, and the precautions necessary. The SUXOS will also ensure that the Visitors Log, the Daily Field Report , and the Explosives Record of Use are properly filled out and accurately depict the demolition events and

demolition material consumption for each day's operations. The SUXOS will be present during all demolition operations or designate a competent, qualified person to be in charge during any absences.

4.3 UXO SAFETY OFFICER

The UXO Safety Officer (UXOSO) for the site is responsible for ensuring that all demolition operations are being conducted in a safe and healthful manner, and is required to be present during all MEC demolition operations. The UXOSO will ensure the compliance of the demolition team with the above referenced documents that are applicable to the particular task being performed.

4.4 UXO QUALITY CONTROL SPECIALIST

The UXO Quality Control Specialist (UXOQCS) is also responsible for ensuring the completeness of demolition operations records and for weekly inspection of the Explosives Record of Use, as well as completing the Daily Quality Control (QC) Report, and QC Inspection Record. The UXOQCS, assisted by demolition team personnel, will inspect each demolition pit and an area of appropriate radius after each demolition shot, in accordance with the approved Final Explosives Safety Submission, to ensure that there are no kick-outs, hazardous MEC components, or other hazardous items. In addition, the pit may be checked with a magnetometer, and large metal fragments, and any hazardous debris, will be removed on a per use basis. Any MEC discovered during the QC check will be properly disposed of using the demolition procedures in this SOP. Extreme caution must be exercised when handling MEC, which has been exposed to the forces of detonation. Personnel must adhere to acceptable safe practices and procedures when determining the condition of munitions and fuzes that have not been consumed in the disposal process.

5.0 GENERAL OPERATIONAL AND SAFETY PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in operations on MEC-contaminated sites will be familiar with the potential safety and health hazards associated with the conduct of demolition / disposal operations, and with the work practices and control techniques used to reduce or eliminate these hazards. All UXO that are to be disposed by demolition must be guarded. During demolition operations, the general safety provisions listed below will be followed by all demolition personnel, at all times. Noncompliance with the general safety provisions listed below will result in disciplinary action, which may include termination of employment.

All safety regulations applicable to demolition range activities and demolition and MEC materials involved will be complied with:

- Demolition of any kind is prohibited without an approved Final Explosives Safety Submission.

- The quantity of MEC to be destroyed will be determined by the range limit, fragmentation and K (degree of protection provided)-Factor distance calculations.

- In the event of an electrical storm, dust storm, or other hazardous meteorological conditions, immediate action will be taken to cease all demolition range operations and evacuate the area.

- In the event of a fire, which does not include explosives or energetic material, put out the fire using the firefighting equipment located at the site; if unable to do so, notify the fire department and evacuate the area. If injuries are involved, remove the victims from danger, administer first aid, and seek medical attention.

- The UXOSO is responsible for reporting all injuries and accidents that occur.

- Personnel will not tamper with any safety devices or protective equipment.

- Any defect or unusual condition noted that is not covered by this SOP will be reported immediately to the SUXOS, UXOQCS, and/or UXOSO for evaluation and / or correction.

- Methods of demolition will be conducted in accordance with this SOP and approved changes or revisions thereafter.

- Adequate fire protection and first aid equipment will be provided at all times.

- All personnel engaged in the destruction of MEC will wear clothing made of natural fiber, close-weave clothes, such as cotton. Synthetic material such as nylon is not authorized unless treated with anti-static material.

- Care will be taken to minimize exposure to the smallest number of personnel, for the shortest time, to the least amount of hazard, consistent with safe and efficient operations.

- Work locations will be maintained in a neat and orderly condition.

- All hand tools will be maintained in a good state of repair.

- Each heavy equipment and / or vehicle operator will have a valid operator's permit or license for the equipment being operated.

- Equipment and other lifting devices designed and used for lifting will have the load rating and date of next inspection marked on them. The load rating will not be exceeded, and the equipment will not be used without a current inspection date.

- Leather or leather-palmed gloves will be worn when handling wooden boxes, munitions, or MEC.

- Lifting and carrying require care. Improper methods cause unnecessary strains. Observe the following preliminaries before attempting to lift or carry:
  - When lifting, keep your arms and back as straight as possible, bend your knees and lift with your leg muscles.
  - Be sure you have good footing and hold, and lift with a smooth, even motion.

- The demolition range will be provided with two forms of communication, capable of contacting appropriate personnel or agencies (i.e., medical response, etc.).

- Motor vehicles and material handling equipment (MHE) used for transporting MEC or demolition materials must meet the following requirements:
  - Exhaust systems will be kept in good mechanical repair at all times.
  - Lighting systems will be an integral part of the vehicle.
  - One Class 10B: C rated, portable fire extinguisher will, if possible, be mounted on the vehicle outside of the cab on the driver's side, and one Class 10B: C fire extinguisher will be mounted inside the cab.
  - Wheels of carriers must be chocked, and brakes set during loading and unloading.
  - No demolition material or MEC will be loaded into or unloaded from motor vehicles while their motors are running.

- Motor vehicles and MHE used to transport demolition material and MEC will be inspected prior to use to determine that:
  - Fire extinguishers are filled and in good working order.
  - Electrical wiring is in good condition and properly attached.
  - Fuel tank and piping are secure and not leaking.
  - Brakes, steering, and safety equipment are in good condition.
  - The exhaust system is not exposed to accumulations of grease, oil, gasoline, or other fuels, and has ample clearance from fuel lines and other combustible materials.

- Employees are required to wear leather or rubber gloves during all handling of demolition materials (i.e. during shot setup). The type of glove worn is dependent on the type of demolition material.

- A red warning flag, such as an "Active Range Flag" or a wind sock, will be displayed at the entrance to the demolition range during demolition operations when required by local authority. If applicable, the entrance gate will be locked when demolition work is in process.

- Unless otherwise directed or authorized by the Final Explosives Safety Submission, all demolition shots will be tamped with an appropriate amount of earth/dirt.

- An observer will be stationed at a location where there is a good view of the air and surface approaches to the demolition range, before material is detonated. It will be the responsibility of the observer to order the SUXOS to suspend firing if any aircraft, vehicles, or personnel are sighted approaching the general demolition area.

- Two-way radios will not be operated in close proximity of the demolition range while the pit is primed or during the priming process. Radio transmissions and explosives will be separated by a minimum of 50 feet (ft).

- No demolition operation will be left unattended during the active portion of the operation (i.e., during the burn or once any explosives or UXO / MEC are brought to the range).

- A minimum radius (approximately 10 ft) around the demolition pit will be cleared of dry grass, leaves, and other extraneous combustible materials around the demolition pit area.

- No demolition activities will be conducted if there is less than a 2,000-ft ceiling or if wind velocity is in excess of 20 miles per hour (mph).

- Demolition shots must be fired during daylight hours (minimum time for sunrise and sunset is determined by the firing procedure used (i.e., electric, non-electric, shock tube 30/60/60).

- Notification of the local authorities will be made in accordance with the site requirements.

- Transporting demolition material or MEC. No person will be allowed to ride in the trailer or bed of the truck.

- Vehicles will not be refueled when carrying demolition material or MEC and must be 100 ft from magazines or trailers containing such items before refueling.

- All explosive vehicles will be cleaned of visible explosive and other contamination, before releasing the vehicles for other tasks.

- Prior to conducting any other task, personnel will wash their faces and hands after handling demolition material or MEC.

- Demolition pits will be spaced a safe distance apart, with no more than 10 pits prepared for a series of shots at any one time.

6.0 SPECIAL REQUIREMENTS FOR DEMOLITION ACTIVITIES

The following safety and operational requirements will be met during demolition range operations. Any deviations from this procedure will be allowed only after receipt of written

approval from the PM and the contracting officer representative (COR). Failure to adhere to the requirements and procedures listed in the paragraphs below could result in serious injury or death; therefore, complete compliance with these requirements and procedures will be strictly enforced.

6.1 GENERAL REQUIREMENTS

The general demolition range requirements listed below will be followed at all times:

- The Corps of Engineers – Huntsville Center "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on MEC Sites," will be followed when destroying multiple munitions by detonation on site. This document will be present onsite during site operations.

- White Phosphorus and propellant will be disposed of only in an approved manner and following the guidance for maximum temperature exposure (90 degrees Fahrenheit).

- Material awaiting destruction will be stored at not less than intra-line distance, based on the largest quantity involved, from adjacent explosive materials and from explosives being destroyed. The material will be protected against accidental ignition or explosion from fragments, grass fires, burning embers, or detonating impulses originating in materials being destroyed.

- MEC or bulk explosives to be destroyed by detonation should be detonated in a pit and covered with earth or sand bags. The components should be placed on their sides or in a position to expose the largest area to the influence of the demolition material. The demolition material should be placed in direct contact with the item to be detonated and held in place by tape or earth packed over the demolition materials. The total quantity to be destroyed below ground at one time will not exceed the range limit.

- Detonations will be counted to ensure detonation of all pits. After each series of detonations, a search will be made of the surrounding area for MEC. Items such as lumps of explosives or unfuzed ammunition may be picked up and prepared for the next shot. Fuzed ammunition, or items that may have internally damaged components, will be detonated in place, if possible.

- Prevailing weather condition information can be obtained from the local weather service, or other acceptable source and the data logged in the Daily Field Report.

- All shots will be dual primed.

- Whenever possible, during excavation of the demolition pits contour the ground so that runoff water is channeled away from the pits. If demolition operations are discontinued for more than 2 weeks, the pits should be backfilled until operations resume.

- Upon completion of the project, all disturbed demolition areas will be thoroughly inspected for MEC. Depending upon contract requirements, the site may have to be backfilled and leveled. If necessary, this will be coordinated with the COR.

- Prior to and after each shot, the Daily Field Report, is to be filled out by the SUXOS with all applicable information.

6.2 ELECTRIC DETONATOR USE

The following requirements are necessary when using electric detonators and blasting circuits:

- Electric detonators and electric blasting circuits may be energized to dangerous levels from outside sources such as static electricity, induced electric currents, and radio communication equipment. Safety precautions will be taken to reduce the possibility of a premature detonation of the electric detonator and explosive charges of which they form a part. Radios will not be operated while the pit is primed or during the priming process.

- The shunt will not be removed from the leg wires of the detonator until the continuity check of the detonator is to be performed.

- When uncoiling, or straightening, the detonator leg wires, keep the explosive end of the detonator pointing away from the body and away from other personnel. When straightening the leg wires, do not hold the detonator itself; rather, hold the detonator leg wires approximately 1 inch (in.) from the detonator body. Straighten the leg wires by hand; do not throw or wave the wires through the air to loosen them.

- Prior to use, the detonators will be tested for continuity. To conduct the test, place the detonators in a pre-bored hole in the ground or place them in a sand bag, and walk facing away from the detonators and stretch the wires to their full length, being sure to not pull the detonators from the hole or sand bag. With the leg wires stretched to their fullest length, test the continuity of the detonators one at a time by un-shunting the leg wires and attaching them to the galvanometer and checking for continuity. After the test, re-shunt the wires by twisting the two ends together. Repeat this process for each detonator until all detonators have been tested. This process will be accomplished at least 50 ft from and downwind of any MEC or demolition materials and out of the demolition range personnel and vehicle traffic flow pattern. In addition, all personnel on the demolition range will be alerted prior to the test being conducted.

  NOTE: When testing the detonator, prior to connecting the detonator to the firing circuit, the leg wires of the detonator must be shunted by twisting the bare ends of the wires together immediately after testing. The wires will remain short circuited until time to connect them to the firing line or Remote Firing Device (RFD) Receiver.

- At the power source end of the blasting circuit, the ends of the wires will be shorted or twisted together (shunted) at all times, except when actually testing the circuit or firing the charge. The connection between the detonator and the circuit firing wires must not be

made, unless the power ends of the firing wires are shorted and grounded, or the firing panel is off and locked.

- The firing line will be checked using pre-arranged hand signals or through the use of two-way radios, if the demolition pit is not visible from the firing point. If radios are used, communication will be accomplished a minimum of 50 ft from the demolition pit and detonators. The firing line will be checked for electrical continuity in both the open and closed positions and will be closed/shunted after the check is completed.

- MEC to be detonated will be placed in the demolition pit and the demolition material placed / attached in such a manner as to ensure the total detonation of the MEC. Once the MEC and demolition material are in place and the shot has been tamped, the detonators will be connected to the detonation cord. Prior to handling any detonators that are connected to the firing line or RFD, personnel will ensure that they are grounded. The detonators will then be carried to the demolition pit with the end of the detonators pointed away from the individual. The detonators are then connected to the detonation cord, Non-El, etc., ensuring that the detonator is not covered with tamping material to allow for ease of recovery / investigation in the event of a misfire.

- Prior to making connections to the blasting machine or RFD Transmitter, the entire firing circuit will be tested for electrical continuity and ohms resistance, or transmitting power (as applicable), to ensure the blasting machine or RFD Transmitter (distance) has the capacity to initiate the shot.

- The individual assigned to make the connections at the blasting machine or panel will not complete the circuit at the blasting machine or panel, and will not give the signal for detonation, until satisfied that all personnel in the vicinity have been evacuated to a safe distance. When in use, the blasting machine, or its actuating device, will be in the blaster's possession at all times. When using the panel, the switch must be locked in the open position until ready to fire, and the single key must be in the blaster's possession.

- Prior to initiating a demolition shot(s), a warning will be given; the type and duration of such warning will be determined by the prevailing conditions at the demolition range. At a minimum, this should be an audible signal using a siren, air horn, or megaphone, which is sounded for three blasts, five minutes prior to the shot, and again one minute prior to the shot.

6.3 NON-EL USE (SHOCK TUBE)

The following requirements are necessary when using NON-EL (Shock Tube) systems:

- After cutting a piece of shock tube, either immediately tie a tight overhand knot in one or both cut ends or splice one exposed end and tie of the other.

- Always use a sharp knife or razor blade to cut shock tube so as to prevent the tube from being pinched or otherwise obstructed.

- Always cut shock tube squarely across and make sure the cut is clean.
- Use only the splicing tubes provided by the manufacturer to make splices.
- Every splice in the shock tube reduces the reliability of the priming system; therefore, keep the number of splices to a minimum.
- Always dispose of all short, cut-off pieces in accordance with local laws as they relate to flammable material.

The shock tube system is a thin plastic tube of extruded polymer with a layer of Pentaerythritol Tetranitrate (PETN) coated on its interior surface. The PETN propagates a shock wave, which is normally contained within the plastic tubing. The shock tube offers the controlled instantaneous action of electric initiation without the risk of premature initiation of the detonator by radio transmissions, high-tension power lines, or static electricity discharge. The NON-EL system uses detonators in the bunch blocks and in the detonator assembly, which are to be handled in accordance with approved procedures.

The high reliability of the shock tube initiating system is due to the fact that all of the components are sealed and, unlike standard non-electric priming components, cannot be easily degraded by moisture. Cutting the shock tube makes the open end vulnerable to moisture and foreign contamination; therefore, care must be taken to prevent moisture and foreign matter from getting in the exposed ends of the shock tubes.

6.3.1 Shock Tube Demolition Procedures

WARNING
Although the detonation along the shock tube is normally contained within the plastic tubing, burns may occur if the shock tube is held.

6.3.2 Shock Tube Assembly

- Spool out the desired length of shock tube from firing point to demolition site and cut it off with a sharp knife or razor blade. Weight down the loose end of trunk line.
- Immediately seal off the shock tube remaining on the spool by tying a tight overhand knot in the cut-off end or use a push-over sealer.
- Using a sharp knife or razor, cut the sealed end off the detonator assembly.
- Push one of the shock tube ends to be spliced firmly into one of the pre-cut splicing tubes provided by the manufacturer at least ¼ in. Push the other shock tube end firmly into the other end of the splicing tube at least ¼ in. Secure splice with tape if needed.

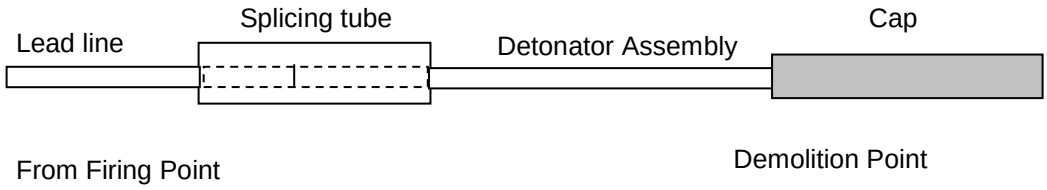

Figure 1

6.3.3 Firing Assembly Setup

1) If there are multiple items to be destroyed using bunch block(s) supplied by the manufacturer, lay out lead lines at demo site to the shot(s) and secure the bunch block with a sandbag, or some other item which will keep it from moving.

NOTE: No more than six leads may be used from any one bunch block.

2) If the detonator assembly has not been attached yet, then, using the splicing tube, splice the detonator assembly to the shock tube branch line as explained in the splicing instructions above.

3) If this is a non-tamped shot, place the detonator assembly into the demolition material. If the shot is to be tamped, then prepare the demolition material with a detonating cord lead long enough to stick out of the tamping at least 1 ft.

4) Tape the detonator assembly with cap to the detonating cord lead as shown in Figure 1.

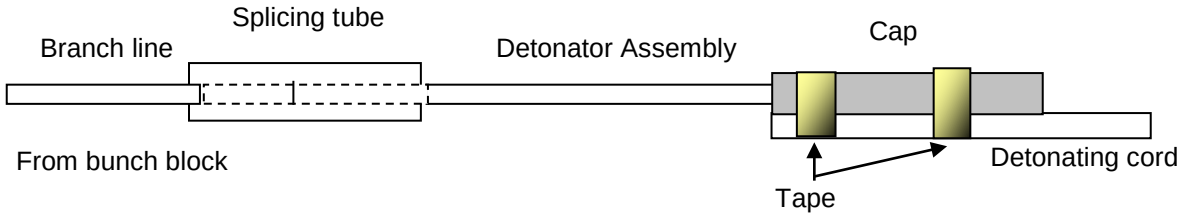

Figure 1

5) Return to the firing position.

6) Cut off the sealed end of shock tube; proceed to the directions listed in Step 7. If you are using a previously cut piece of shock tube, using a sharp knife or razor blade, cut approximately 18 in. from the previously cut end, whether or not it was knotted in accordance with the above guidance.

7) Insert a primer into the firing device and connect the shock tube lead line to the firing device ensuring that the shock tube is properly seated in the firing device.

8) Take cover.

9) Signal **"Fire in the hole"** three times and initiate charge.

10) Observe a five-minute wait time after the detonation.

11) Remain in designated safe area until Demolition Supervisor announces, **"All Clear."**

6.4 DETONATING CORD USE

The following procedures are required when using detonating cord (detonation cord):

- Detonation cord should be cut using approved crimpers, and only the amount required should be removed from inventory.
- When cutting detonation cord, the task should be performed outside the magazine.
- For ease of inventory control, remove detonation cord only in 1-ft increments.
- Detonation cord should not be placed in clothing pockets or around the neck, arm, or waist, and should be transported to the demolition location in either an approved "day box," original container, or a cloth satchel, depending upon the magazine location and proximity to the demolition area.
- Detonation cord should be placed at least 50 ft away from detonators and demolition materials until ready for use. To ensure consistent safe handling, each classification of demolition material will be separated by at least 25 ft until ready for use.
- When ready to "tie in" either the detonation cord to demolition materials, or detonation cord to detonator, the detonation cord will be connected to the demolition material and secured to the UXO / MEC. The cord is then strung out of the hole and secured in place with soil, or filled sandbags, being sure to leave a minimum of 6 ft of detonation cord exposed outside the hole.
- Once the hole is filled, make a loop in the detonation cord large enough to accommodate the detonator, place the detonator in the loop, and secure it with tape. The detonator's explosive end will face down the detonation cord toward the demolition material or parallel to the main line.
- In all cases, ensure that there is a minimum of 6 ft of detonation cord extending out of the hole to allow for ease of detonator attachment and detonator inspection / replacement should a misfire occur.
- If the detonation cord detonators are electric, they will be checked, tied in to the firing line, and shunted prior to being taped to the loop. If the detonation cord detonators are non-electric, the time / safety fuze will be prepared with the igniter in place prior to

taping the detonators to the detonation cord loop. If the detonation cord detonators are Non-El, simply tape the detonators into the loop as described above.

- In the event that a time / safety fuze is used, an igniter is not available, and a field expedient initiation system is used (i.e., matches), do not split the safety fuze until the detonator is taped into the detonation cord loop.

6.5 TIME / SAFETY FUZE USE

The following procedures are required when using a time / safety fuze:

- Prior to each daily use, the burn rate for the time / safety fuze must be tested to ensure the accurate determination of the length of time / safety fuze needed to achieve the minimum burn time of five minutes needed to conduct demolition operations.

- To ensure both ends of the time / safety fuze are moisture free, use approved crimpers to cut 6 in. off the end of the time / safety fuze roll, and place the 6–in. piece in the time / safety fuze container.

- If quantity allows, accurately measure and cut off a 6-ft-long piece of the time / safety fuze from the roll.

- Take the 6-ft section out of the magazine and attach a fuze igniter.

- In a safe location, removed from demolition materials and MEC, ignite the time / safety fuze, measure the burn time from the point of initiation to the "spit" at the end, and record the burn time in the SUXOS's Log.

- To measure the burn time, use a watch with a second hand or chronograph.

- To calculate the burn rate in seconds per foot, divide the total burn time (in seconds) by the length (in., ft) of the test fuze.

- When using time / safety fuze for demolition operations, the minimum amount of fuze to be used for each shot will be the amount needed to permit a minimum burn time of five minutes.

6.6 DEMOLITION RANGE INSPECTION SCHEDULE

The schedule for the demolition range inspection will be followed when demolition operations are being conducted. This inspection will be conducted by the UXOQCS / UXOSO and will be documented in the Site Safety or QC Log. If any deficiencies are noted, demolition operations will be suspended and the deficiency reported to the SUXOS. Once the deficiencies are corrected, demolition operations may be resumed.

7.0 METEOROLOGICAL CONDITIONS

In order to control the effects of demolition operations and to ensure the safety of site personnel, the following meteorological limitations and requirements will apply to demolition operations:

- Demolition operations will not be conducted during electrical storms or thunderstorms.
- No demolition operations will be conducted if the surface wind speed is greater than 20 mph.
- Demolition operations will not be conducted during periods of visibility of less than 1 mile caused by, but not limited to, dense fog, blowing snow, rain, sand storms, or dust storms.
- Demolition will not be carried out on extremely cloudy days, defined as overcast (more than 80 percent cloud cover) with a ceiling of less than 2,000 ft.
- Demolition operations will not be initiated until an appropriate time after sunrise and will be secured at an appropriate time prior to sunset (see Section 5.0).

8.0 PRE-DEMOLITION / DISPOSAL PROCEDURES

8.1 PRE-DEMO / DISPOSAL OPERATIONAL BRIEFING

It is the belief of EA that the success of any operation is dependent upon a thorough brief, covering all phases of the task, which is presented to all affected personnel. The SUXOS will brief all personnel involved in range operations in the following areas:

- Type of UXO / MEC being destroyed
- Type, placement, and quantity of demolition material being used
- Method of initiation (electric, non-electric, or NON-EL)
- Means of transporting and packaging MEC
- Route to the disposal site
- Equipment being used (i.e., galvanometer, blasting machine, firing wire, etc.)
- Misfire procedures
- Post-shot clean-up of range.

8.2 PRE-DEMO / DISPOSAL SAFETY BRIEFING

The EA SUXOS or UXOSO will conduct a safety brief for all personnel involved in range operations in the following areas:

- Care and handling of explosive materials

- Personal hygiene
- Two-man rule, and approved exceptions
- Personnel roles and responsibilities
- Potential trip/fall hazards
- Horseplay on the range
- Stay alert for any explosive hazards on the range
- Calling a safety stop for hazardous conditions
- Location of emergency shelter (if available)
- Parking area for vehicles (vehicles must be positioned for immediate departure, with the keys in the ignition
- Location of range emergency vehicle
- Location of the assigned paramedic
- Wind direction (to assess potential toxic fumes)
- Locations of first aid kit and fire extinguisher
- Route to nearest hospital or emergency aid station
- Type of communications in event of an emergency
- Storage location of demolition materials and MEC awaiting disposal
- Demolition schedule.

8.3 TASK ASSIGNMENTS

Individuals with assigned tasks will report the completion of the task to the SUXOS. The types of tasks that may be required are:

- Contact local military authorities and fire response personnel, and get air clearance, as required
- Contact hospital/emergency response / medevac personnel, if applicable
- Secure all access roads to the range area
- Visually check range for any unauthorized personnel
- Check firing wire for continuity and shunt
- Prepare designated pits as required
- Check continuity of detonators
- Check time / safety fuze and its burn rate
- Designate a custodian of the blasting machine; fuze igniters, or NON-EL initiator

- Secure detonators in a safe location
- Place MEC in pit, and place charge in desired location.

8.4 PREPARING EXPLOSIVE CHARGE FOR INITIATION

To prepare the explosive charge for initiation, the procedures listed below will be followed:

- Ensure firing wire is shunted
- Connect detonator to the firing wire
- Isolate or insulate all connections
- Prime the demolition charge
- Place demolition charge on MEC
- Depart to firing point (if using non-electric firing system, obtain head count, pull igniters, and depart to designated safe area)
- Obtain a head count
- Give one minute warning signal, using a bullhorn or siren, five minutes prior to detonation, and again at one minute prior to detonation
- Check the firing circuit
- Signal **"fire in the hole"** three times (or an equivalent warning), and take cover
- If using electric firing system, connect firing wires to blasting machine, and initiate charge
- Remove firing wires from blasting machine and shunt or turn off RFD Transmitter
- Remain in designated safe area until SUXOS announces **"All Clear."** This will occur after a post-shot waiting period of five minutes and the SUXOS has inspected the pit(s).

9.0 POST DEMOLITION / DISPOSAL PROCEDURES

Do not approach a smoking hole or allow personnel out of the designated safe area until cleared to do so, and follow the procedures listed below:

- After the **"All Clear"** signal, check pit for low orders or kick outs
- Examine pit, and remove any large fragmentation, as needed
- Back fill hole, as necessary
- Police all equipment
- Notify military authorities, fire department, etc., that the operation is complete.

10.0 MISFIRE PROCEDURES

A thorough check of all equipment, firing wire, and detonators will prevent most misfires. However, if a misfire does occur, the procedures outlined below will be followed.

10.1 ELECTRIC MISFIRES

To prevent electric misfires, one technician will be responsible for all electrical wiring in the circuit. If a misfire does occur, it must be cleared with extreme caution, and the responsible technician will investigate and correct the situation, using the steps outlined below:

- Check firing line and blasting machine connections and make a second initiation attempt.
- If unsuccessful, disconnect and connect to another blasting machine (if available), and attempt to initiate a charge.
- If unsuccessful, commence a 60-minute wait period.
- After the maximum delay predicted for any part of the shot has passed, the designated technician will proceed down range to inspect the firing system, and a safety observer must watch from a protected area.
- Disconnect and shunt the detonator wires, connect a new detonator to the firing circuit, check the replacement detonator for continuity, and prime the charge without disturbing the original detonator.
- Follow normal procedures for effecting initiation of the charge.

10.2 NON-ELECTRIC MISFIRES

Working on a non-electric misfire is the most hazardous of all operations. Occasionally, despite all painstaking efforts, a misfire will occur. Investigation and corrective action should be undertaken only by the technician who placed the charge, using the following procedure:

- If charge fails to detonate at the determined time, initiate a 60-minute wait period plus the time of the safety fuze, i.e., five-minute safety fuze plus 60 minutes for a total of 65 minutes.
- After the wait period has expired, a designated technician will proceed down range to inspect the firing system. A safety observer must watch from a protected area.
- Prime the shot with a new non-electric firing system and install a new fuze igniter.
- Follow normal procedures for initiation of the charge.

10.3 NON-EL MISFIRE

The use of a shock tube for blast initiation can present misfires, which require the following actions:

- If charge fails to detonate, it could be the result of the shock tube not firing. Visually inspect the shock tube; if it is not discolored (i.e., slightly black), it has not fired.
- If it has not fired, cut a 1-ft piece off the end of the tube, re-insert the tube into the firing device, and attempt to fire again.
- If the device still does not fire, wait 60 minutes and proceed down range to replace the shock tube per the instructions outlined below.
- If the tube is slightly black, then a "Black Tube" misfire has occurred, and the shock tube will have to be replaced, after observing a 60-minute wait time. When replacing the shock tube, be sure to remove the tube with the detonator in place. Without removing the detonator from the end of the tube, dispose of by demolition.

10.4 DETONATING CORD MISFIRE

EA uses detonation cord to tie in multiple demolition shots, and to ensure that electric detonators are not buried. Since detonation cord initiation will be either electrical or non-electrical, the procedures presented in Paragraphs 10.1, 10.2, or 10.3, as appropriate to the type of detonator used, will be used to clear a detonation cord misfire. In addition, the following will be conducted:

- If there is no problem with the initiating system, wait the prescribed amount of time, and inspect the initiator to the cord connection to ensure it is properly connected. If it was a bad connection, simply attach a new initiator, and follow the appropriate procedures in Paragraph 9.0.
- If the initiator detonated and the cord did not, inspect the cord to ensure that it is detonation cord and not time fuze. Also, check to ensure that there is PETN in the cord at the connection to the initiator.
- It may be necessary to uncover the detonation cord and replace it. This must be accomplished carefully, to ensure that the demolition charge and the MEC item are not disturbed.

11.0 RECORD KEEPING REQUIREMENT

To document the demolition operations procedures and the completeness of the demolition of MEC, the following record keeping requirements will be met:

- EA (as directed) will obtain and maintain all required permits.

- The SUXOS will ensure the accurate completion of the logs, and the SUXOS and UXOQCS will monitor the entries in the log for completeness, accuracy, and compliance with meteorological conditions.

- The SUXOS will enter the appropriate data on the Ordnance Accountability Log and the EA Demolition Shot Records to reflect the MEC destroyed and will complete the appropriate information on the Explosives Accountability Log which indicates the demolition materials used to destroy the MEC.

- The quantities of MEC recovered must also be the quantities of MEC destroyed or disposed.
- EA will retain a permanent file of all demolition records, including permits; magazine data cards; training and inspection records; waste manifests, if applicable; and operating logs.

- Copies of the Bureau of Alcohol, Tobacco, Firearms, and Explosives (BATF) License and any required permits must be on hand.

12.0 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

The following safety measures and personal protective equipment (PPE) will be used in preventing or reducing exposure to the hazards associated with MEC demolition / disposal operations. These requirements will be implemented unless superseded by site-specific requirements stated in the Accident Prevention Plan.

- Steel toe, shank boots, or composite safety toe boots will be worn during MEC demolition / disposal operations.

- Safety glasses will be required whenever an eye hazard exists, for example, when working around flying dirt / debris, using hand tools, etc. Safety glasses will provide protection from impact hazards and, if necessary, ultraviolet radiation (i.e., sunlight).

- Positive means will be required to secure the PPE and prevent it from falling and causing an accidental detonation.

13.0 REGULATORY REFERENCES

Applicable sections and paragraphs in the documents listed below will be used as references for the conduct of MEC demolition / disposal operations:

- EA Corporate Safety and Health Program

- OSHA General Industry Standards, 29 CFR 1910

- OSHA Construction Standards, 29 CFR 1926

- DDESB TP-16, Methodology for Calculation of Fragmentation Characteristics
- DoD 4160.21-M, Defense Reutilization and Marketing Manual
- DoD 6055.9, DoD Ammunition and Explosives Safety Standards
- AR 385-64, U.S. Army Explosives Safety Program
- AR 385-10, Army Safety Program
- DA PAM 385-64, U.S. Army Explosives Safety Program
- TM 9-1300-200, Ammunition General
- TM 9-1300-214, Military Explosives
- AR 190-11, Physical Security of Arms, Ammunition, and Explosives
- AFM 91-201, Explosives Safety Standards
- ATF 5400.7, Alcohol, Tobacco, and Firearms Explosives Laws and Regulations
- DOT, 49 CFR, Parts 100 to 199, Transportation (applicable sections)
- EPA, 40 CFR Parts 260 to 299, Protection of Environment (applicable sections).
- AR 385-40 w/ Supplement 1, Accident Reporting & Records
- USACE EM 385-1-1, Safety and Health Requirements Manual
- USACE EM 385-1-97, Explosives Safety and Health Requirements Manual

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STANDARD OPERATING PROCEDURE – SOP 07
EXPLOSIVES AND AMMUNITION TRANSPORTATION

1.0 PURPOSE

The purpose of this Explosives and Ammunition Transportation Standard Operating Procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to the transportation of explosives and munitions and explosives of concern (MEC).

The following EA Engineering, P.C. (EA) policies are not all inclusive nor are they applicable in all situations. This policy is not a stand-alone document; rather, it is to be used together with the applicable project-specific Work Plan; Accident Prevention Plan (APP); Quality Assurance Project Plan (QAPP); applicable federal, state, and local regulations; and contract restrictions and guidance.

Accidents involving EA or subcontracted personnel will be documented using the EA Accident/Loss Report and the EA Accident/Loss Report.

2.0 SCOPE

This SOP applies to all site personnel, including contractor and subcontractor personnel, involved in the conduct of operations on a site with MEC contamination. This SOP is not intended to contain all of the requirements needed to ensure compliance. Consult the documents listed in Section 7.0 of this SOP for additional compliance issues.

3.0 MAINTENANCE

The Project Manager (PM), in collaboration with the Senior Unexploded Ordnance Supervisor (SUXOS) is responsible for the maintenance of this procedure. Approval authority rests with the Program Quality Control Manager (PQCM).

4.0 TRANSPORTATION REQUIREMENTS FOR EXPLOSIVES AND MEC

Transportation of explosives and MEC will comply with all federal, state, and local regulations. Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), permits are not required for transportation of explosives or MEC on-site or on Federal Installations. MEC will not be transported outside of the munitions response site in which it was discovered.

5.0 FEDERAL INSTALLATIONS / ON-SITE

EA will transport explosives in an on-site vehicle and Institute of Makers of Explosives (IME) - 22 containers for transportation of explosives to the disposal sites while using public access roads. When transporting explosives personnel will comply with the following:

- Initiating explosives, such as blasting caps, will remain separated at all times. Blasting caps may be transported in the same vehicle as long as they are in a separate IME-22 container (49 CFR 173.63) and secured away from other items.
- Vehicles will be inspected using DD Form 626, Motor Vehicle Inspection or EA inspection form (Attachment A). This is to be filled out by the driver of the vehicle and verified by the UXO Safety Officer (UXOSO).
- Vehicles will be properly placarded for the Hazard Classification of the material being transported.
- Compatibility requirements will be observed.
- Only Unexploded Ordnance Technicians III (UXOTIII) and above may be issued and transport explosive materials.
- The receiving party shall sign the receipt documents for accountability.
- Operators transporting Hazard Division (49 CFR 173.50) 1.1 explosives will have a valid commercial driver's license.
- Drivers will comply with posted speed limits but will not exceed a safe and reasonable speed for conditions. Vehicles transporting explosives off-road will not exceed 25 miles per hour (mph) and will be properly equipped.
- Personnel will not ride in the cargo compartment with explosives or MEC.

6.0 SUMMARY

Transportation of explosives presents risks to both the vehicle operator and the surrounding populace. The procedures contained in this SOP are designed to eliminate and/or mitigate these risks. Personnel engaged in these activities will strictly comply with these procedures and those contained in the referenced documents.

7.0 REFERENCES

AFM 91-201 Explosives Safety Standards

EA Corporate Safety and Health Program (CSHP)

DoD 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives

DoD 6055.9, DoD Ammunition and Explosives Safety Standards

DoD 4160.21-M, Defense Reutilization and Marketing Manual

Department of Transportation (DOT), 49 CFR Parts 100 to 199, Transportation (applicable sections)

27 CFR Part 55, Commerce in Explosives

29 CFR 1910, Occupational Safety and Health Standards

29 CFR 1926, Construction Standards

Environmental Protection Agency (EPA), 40 CFR Parts 260 to 299, Protection of Environment (applicable sections)

ATF 5400.7, Bureau of Alcohol, Tobacco, Firearms, and Explosives Laws and Regulations

U.S. Army Corps of Engineers (USACE) Engineering Manuel (EM) 385-1-1, Safety and Health Requirements Manual

USACE EM 385-1-97, Explosives Safety and Health Requirements Manual

Technical Manual (TM) 9-1300-200, Ammunition General

TM 9-1300-214, Military Explosives

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ATTACHMENT A

Explosive Vehicle Inspection Forms –

On-site

DD Form 626

DD Form 836

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Explosive Vehicle Inspection, ON-SITE

This form must be filled out for any vehicle carrying explosives, prior to loading.
This form is for use on site only, if traveling on public highways use DD Form 626

DRIVERS NAME _____ LICENSE NUMBER _____
COMPANY _____
TYPE OF VEHICLE _____ VEHICLE NUMBER _____
INSPECTION DATE/TIME _____ INSPECTOR _____

PART INSPECTED	**SAT.**	**UNSAT.**	COMMENT
HORN			
STEERING SYSTEM			
WIPERS			
MIRRORS			
FIRE EXTINGUISHERS (10 ABC, 2 EACH)			
REFLECTORS			
EMERGENCY FLASHERS			
LIGHTS			
ELECTRIC WIRING			
FUEL SYSTEM			
EXHAUST SYSTEM			
BRAKE SYSTEM			
SUSPENSION			
CARGO SPACE			
TIRES, WHEELS, RIMS			
TAILGATE			
TARPAULIN			

Explosive Vehicle Inspection, ON-SITE (continued)

INSPECTION RESULTS
(INSPECTOR INITIAL)

ACCEPTED _____

REJECTED _____

REMARKS _____

DRIVERS SIGNATURE/DATE

INSPECTORS
SIGNATURE/DATE

STANDARD OPERATING PROCEDURE – SOP 08
SUBSURFACE UTILITY CLEARANCE

1.0 SCOPE AND APPLICATION

1.1 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to prevent injury to workers and damage to subsurface structures (including tanks, pipe lines, water lines, gas lines, electrical service, etc.) during ground disturbance activities (including, augering, sampling, or other similar operations).

1.2 LIMITATIONS

The procedures set forth in this document are the suggested procedures but may not be applicable to particular sites based on the site-specific considerations. The EA Engineering, P.C. (EA) Project Manager (PM) is responsible for making a site-specific evaluation of each site to determine whether the Subsurface Utility Clearance Procedures should be utilized or require modification. If safety or other site-specific considerations require a modified or different procedure, the PM should review the modified procedure with the Business Unit Director, Profit Center Manager, or Senior Technical Reviewer.

1.3 SCOPE

This procedure provides minimum guidance for subsurface clearance activities, which must be followed prior to and during ground disturbance activities at EA project sites. Even after completing the subsurface clearance activities required in this procedure, all ground disturbance activities should proceed with due caution.

Deviations from this procedure may be provided on an exception basis for specific situations, such as underground storage tank systems removals, verified aboveground or overhead services/lines, undeveloped land/idle facilities, shallow groundwater conditions, soil stability, or well construction quality assurance/quality control concerns, etc.

EA or its subcontractors are responsible for, and shall ensure that, all ground disturbance activities are completed safely, without incident, and in accordance with applicable federal, state, and local regulations.

This procedure shall not override any site-specific or consultant/contractor procedures that are more stringent or provide a greater degree of safety or protection of health or the environment.

2.0 PROCEDURES

The EA PM or his designee must complete the Subsurface Clearance Procedure Checklist (Attachment A to this SOP) in conjunction with the following procedures. The checklist must be completed before initiating any ground disturbance activities. The completed checklist must be

submitted to the appropriate team individuals, subcontractors, and/or the client and included in the project files.

2.1 SAFETY

The Accident Prevention Plan (APP) will be available onsite and followed by all contractors and subcontractors.

All work areas shall be defined and secured with safety cones, safety tape, construction fence, other barriers, or signs as appropriate.

Site work permits must be obtained as required by site procedures. Based on site conditions or classification, the use of intrinsically-safe equipment may be required.

To ensure the safety of all onsite personnel and subsurface structure integrity, consideration should be given to de-energizing and locking out selected site utilities or temporarily shutting down a portion of or the entire facility.

2.2 PREPARATION TASKS

Objective—To gather all relevant information about potential subsurface structures prior to the actual site visit.

2.2.1 Obtain Permits and Site Access

The consultant/contractor is responsible for following all applicable laws, guidance, and approved codes of practice; obtaining all necessary permits and utility clearances; and securing site access permission.

2.2.2 Historic Site Information

Obtain most recent as-built drawings and/or site plans (including underground storage tank, product, and vent lines) as available.

NOTE: As-built drawings may not accurately depict the locations and depths of improvements and subsurface structures and should, therefore, not be solely relied upon.

EA should obtain any other site information such as easements, right-of-ways, historical plot plans, fire insurance plans, tank (dip) charts, previous site investigations, soil surveys, boring logs, and aerial photographs, etc. as relevant to the planned ground disturbance activities.

Where applicable, EA should also contact contract personnel who may have historic site knowledge.

2.2.3 Mark-Outs

Objective—To identify location of subsurface structures on surface.

EA must ensure that a thorough mark-out at the site is completed to locate electrical, gas, telephone, water, sewer, low voltage electric lines, product delivery pipelines, fiber optic, and all other subsurface utilities/services.

- Where available, public utility companies must be contacted to identify underground utilities. This can be accomplished through the One-Call system in most instances.
- In addition, where available and warranted by site conditions, a private utility/pipeline mark-out company should be contracted to perform an electronic subsurface survey to identify the presence of suspected hazardous or critical underground utilities and subsurface structures. In some cases, this is necessary to confirm public utility mark-outs in the vicinity of planned ground disturbance activities.

EA will review all available site plan subsurface information with the private mark-out company to assist in locating utilities and other subsurface structures.

NOTE: Mark-outs may not accurately depict the exact locations of improvements and subsurface structures and should, therefore, not be solely relied upon.

Where possible, EA personnel are encouraged to be onsite at the time of subsurface mark-outs. This is to ensure accuracy and understanding of subsurface structures identified and provides an opportunity to exchange information with mark-out company personnel regarding planned work activities.

Subsurface structures should be marked throughout the entire work area(s) with adequate materials (e.g., site conditions may require paint and tape/flags). Ground disturbance activities must be started within 30 days of mark-out, unless local ordinances specify a shorter time period. If activities are not started within required time period or markings have faded, mark-outs must be redone.

EA personnel will record time and date of mark-out request and list all companies contacted by the service and confirmation number. This should be available for review onsite and checked off after visual confirmation of markings.

2.2.4 Initial Site Visit

Objective—To compare the Work Plan to actual conditions based on information gathered during the review of historic site information, obtain additional site information needed, and prepare a vicinity map.

EA will document all findings and update the Work Plan with this information. On third party sites, close coordination with the site owner's representatives for mark-outs, review of as-builts, and other information reviews should be conducted prior to work.

In some regions, it may be more effective and efficient to conduct the site visit at the same time the contractor and drill rig are mobilized to the site. The inspection should include the following activities and may include others as determined by the consultant/contractor and the Project PM.

2.2.5 Utilities

EA shall perform a detailed site walk-through for the purpose of identifying all aboveground indicators of subsurface utilities/services that may be leading to or from buildings within the planned work area. The inspection shall include, but not be limited to, the following:

- Utility mark-outs
- Aboveground utilities
- Area lights/signs
- Phones
- Drains
- Junction boxes
- Natural gas meters or connections
- Other utilities including fire hydrants, on/below grade electrical transformers, splice cages, sewer lines, pipeline markers, cable markers, valve box covers, clean-outs/traps, sprinkler systems, steam lines (including insulated tanks that may indicate steam lines), and cathodic protection on lines/tanks
- Observe paving scars (i.e., fresh asphalt/concrete patches, scored asphalt/concrete)

NOTE: In many cases, the onsite location of low-voltage electrical lines and individual property water and sewer line branches may be approximated by using the following technique:

- Locate the entry/connection location at the facility building.
- Attempt to identify utility connections for the mains (water sewer, etc.) by locating cleanouts, valve manways, etc. The location path of the utility is likely within the area between the main connection and facility building connection. Subsurface electrical line locations from the facility building to signs, lamps, etc. can be estimated with the same process.

2.2.6 Other Subsurface Systems

Some other subsurface systems to be cognizant of during subsurface activities include product delivery systems (i.e., at gas stations) and existing remediation systems.

2.2.7 Selection of Ground disturbance Locations

EA will utilize the information collected to this point in combination with regulatory requirements and project objectives to select ground disturbance locations. Ground disturbance locations should also consider the location of overhead obstructions (e.g., power lines). Work at active gasoline retail locations must consider several special considerations that should be outlined in the site-specific safety and health plan.

2.2.8 Review of Selected Locations with the Client

EA will review the selected ground disturbance locations with the client. EA will not proceed with the subsurface activities until the plan has been discussed with the client. During execution of the project, subsurface activities are required outside of the area previously approved by the client. EA will submit these changes to the client for approval prior to execution.

2.2.9 Ground Disturbance Activity Sequence

EA will plan ground disturbance activities starting at the point farthest from the location of suspected underground improvements. This is done to determine the natural subsurface conditions and to allow EA site personnel to recognize fill conditions.

Experience has shown that the following warning signs may indicate the presence of a subsurface structure:

- Warning tape (typically indicative of underground services).
- Pea gravel/sand/non-indigenous material (typically indicative of tanks or lines).
- Red concrete (typically indicative of electrical duct banks).
- The abrupt absence of soil recovery in a hand auger. This could indicate pea gravel or sand that has spilled out of the auger. This may not be indicative in areas where native soil conditions typically result in poor hand auger recoveries.
- Any unexpected departure from the native soil or backfill conditions as established by prior onsite digging.

If any of these conditions is encountered by EA site personnel, digging should stop and the client should be contacted.

3.0 SUBSURFACE CLEARANCE METHODS

The method used to delineate the subsurface should be compatible with the inherent associated risk given the type of facility/property, soil stratigraphy, and the location of the ground disturbance activity, such that required delineation is obtained. It should be noted that in areas where there is paving, sufficient paving should be removed to allow clear visibility of the

subsurface conditions during clearance activities. The following is a list of potential clearance methods that may be used on a job site:

- Probing
- Mechanical Excavation
- Hand digging
- Hand augering.

EA personnel will evaluate the potential for electrical shock or fire/explosion for each subsurface disturbance project and will evaluate as necessary the use of non-conductive or non-sparking tools (i.e., fiberglass hand shovels, and thick electrically insulating rubber grips on hand augers or probes). The potential need for the use of non-conductive materials, electrical safety insulated gloves, and footwear will also be evaluated on a case-by-case basis.

3.1 SUBSURFACE CLEARANCE PROCEDURES FOR DRILLING, DIRECT-PUSH TECHNOLOGY, AUGERING, FENCE POST INSTALLATION, OR OTHER BOREHOLE INSTALLATION ACTIVITIES

The area to be delineated will exceed the diameter of the largest tool to be advanced and sufficiently allow for visual inspection of any obstructions encountered.

Uniform color codes for marking of underground facilities are provided in Attachment B to this SOP.

Attachment A to SOP 08

Subsurface Clearance Procedure Checklist

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Subsurface Clearance Procedure Checklist

Site Identification: _____

Project Consultant/Contractor: _____

Section 1: Safety, Preparation Tasks, and Mark-Outs

Activity	Yes	No	N/A	Comments including Justification if Response Is No or Not Applicable
Health and Safety Plan is available and all contractors and subcontractors are familiar with it.				
All applicable local, state, and federal permits have been obtained.				
Site access/permission has been secured.				
Most recent as-built drawings and/or site plans (including underground storage tank, product, and vent lines) obtained.				
Reviewed site information to identify subsurface structures relevant to planned site activities (easements, rights-of-way, historical plot plans, fire insurance plans, tank dip charts, previous site investigations, soil surveys, boring logs, aerial photographs, etc.).				
Utility mark-outs have been performed by public utility company(s). Mark-outs clear/visible.				
Subsurface structure mark-outs performed by private mark-out company. Mark-outs clear/visible.				
Additional Activities: Were dig locations reviewed with site representative?				

Section 2: Initial Site Visit and Selecting Ground Disturbance Locations

Activity	Yes	No	N/A	Comments including Justification if Response Is No or Not Applicable
Location of all aboveground indicators of subsurface utilities/services that may be leading to or from buildings within the planned work area has been identified.				
Location of utility mark-outs by all utility companies previously contacted has been identified within required time period.				
Location of all subsurface structure mark-outs by private mark-out company has been identified within required time period.				
Location of area lights/signs and associated subsurface lines identified.				
Location of all phones and associated subsurface lines identified.				
Location of all drains and associated interconnecting lines identified.				
Location of all electrical junction boxes and associated interconnecting lines identified				
Location of all natural gas meters or connections and all interconnecting lines identified				

Completed by: _____
Name

Signature: _____ _____
Company Date

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Attachment B to SOP 08

Uniform Color Codes for Excavation

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APWA UNIFORM COLOR CODE

WHITE - Proposed Excavation

PINK - Temporary Survey Markings

RED - Electric Power Lines, Cables, Conduit and Lighting Cables

YELLOW - Gas, Oil, Steam, Petroleum or Gaseous Materials

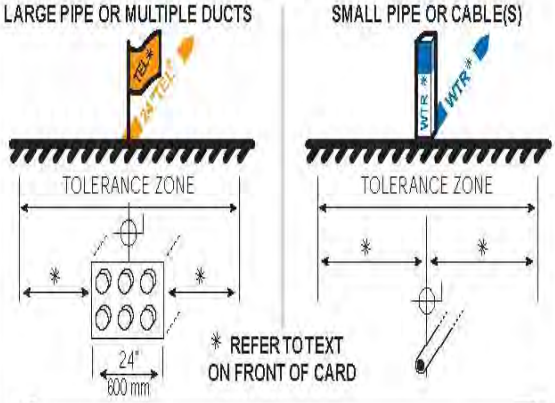
ORANGE - Communication, Alarm or Signal Lines, Cables or Conduit

BLUE - Potable Water

PURPLE - Reclaimed Water, Irrigation and Slurry Lines

GREEN - Sewers and Drain Lines

TYPICAL MARKING



Customize with your center's phone and address information

GUIDELINES FOR UNIFORM TEMPORARY MARKING OF UNDERGROUND FACILITIES

This marking guide provides for universal use and understanding of the temporary marking of subsurface facilities to prevent accidents and damage or service interruption by contractors, excavators, utility companies, municipalities or any others working on or near underground facilities.

ONE-CALL SYSTEMS

The One-Call damage prevention system shall be contacted prior to excavation.

PROPOSED EXCAVATION

Use white marks to show the location, route or boundary of proposed excavation. Surface marks on roadways do not exceed 1.5" by 18" (40 mm by 450 mm). The facility color and facility owner identity may be added to white flags or stakes.

USE OF TEMPORARY MARKING

Use color-coded surface marks (i.e., paint or chalk) to indicate the location or route of active and out-of-service buried lines. To increase visibility, color coded vertical markers (i.e., stakes or flags) should supplement surface marks. Marks and markers indicate the name, initials or logo of the company that owns or operates the line, and width of the facility if it is greater than 2" (50 mm). Marks placed by other than line owner/operator or its agent indicate the identity of the designating firm. Multiple lines in joint trench are marked in tandem. If the surface over the buried line is to be removed, supplementary offset markings are used. Offset markings are on a uniform alignment and clearly indicate the actual facility is a specific distance away.

TOLERANCE ZONE

Any excavation within the tolerance zone is performed with non-powered hand tools or non-invasive method until the marked facility is exposed. The width of the tolerance zone may be specified in law or code. If not, a tolerance zone including the width of the facility plus 18" (450 mm) measured horizontally from each side of the facility is recommended.

ADOPT UNIFORM COLOR CODE

The American Public Works Association encourages public agencies, utilities, contractors, other associations, manufacturers and all others involved in excavation to adopt the APWA Uniform Color Code, using ANSI standard Z535.1 Safety Colors for temporary marking and facility identification.

Rev. 4/99

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STANDARD OPERATING PROCEDURE – SOP 09
SURFACE CLEARANCE OPERATIONS

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide all EA Engineering, P.C. (EA) employees and subcontractors with the minimum procedures and safety and health requirements applicable to the conduct of analog detection and removal actions at sites potentially containing munitions and explosives of concern (MEC). This SOP can also be used following reacquisition of digitally collected geophysical anomalies.

2.0 SCOPE

This SOP applies to all EA site personnel, including contractor and subcontractor personnel, involved in the conduct of analog detection and surface removal actions on a site contaminated with MEC. The following EA policies and procedures are not all inclusive nor are they applicable in all situations. This SOP is not a stand-alone document and is to be used together with the entire Work Plan, other EA SOPs, applicable federal, state, and local regulations, and contract restrictions and guidance.

3.0 MAINTENANCE

The Project Manager (PM), in collaboration with the Site Supervisor and or Senior Unexploded Ordnance Supervisor (SUXOS) is responsible for the maintenance of this procedure. Approval authority rests with the Program Quality Control Manager (PQCM).

4.0 PERSONNEL REQUIREMENTS / RESPONSIBILITIES

The PM is responsible for ensuring availability of resources to safely and effectively implement this SOP.

The SUXOS will ensure that this SOP is implemented in plans, procedures, and training. In addition, he is responsible for oversight and supervision of field personnel and ensuring compliance with this SOP.

4.1 UXO SAFETY OFFICER

The UXO Safety Officer's (UXOSO) duties shall include, but are not limited to analyzing MEC, explosives operational risk, hazards, and safety requirements; establishing and ensuring compliance with all site-specific safety requirements for MEC and explosives operations; enforcing personnel limits and safety exclusion zones (EZ) for MEC clearance operations; and all activities associated with MEC and explosives transportation, storage, and destruction.

4.2 UXO QUALITY CONTROL SPECIALIST

The UXO Quality Control Specialist (UXOQCS) duties shall include but are not limited to establishing and ensuring compliance with site-specific quality control requirements for MEC and explosives operations and all activities associated with MEC and explosives transportation, storage, and destruction in accordance with the approved Work Plan.

5.0 OPERATIONS

5.1 SURFACE CLEARANCE OPERATIONS

All analog detection and removal activities at MEC sites will be under the supervision of unexploded ordnance (UXO) qualified personnel. Non-essential personnel will not be allowed in the EZ MEC clearance operations unless prior approval is given by the contracting officer representative. If access is required by non-UXO qualified and non-authorized personnel, all work will stop while they are in the EZ.

Work may continue if authorized essential personnel are in the EZ. This authorizing process will include approval by the EA PM, EA Corporate Safety and Health Director, the UXOSO, and the Ordnance and Explosives Safety Specialist (OESS). Project personnel listed in the APP, including the UXO team, the global positioning team, excavation/sifting teams, and the field sampling teams, do not require this approval process. All authorized visitors will be given a safety briefing prior to entering EZ and will be provided a UXO-qualified escort regardless of their qualifications.

During operations, EA personnel will strictly adhere to the APP and the following general safety practices:

- Operations will be conducted during daylight hours only.
- Access to operating areas will be limited to only those personnel necessary to accomplish the specific operation.
- UXO will not be handled, disturbed, or moved.
- During UXO operations the minimum separation distance (MSD) between UXO and non-UXO operations is the hazardous fragmentation distance (HFD) of the munition with the greatest fragmentation distance (MGFD), as stated in the approved Explosives Safety Plans.
- During demolition operations personnel remaining on site will be limited to those personnel needed to safely and efficiently prepare the item(s) for destruction.
- All personnel will attend the daily safety briefing (tailgate safety briefing) or a supplemental safety briefing provided by the UXOSO prior to entering the operating area.
- Anyone can stop operations for an unsafe act or situation.

- Safety violations and/or unsafe acts will be immediately reported to the UXOQCS / UXOSO.
- Failure to comply with safety rules/procedures may result in termination of employment.

5.2 GRID LAYOUT

Depending on the method selected and approved by the customer, the site layout and search grids will be established using a Global Positioning System (GPS) or compass and measuring tape. Grid establishment will consist of GPS operators and at least one UXO Technician II or above who will provide UXO avoidance including checking the intended survey stake locations with a magnetometer prior to driving stakes into the ground. This will prevent driving stakes into potential subsurface MEC.

5.3 ANALOG SWEEP PROCEDURES

MEC surface sweep operations will include minimum of a UXO Technician III and a UXO Technician II. During MEC operations UXO Technicians I will operate under the supervision of UXO Technicians II or III. UXO operations will only be performed by qualified UXO Technicians, which are defined as:

- MEC identification
- Access procedures such as excavation, either by hand or using heavy equipment
- Handling of MEC, explosives, or explosive items
- Disposal, including movement, transportation, and final disposal of MEC.

Analog detector sweeps are particularly effective in areas where vegetation and terrain limit the use of larger digital systems. Also, magnetometer and dig approaches should be used when there is insufficient difference between MEC at the site and other metallic fragments and debris, such that digital discrimination is ineffective or cost prohibitive.

5.3.1 Pre-Survey Field Operations

Each piece of field equipment scheduled for that day's use will be function tested prior to commencement of work. Routine testing procedures will be identified, including the criteria for acceptable performance using an instrument verification strip (IVS), and the action to be taken if the equipment is not performing with the parameters established by the manufacturer or fails to detect the items placed within the IVS at the prescribed depths and axis. Instrumentation used in the field will be tested with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the manufacture's specifications. Testing, repair, or replacement records will be filed and maintained by the SUXOS and may be subject to audit at any time.

The manufacturer's written maintenance schedule shall be followed to minimize the downtime of the measurement systems. The operator's responsibility will be to adhere to this maintenance

schedule and to arrange necessary and prompt service as required. At a minimum, equipment used daily will be cleaned at the end of each work day and kept in good operating condition. Service to the equipment, instrument, tools, etc. shall be performed by qualified personnel. In the absence of manufacturer's recommended maintenance criteria, a maintenance procedure will be developed based upon previous use of the equipment.

Equipment pre-operation procedures will be observed by the SUXOS and/or UXOQCS and recorded in the daily log. If equipment field checks indicate that a piece of equipment is not operating correctly and field repair cannot be made, the equipment will be tagged and removed from service. The SUXOS and/or UXOQCS will request repair or replacement from logistics. Replacement equipment will meet the same specifications for accuracy and sensitivity as the equipment removed from service. Metal detectors will be field tested each day on a known target to ensure they are operating properly. Fisher and Schonstedt (or similar) metal detectors do not require calibration; they have a simple "Go/No Go" field operational check. Failure to detect the test target is reason to reject the instrument and return it to the manufacturer for repairs. During daily operations, random checks of metal detectors will be performed to ensure the equipment is operating correctly. Daily maintenance will include cleaning, minor repairs to the equipment, and battery changes when needed. Repairs may include replacing control knobs and tightening connections as the stated in the manufacturer's manual. Major repairs will be accomplished by returning the equipment to the manufacturer. Batteries will be removed from metal detectors when stored for more than 24 hours and before shipment. Documentation of the status of the metal detectors will be recorded on the Team Leaders (Technician III) daily journal/ logbook.

5.3.2 Survey Field Operations

Initially, individual search lanes will be established approximately 5 feet (ft) wide. Each lane will be surveyed using a Schonstedt magnetometer. The operation will begin at one end of each lane and move in a forward direction toward the opposing baseline. During the forward movement the technician moves the magnetometer back and forth from one side of the lane to the other. Both forward movement and the swing of the magnetometer are performed at a pace that ensures the entire lane is searched and that the instrument is able to appropriately respond to metallic surface debris and subsurface anomalies. When a ring-off occurs the UXO Technician halts and investigates if the source is from a metallic object on the surface or a subsurface anomaly. Throughout this operation the team leader closely monitors the team's individual performance to ensure these procedures are being performed correctly.

5.4 SURFACE MEC/UXO

MEC will be identified by two UXO Technician IIIs or greater. The SUXOS and UXOSO will determine whether or not the item is acceptable to move. If the item is determined to be acceptable to move the item can be consolidated with other MEC items for disposal. If determined to be unacceptable to move it will be marked (flagged) in accordance with the approved Work Plan pending disposition. If disposal cannot be arranged the same day as the MEC/ is identified, a guard will be posted during the non-working hours to ensure the item is not disturbed or moved.

6.0 RECORD KEEPING

The team leader (UXO Technician III) will record at a minimum will contain a record of the following:

- Weather
- Instrument details and serial number
- Team personnel
- Grids worked
- GPS location
- Start and stop times
- MEC items encountered

The data to be recorded for each item discovered during anomaly excavation will include the following (as applicable):

- Type (e.g., munitions debris, material potential presenting an explosive hazard [MPPEH], UXO, and non-MEC Scrap)
- Description (e.g., "projo, 20-millimeter [mm], practice, MK105" and "base, coupling, firing device")
- Initial Condition (e.g., expended, inert, live, and to be determined)
- Approximate length
- Approximate width
- Depth
- Approximate weight
- Found in a pit?
- Piece of fragmentation?
- Initial disposition (e.g., left in place and removed to scrap pile)
- Requires demolition?

7.0 REFERENCES

EA Corporate Safety and Health Program (CSHP)

OSHA, 29 CFR 1910, Occupational Safety and Health Standards

OSHA, 29 CFR 1926, Construction Standards

Applicable sections of EPA, 40 CFR Parts 260 to 299, Protection of Environment

Applicable sections of DOT, 49 CFR Parts 100 to 199, Transportation

USACE EM 385-1-1, Safety and Health Requirements Manual

USACE ER 385-1-92, Safety and Occupational Health Document Requirements for Hazardous Waste Remedial Actions

USACE ER 385-1-95, Safety and Health Requirements for Operations and Activities Involving Munitions and Explosives of Concern

USACE EM 385-1-97, Explosives Safety and Health Requirements Manual

DOD 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives

DOD Manual 6055.09, DOD Ammunition and Explosives Safety Standards

DOD 4160.21-M, Defense Reutilization and Marketing Manual

DA PAM 385-64, Ammunition and Explosives Safety Standards

AR 385-64, Ammunition and Explosives Safety Standards

AR 200-1, Environmental Protection and Enhancement

AR 385-10, The Army Safety Program

AR 385-16, System Safety Engineering and Management

AR 385-40 w/USACE supplement, Accident Reporting and Records

TM 9-1300-200, Ammunition General

TM 9-1300-214, Military Explosives

STANDARD OPERATING PROCEDURE – SOP 10
EXPLOSIVE STORAGE AND ACCOUNTABILITY

1.0 PURPOSE

The purpose of this policy is to provide the minimum procedures and safety and health requirements applicable to the acquisition, storage, and accountability of explosives at EA Engineering, P.C. (EA). This policy is not meant to be all inclusive, nor is it is applicable in all situations. This policy is not a stand-alone document; rather, it is to be used together with the applicable project-specific Work Plan; Accident Prevention Plan (APP); Quality Assurance Project Plan (QAPP); applicable federal, state, and local regulations; and contract restrictions and guidance.

2.0 SCOPE

This Standard Operating Procedure (SOP) applies to all site personnel, including subcontractor personnel, involved in the conduct of operations on munitions response sites requiring the use and/or storage of explosives. This SOP is not intended to contain all of the requirements needed to ensure compliance. Consult the documents listed in Section 10 of this SOP for additional compliance issues.

3.0 MAINTENANCE

The Project Manager (PM), in collaboration with the Senior Unexploded Ordnance Supervisor (SUXOS) is responsible for the maintenance of this procedure. Approval authority rests with the Program Quality Control Manager (PQCM).

4.0 PERSONNEL REQUIREMENTS / RESPONSIBILITIES

4.1 RESPONSIBLE PERSONNEL

Responsible personnel are specific personnel identified within EA's Federal Programs Group and approved in writing by the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF). These persons have the authority to direct the management and polices for explosive materials.

4.2 EMPLOYEE POSSESSOR

An employee possessor is an individual who has the actual or constructive possession of explosive materials during the course of their employment.

4.3 PROJECT MANAGER

The PM, in conjunction with the SUXOS, is responsible for the initial quantity and type of demolition material ordered. The initial requisition should be of sufficient quantity to support the project.

4.4 SENIOR UNEXPLODED ORDNANCE SUPERVISOR

The SUXOS will be responsible for all subsequent requisitions for demolition materials. This will be accomplished by submitting a purchase requisition request through the PM, who approves and forwards it for preparation of a purchase order.

4.5 UNEXPLODED ORDNANCE SAFETY OFFICER (UXOSO)

The Unexploded Ordnance Safety Officer (UXOSO) will be responsible for verifying and documenting that the safety procedures for storing and accounting for explosives are followed in accordance with the approved Work Plan and Explosives Safety Submission or Explosives Site Plan.

4.6 UNEXPLODED ORDNANCE QUALITY CONTROL SPECIALIST (UXOQCS)

The Unexploded Ordnance Quality Control Specialist (UXOQCS) will be responsible for verifying and documenting that explosives are stored and accounted for in accordance with the approved Work Plan.

4.7 ORDNANCE ACCOUNTABILITY OFFICER

The Ordnance Accountability Officer will be responsible for documenting each occurrence of a receipt or issuance of explosive material on the Magazine Data Card and the Explosives Usage Record.

5.0 REQUSITION PROCEDURES

The requisition of explosives will be in accordance with EA's policy and procedure for acquisition of goods. The location of the supplier(s) is a paramount consideration for the requisition of explosives in this process. Generally, response times and pricing are better for those suppliers closest to the site. Additionally, there is the possibility of leasing explosives magazines from the supplier.

6.0 LICENSES / PERMITS

6.1 FEDERAL LICENSE

In order to requisition explosives, EA will maintain a valid ATF license for explosive materials (and manufacturing) on hand, to include an Explosives Purchase / Receipt Authorization List for the receipt of explosives. These two documents must be on file at EA's Corporate Headquarters and at the project site and each explosives supplier must also have a copy of each in order to provide explosives to EA.

7.0 RECORD KEEPING REQUIREMENTS

The regulation in 27 Code of Federal Regulations (CFR) 555 Subpart G requires explosives licensees to keep permanent records of the acquisition, disposition, and inventory of explosive materials. These records are essential in accounting for explosives inventory and identifying lost or stolen explosives. They are also an extremely important source of information for law enforcement during a criminal investigation.

Records will be kept for a minimum of five years from the date a transaction occurs or until discontinuance of business or operations by EA (see 27 CFR 555.128 for discontinuance of business or operations).

7.1 MANUFACTURING OF BINARY EXPLOSIVES

A binary explosive or two-component explosive is an explosive consisting of two components, neither of which is dangerous by itself, which have to be mixed in order to become explosive. If binary explosives are utilized, a separate "Manufacturer of Explosives Record of Use" (Figure 3) must be maintained. This record must identify, at a minimum, the date of use, quantity used, and description.

7.2 EXPLOSIVES RECEIPT

Only those individuals named on the authorization list, which will be kept on file, (refer to Figure 1 in this SOP for an example) may accept and sign for explosives from the explosives vendor. In order to ensure that the quantity shipped is the same as the quantity listed on the shipping documents, two EA personnel will inventory the shipment prior to accepting and signing the bill of laden and receipts.

Figure 1. Persons Authorized to Order, Receive, or Sign for Explosives Form

PERSONS AUTHORIZED TO ORDER, RECEIVE, OR SIGN FOR EXPLOSIVES	
DATED:	
EMPLOYER'S FEDERAL ID NO.:	ATF PERMIT NO.:

I, *Name of Corporate Responsible Personnel*, *Title* of EA Engineering, Science, and Technology, Inc., PBC of 11019 McCormick Road, Hunt Valley, Maryland, 21031, certify the following employee is qualified to ORDER, RECEIVE, or SIGN for explosives.

		Signature
The intended use of the explosive materials purchased is for unexploded ordnance detonation.		
Name	Social Security Number	Date of Birth
Place of Birth (City and State)	Home Address	
Name	Social Security Number	Date of Birth
Place of Birth (City and State)	Home Address	
Name	Social Security Number	Date of Birth
Place of Birth (City and State)	Home Address	

7.3 SHIPPING DOCUMENTS

Explosive shipments are generally accompanied by the explosive supplier's Bill of Lading and the freight company's shipping document. The initial inventory will include reconciling the two documents with the actual shipment, and creating an onsite record that includes these documents and the inventory records. Regardless of the outcome of the initial inventory, one copy of the Bill of Lading and the freight company's shipping document will be attached to a copy of the purchase requisition and the resultant purchase order. One copy of each of the four documents will be filed onsite, and one complete set will be forwarded to Corporate Contracts and Procurement.

7.4 RECEIPT DISCREPANCIES

In the event that there is a discrepancy between the amount shipped and the amount received, the SUXOS will immediately contact the PM and explosives supplier and inform the supplier of the discrepancy. It is then the responsibility of the supplier and shipper to rectify the situation and inform EA of the results. The supplier and/or shipper must then correct their documents and forward the corrected documents to the site. In all cases, only the amount received will be entered on the Magazine Data Card (Figure 2 in this SOP).

Figure 2. Magazine Data Card

EXPLOSIVES STORAGE MAGAZINE DATA CARD

Nomenclature: _____ Contract Number: W9128F-10-D-0056

Lot #: _____ Unit of Issue: _____ Hazard Division: _____

Line #	Date	Printed Last Name and Signature of Authorized Person	Quantity Received from Supplier	Quantity Issued for Use	Unused Quantity Returned to Storage	Balance in Magazine	Verifier Initials	Comments
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

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Figure 3. Explosive Usage Record

EXPLOSIVES USAGE RECORD

EA Engineering, P.C.

Contract Number: W9128F-10-D-0056

Demolition Supervisor _____ Date _____

Work Area/Grid # Team Number

Explosives Issued

Nomenclature	Unit	QTY	Lot #	Checker's Initials

Team Leader Signature _____

Explosives Expended

Nomenclature	Unit	QTY	Lot #	Checker's Initials

Team Leader Signature _____

Explosives Returned

Nomenclature	Unit	QTY	Lot #	Checker's Initials

Team Leader Signature _____

By signing below, I verify that all explosives listed were issued, expended, or returned to storage and that the quantities listed were verified through a physical count.

UXOQCS Signature

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8.0 SUMMARY

The procedures contained in this SOP are meant to ensure that explosive materials are properly stored, accounted for, and issued. These procedures must be strictly followed; violations of this Standard Operating Procedure may result in an employee's immediate dismissal.

9.0 REFERENCES

AFM 91-201, Explosives Safety Standards

AR 385-64, Ammunition and Explosives Safety Standards

AR 200-1, Environmental Protection and Enhancement

AR 385-10, U.S. Army Safety Program

AR 385-16, System Safety Engineering and Management

AR 385-40 with U.S. Army Corps of Engineers supplement, Accident Reporting and Records

ATF Publication 5400.7 Federal Explosives Law and Regulations

ATF Publication 5400.15 Safety and Security Information for Federal Explosives Licensees and Permittees

DA PAM 385-64, Ammunition and Explosives Safety Standards

Department of Transportation, 49 CFR Parts 100 to 199, Transportation (applicable sections)

DOD 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives

DOD 6055.09, Department of Defense Ammunition and Explosives Safety Standards

DOD 4160.21-M, Defense Reutilization and Marketing Manual

Occupational Safety and Health Administration, 29 CFR 1910, Occupational Safety and Health Standards

Occupational Safety and Health Administration, 29 CFR 1926, Construction Standards

Title 27 CFR Part 555 – Commerce in Explosive

TM 9-1300-200, Ammunition General

TM 9-1300-214, Military Explosives
U.S. Army Corps of Engineers EM 385-1-1, Safety and Health Requirements Manual

U.S. Army Corps of Engineers ER 385-1-92, Safety and Occupational Health Document Requirements for Hazardous Waste Remedial Actions

U.S. Army Corps of Engineers EM 385-1-97, Explosives Safety and Health Requirements Manual

U.S. Environmental Protection Agency, 40 CFR Parts 260 to 299, Protection of Environment (applicable sections)

SOP-11
EARTH-MOVING MACHINERY OPERATIONS

1. INTRODUCTION

The purpose of this Standard Operating Procedures (SOP) is to provide the procedures, safety and health requirements, and operations associated with earth-moving machinery (EMM) for Munitions of Explosive Concern (MEC) at EA Engineering, P.C. (EA). This SOP is not meant to be all inclusive, nor is it applicable in all situations. This SOP is not a standalone document; rather, it is to be used in conjunction with other applicable SOPs; project-specific Work Plan (WP); Accident Prevention Plan (APP)/Site Safety and Health Plan (SSHP); applicable federal, state, and local regulations; contract restrictions; and guidance.

This SOP applies to all site personnel, including subcontractor personnel, involved in the conduct of operations on munitions response sites requiring the use of EMM. This SOP is not intended to contain all of the requirements needed to ensure compliance. Consult the documents listed in the reference sections of the WP and APP/SSHP.

2. EARTH-MOVING MACHINERY OPERATIONAL PROCEDURES

2.1 EARTH-MOVING MACHINERY SAFETY

Applicable safety procedures as outlined in the APP/SSHP and will be followed in addition to the safety procedures outlined in this SOP and any other applicable SOPs. The safety procedures to be used during earth-moving machinery (EMM) operations for MEC are discussed below:

- The operation of EMM will be limited to authorized personnel specifically trained in its operation.
- A competent person will visually inspect EMM daily prior to operation and report any abnormalities/deficiencies to the Unexploded Ordnance (UXO) Safety Officer.
- The operator will use the safety devices provided with the equipment, including seat belts and backup warning indicators, and horns will be operable at all times.
- While in operation, all personnel not directly required in the area will keep a safe distance from the equipment.
- The operator's cab will be kept free of all non-essential items, and all loose items will be secured.
- Personnel will avoid moving into the path of operating equipment, and areas blinded from the operator's vision will be avoided.
- EMM requiring an operator will not be permitted to run unattended.
- Except for equipment designed to be serviced while in operation, all equipment will be shut down and positive means taken to prevent its operation while repair or servicing is being conducted.

- All equipment will be secured at the end of the day, or when not in operation, with the blades/buckets of EMM placed on the ground.
- Equipment operated on the highway will be equipped with turn signals visible from the front and rear.
- Stationary machinery and equipment will be placed on a firm foundation and secured before being operated.
- All points requiring lubrication during operation will have fittings so located or guarded as to be accessible without hazardous exposure.
- Mobile-type equipment operating within an off-highway job site not open to public traffic will have a service brake system and a parking brake system capable of stopping and holding the equipment fully loaded on the grade of operation.
- EMM will be shut down prior to and during fueling operations.
- All equipment with windshields will be equipped with powered wipers, and equipment that operates under conditions that cause fogging or frosting of windshields will be equipped with operable defogging or defrosting devices.
- Whenever the equipment is parked, the parking brake will be set, and equipment parked on inclines will have the wheels chocked or track mechanism blocked and the parking brake set.
- Personnel will not work or pass under the buckets or booms of loaders in operation.
- Each bulldozer, scraper, drag-line, crane, motor grader, front-end loader, mechanical shovel, backhoe, dump truck, and other similar equipment will be equipped with at least one dry chemical fire extinguisher having a minimum Underwriters Laboratories rating of 5-pound B:C.
- When EMM must negotiate in tight quarters, or if operators of EMM cannot see the bucket, a secondary person will be stationed to guide the operator.
- Additional riders will not be allowed on equipment, unless it is specifically designed for that purpose (i.e., there is an additional seat with a seat belt).

2.2 PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

The following safety measures and personal protective equipment (PPE) will be used in preventing or reducing exposures associated with EMM operations. PPE used to protect workers from contaminant-related hazards must comply with the requirements specified in the SSHP appendix to the APP. These requirements will be implemented, unless superseded by site-specific requirements stated in the SSHP. At a minimum, the following PPE will be required:

- Level of PPE as specified in the SSHP for EMM operators
- Normal work clothes (long pants and shirt)
- Gloves (outer leather for UXO operations – outer nitrile for sampling)

- Boots (leather, steel, or composite protective toe)
- Hard hat (as required); EA UXO personnel will use hard hats during EMM operations except during any MEC investigation.

3. MUNITIONS AND EXPLOSIVES OF CONCERN EARTH-MOVING MACHINERY OPERATIONS

The following procedures will be in conjunction with other applicable SOPs as stated in the site-specific WP.

3.1 PROCEDURES

In accordance with Engineer Manual EM 385-1-97, 1.2.H, the following practices will be used during intrusive investigations on MEC sites:

- Start all excavations from the side of the anomaly. Carefully dig from the side until identification of the anomaly is made. Excavation operations, whether by hand or EMM, will employ a step-down or offset access method. Under no circumstances will any excavation be made directly over suspected MEC.
- Clear debris/dirt from the subsurface anomaly only enough to permit identification of the anomaly and to apply the necessary MEC procedure.
- Move with slow, deliberate motions; avoid abrupt moves.
- Avoid impacting, jarring, or striking UXO.
- Operator must observe the UXO technician at the front of the equipment for all signals.
- Observe electromagnetic radiation precautions in accordance with Department of the Army Pamphlet 385-64.

3.2 PERSONNEL

All personnel, including contractor and subcontractor personnel, involved in excavation or trenching operations shall be familiar with the potential safety and health hazards associated with the conduct of this operation, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

All non-essential personnel will remain outside the exclusion zone during excavation activities. If non-essential personnel need to be onsite, all excavation activities will stop and the EMM operator will shut down the equipment until activities resume.

3.3 UNEXPLODED ORDNANCE TEAM

The UXO team will monitor all excavation activities in areas known or suspected to contain MEC. One member of the team will be positioned to the rear and upwind of the excavation equipment for continuous visual observation of activities. If the EMM operator unearths or otherwise encounters a military munitions with unknown filler, all excavation activities will cease.

The UXO team will assess the condition of the military munitions to determine if a disposal action is required. Once MEC have been encountered in an excavation, no further excavation will be allowed at that location until Explosive Ordnance Disposal has removed the MEC. Excavation will not continue until a detailed assessment of the potential of encountering additional MEC is completed. If the Project Delivery Team determines that the item was an anomaly, and no other MEC are expected, then the excavation may continue. If the Project Delivery Team determines through the available data that the probability of encountering additional MEC is moderate to high, then a subsurface removal of the construction footprint is required. Refer to SOP 05 (Intrusive Operations) for subsurface removal requirements.

4. FOLLOW-UP ACTIONS

In the After-Action Report, indicate that MEC were encountered and summarize the resulting activities. Avoidance and soil excavation will be presented in the WP and SSHP. Refer to corresponding SOPs for further guidance.

The Senior UXO Team Leader will provide the list below of documents and information to the EA Project Manager upon completion of the project:

- All logbooks
- Project documentation
- Photos
- MEC/UXO disposition documents
- Munitions debris disposition documents
- Site-Specific Final Report information (in accordance with Munitions Response MR 030).

5. SUMMARY

EA uses proven procedures and methods to provide MEC Support Services. Only qualified UXO personnel will perform tasks associated with MEC location, identification, and item condition determination. The procedures outlined in this SOP are based on industry standards and ensure that operations are safely and efficiently performed.

Attachment A

Backhoe Operational Procedures

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ATTACHMENT A
BACKHOE OPERATIONAL PROCEDURES

BEFORE USING THE MACHINE

1. Read the owner's manual to learn the characteristics of your machine. For your personal protection, you will need to wear some or all of the following:

   a. Sturdy pants and shirt
   b. Safety shoes
   c. Hard hat
   d. Safety goggles or glasses
   e. Gloves
   f. Hearing protection
   g. Respirator for dusty conditions
   h. Sunscreen protection is vital in bright sunshine if not under a roof.

2. Check the loader/backhoe for the presence of the following safety devices in good working order:

   a. Rollover protective structure
   b. Seat belt (if rollover protective structure equipped)
   c. Guards
   d. Shields
   e. Backup warning system
   f. Lights, and mirrors.

3. Fill the fuel tank while engine is off and cool. Never fill inside a building. Do not smoke. Wipe up any spills immediately.

4. Check the machine daily for broken, missing, or damaged parts. Make the necessary repairs or replacements.

5. Keep the machine clean—especially steps, hand rails, pedals, grab irons, and floor of the cab. Slippery surfaces are very hazardous.

6. Remove or secure loose items in the cab that could interfere with operating the controls.

7. Check the work area for hidden holes, obstacles, drop-offs, etc. Clear children, pets, and bystanders from the area.

8. Check overhead for utility lines, roofs, and other obstacles.

9. Request utility service to locate underground cables, gas lines, water, and sewer lines before digging. You need to request this service in advance.

10. Always use the hand rails, ladders, and steps provided when mounting the machine; never grab controls or the steering wheel.

11. The cab was designed for one person—allow no riders, especially children.

OPERATING THE LOADER

1. Adjust the seat, fasten the seat belt, set the brake, and place transmission in park or neutral before starting the engine.

2. If machine is in a garage, be sure ventilation is adequate. CARBON MONOXIDE KILLS!

3. Start the engine and check all controls for proper function. Check horn and backup alarm. Do not use if anything is faulty.

4. If the backhoe is still attached, be sure to use chains and locks to prevent it from swinging.

5. If the backhoe is removed, you may have to use counterweights. Check your owner's manual.

6. Keep the working area as level and clean as possible. Use the bucket to grade the area frequently.

7. Always carry the bucket low for good visibility and maximum stability.

8. Use extreme caution when backfilling to avoid collapsing the wall of the trench.

9. When undercutting high banks or material piles, be alert for falling rocks and/or cave-ins.

OPERATING THE BACKHOE

1. Keep the loader bucket on the ground.

2. Level the machine for maximum stability.

3. Operate the backhoe only from the seat.

4. Never swing the bucket over a truck cab.

5. Dump the bucket uphill if possible when operating on a slope. If you must dump downhill, swing slowly to avoid tipping the machine.

6. If using the backhoe as a hoist, do so with the weight over the back of the machine—NEVER THE SIDE—to avoid tipping.

7. Be sure the load you are lifting is balanced and
8. move the boom slowly to avoid swaying the load.

SAFE STOPPING PROCEDURE

1. Park the machine on level ground if possible and set the parking brake. Place transmission in park if so equipped.

2. Lower the loader and backhoe buckets to the ground.

3. Stop the engine and remove the key.

4. Work the hydraulic controls to relieve pressure.

5. Wait until all motion has stopped and then dismount carefully using steps and safety holds. Do not jump from the machine.

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Attachment B

Backhoe Safety Checklist

BACKHOE SAFETY CHECKLIST

Site/Location: _____ Date: _____

Backhoe Characteristics:

☐ Labeled for operating rated capacity.

☐ Steps and grab handles.

☐ Seat belts/rollover protective structure

☐ Protective shields or guards.

☐ Correct bucket size.

☐ Proper lighting and signals.

☐ Operating handles easy to reach for operator with full view of work area from all positions.

☐ Brake system.

☐ Appropriate type of fire extinguisher readily available.

Backhoe Operators:

☐ Trained and designated to use the equipment.

☐ Never exceed the equipment's rated capacity.

☐ Use warning signal to alert others in the work area to problems.

☐ Allow proper clearance, including overhead.

☐ Select correct size of bucket.

☐ Ensure area to be dug has been marked. Observe the area and contact the utilities company(s) for locations of utilities. Request "Miss Utility" service in advance of operations.

☐ Tighten sling without hands or fingers between sling and load.

☐ Know maximum depth capability.

☐ Ensure stop locks or barricades are placed near the excavation.

☐ Balance loads placed in buckets.

☐ Wear correct personal protective equipment while operating backhoe.

☐ Remove and secure loose clothing, tools, equipment, etc., out of operating area in cab.

☐ Never operate boom or bucket in an unsafe manner.

☐ Use equipment smoothly, avoiding sudden starts and stops.

Bucket Characteristics:

☐ Select by rated capacity and job requirements for model being operated.

Backhoe Inspection:

Operators are to check, observe, correct, and ensure the following at a minimum:

☐ Observe warnings, cautions, precautions, and recommendations in the operator's manual.

☐ Operating mechanism: Check all controls and throttle.

☐ Hydraulic system: Check hoses, lines, and connections or fittings.

☐ Proper fluid levels: Check all fluid levels, use only approved fluid replacements.

☐ Hoses and lines: Check for cuts, excessive wear, or leaks.

☐ Air filter system: Check for cleanliness and in place.

☐ Frame-lock lever: Check lever and lock stop for damage.

☐ Lighting and mirrors: Check for serviceability.

☐ Frame, steps, and grab handles: Check for damage.

☐ Brakes: Check for stopping ability on and off road.

☐ Backup warning alarm: Check for serviceability.

☐ Seatbelts/rollover protective structure: Check for cuts or missing/inoperable components

☐ Exhaust system: Check for leaks or missing components.

☐ Check for fluid leaks: Check for any fluid leaks, use spill control methods until repaired

☐ Tires: Check for proper inflation, tread wear and damage to rims.

☐ Grease fittings: Check fittings and grease every 8 hours of use, ensure correct type and amount is utilized.

☐ Inspect work area: Check for stop blocks or barricades, collapsed walls, unauthorized personnel in area, obstacles, or other hazardous or dangerous conditions/situations.

☐ Conduct repair/maintenance outside of populated work area. Turn equipment off, lower buckets, display warning signs

Completed By:

Name Position

Attachment C

Trenching and Excavations Checklist

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TRENCHING AND EXCAVATIONS CHECKLIST

Site/Location: _____ Date: _____

Securing the Worksite:	**Yes**	**No**
Have underground utilities installations been located and protected, supported, or removed before opening the excavation?	☐	☐
Has a proper protective system been designed for the excavation site?	☐	☐
Is a written form of the design present on the site and a copy available for Occupational Safety and Health Administration inspection?	☐	☐
Have structural ramps for employees and for equipment been designed to standard?	☐	☐
Have walkways been provided where necessary?	☐	☐
Are means of egress located at required 25-foot intervals in trenches 4 feet or more in depth?	☐	☐
Have all surface obstacles threatening worker safety been removed or supported?	☐	☐
Is the stability of adjacent structures assured by support systems?	☐	☐
Are all walkways, or bridges protected with standard guardrails and barriers? Are covers provided for remote or temporary excavations, shafts, wells, or pits?	☐	☐
Inspection:		
Before work begins, are inspections conducted daily by a competent person for:		
1. Risk of cave-ins?	☐	☐
2. Failure of protective systems?	☐	☐
3. Hazardous atmospheres?	☐	☐
4. Water accumulation?	☐	☐
5. Other hazards?	☐	☐
Are such inspections made after every rainstorm or other hazard-increasing occurrence?	☐	☐
Work Practices:		
Have workers exposed to vehicular traffic been provided with warning vests?	☐	☐
Is there a warning system to protect mobile equipment from falling over the edge of an excavation when the operator's view is obstructed?	☐	☐
Securing the Worksite:	**Yes**	**No**
Do workers keep a safe distance from lifting or digging equipment?	☐	☐
Is emergency rescue equipment such as breathing apparatus, safety harness and line, or a basket stretcher readily available and employees trained in their use?	☐	☐
Are employees protected from loose rock or soil?	☐	☐
Is excavated or other material stored and retained at least 2 feet from the edge of any excavation that workers may need to enter?	☐	☐
Are installations and removals of support systems carried out in the manner and sequence required?	☐	☐

Completed By:

Name Position

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STANDARD OPERATING PROCEDURE – SOP 12
MECHANICAL SCREENING OPERATIONS

1. INTRODUCTION

The purpose of this Standard Operating Procedure (SOP) is to provide the mechanical screening procedures at EA Engineering, P.C. (EA). This SOP is not meant to be all inclusive, nor is it applicable in all situations. This SOP is not a standalone document; rather, it is to be used in conjunction with the applicable project-specific Work Plan (WP); Accident Prevention Plan (APP)/Site Safety and Health Plan (SSHP); applicable federal, state, and local regulations; contract restrictions; and guidance.

This SOP applies to all site personnel, including subcontractor personnel, involved in the conduct of operations on munitions response sites requiring munitions mechanical screening activities. This SOP is not intended to contain all of the requirements needed to ensure compliance. Consult the documents listed in the reference sections of the WP and APP/SSHP.

The following should be taken into consideration when planning or conducting munitions and explosives of concern (MEC) mechanical screening operations:

- SAFETY IS PARAMOUNT.
- Do not move or disturb unidentified items.
- Do not collect souvenirs.
- Do not smoke except in designated areas.
- Do not carry fire or spark-producing devices into the site.
- All MEC operations will use the “buddy” system.
- Prohibit non-essential personnel from visiting the site.

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2. PROCESS SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the processing described within this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's/operator's statement for this process.

I will ensure that the SOP has current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

Supervisor's Name Date

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3. WORKER'S/OPERATOR'S STATEMENT

I have read this SOP and have received adequate training to perform the process according to the SOP. I will follow the SOP unless I identify a hazard not addressed in it or encounter an operation I cannot perform according to the SOP. If that occurs, I will stop the process and notify my immediate supervisor of the problem.

Site Personnel

Name	Date	Signature

Supervisor's Name Date

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4. RESPONSIBILITIES

All personnel onsite during mechanical screening activities are responsible for ensuring they are familiar with all aspects of this SOP, WP, APP/SSHP, and all other applicable SOPs.

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the EA resources needed to implement this SOP, and shall ensure that this SOP is incorporated into the plans, procedures, and training for sites where mechanical screening is to be implemented.

4.2 SENIOR UNEXPLODED ORDNANCE SUPERVISOR

The Senior Unexploded Ordnance (UXO) Supervisor (SUXOS) will ensure that this SOP is implemented for screening operations, and that relevant sections of this SOP are discussed in the tailgate safety briefings. Information related to the daily implementation of the SOP is to be documented in the Site Operational Log, which is maintained by the SUXOS.

4.3 UNEXPLODED ORDNANCE TECHNICIAN III

The UXO Technician III shall be responsible for ensuring the field implementation of this SOP and for implementing the safety and health requirements outlined in the APP/SSHP and Section 6. In the absence of a SUXOS, the UXO Technician III shall be responsible for implementing the SUXOS' responsibilities outlined in Section 4.2.

4.4 UNEXPLODED ORDNANCE SAFETY OFFICER

The UXO Safety Officer (UXOSO) will be responsible for ensuring that the safety and health hazards and control techniques associated with the APP/SSHP and this SOP are discussed during the initial site hazard training and the daily tailgate safety briefings. The UXOSO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with the WP, this SOP, and other regulatory guidelines.

4.5 UNEXPLODED ORDNANCE QUALITY CONTROL SPECIALIST

The UXO Quality Control Specialist (UXOQCS) will be responsible for ensuring that the quality and controlling techniques associated with the WP and this SOP are discussed during the initial site familiarization training and daily activities. The UXOQCS will also be responsible for daily inspections of site operations and conditions to ensure their initial and continued compliance with the WP, this SOP, and other regulatory guidelines.

4.6 SITE SAFETY AND HEALTH OFFICER

EA shall employ a minimum of one Competent Person at each project site to function as the Site Safety and Health Officer (SSHO). The SSHO, at a minimum, must have completed the 30-hour Occupational Safety and Health Administration (OSHA) construction safety class or, as an equivalent, 30 hours of formal construction safety and health training covering the subjects of the OSHA 30-hour course (see Engineer Manual 385-1-1 Appendix A, Paragraph 4.b) applicable to the work to be performed and given by qualified instructors. The SSHO is also required to have 5 years of construction industry safety experience or 3 years if they possess a Certified Safety Professional or safety and health degree.

5. MUNITIONS AND EXPLOSIVES OF CONCERN MECHANICAL SCREENING

All EA, contractor, and subcontractor personnel involved in screening operations shall be familiar with the potential safety and health hazards associated with this operation. Additionally, all affected personnel shall also be familiar with the control techniques that will be used to reduce or eliminate these hazards.

5.1 MECHANICAL SCREENING SAFETY

The safety and health hazards potentially associated with mechanical screening operations on an MEC site are listed below. For each of the hazards listed, at least one hazard control measure is listed in Section 5.2 for the reduction of the operational hazard. At no time will mechanical screening operations be conducted onsite without the use and implementation of the appropriate controls measures.

- When sifting operations are being conducted, essential personnel will be afforded blast and fragment protection through the use of shielding, personal protective equipment (PPE), and/or distance. The requisite shielding is identified within the fragment calculation sheet from the Fragmentation Database for the MEC item(s) expected to be encountered.

- All sifting operations will have the capability of being remotely shut down from a "kill" switch located at, or outside of, the K24 distance.

- All non-essential personnel will be kept outside of the Maximum Fragment Range-Horizontal during mechanized MEC procedures involving sifting.

- All safety plans involving sifting operations will include procedures on how to handle MEC items that are discovered within the sifting mechanical structures.

- MEC/UXO, possibly resulting in heat, fire, fragmentation, and over-pressurization hazards

- Vehicle traffic and movement

- Trips and falls (excavations and man lift)

- Noise

- Heavy equipment operations

- Dust, with potential for exposure to toxic metals

- Stored energy and pinch points

- Engine exhaust.

5.2 OPERATIONAL CONTROL MEASURES

For the safety hazards listed in Section 5.1, the operational control measures presented below shall be used to the greatest extent feasible, to protect site personnel from the hazards associated and identified with mechanical screening operations. The degree and type of hazard, as outlined in the site WP and SSHP will determine the extent of control to be used. However, all of the measures listed below will be implemented:

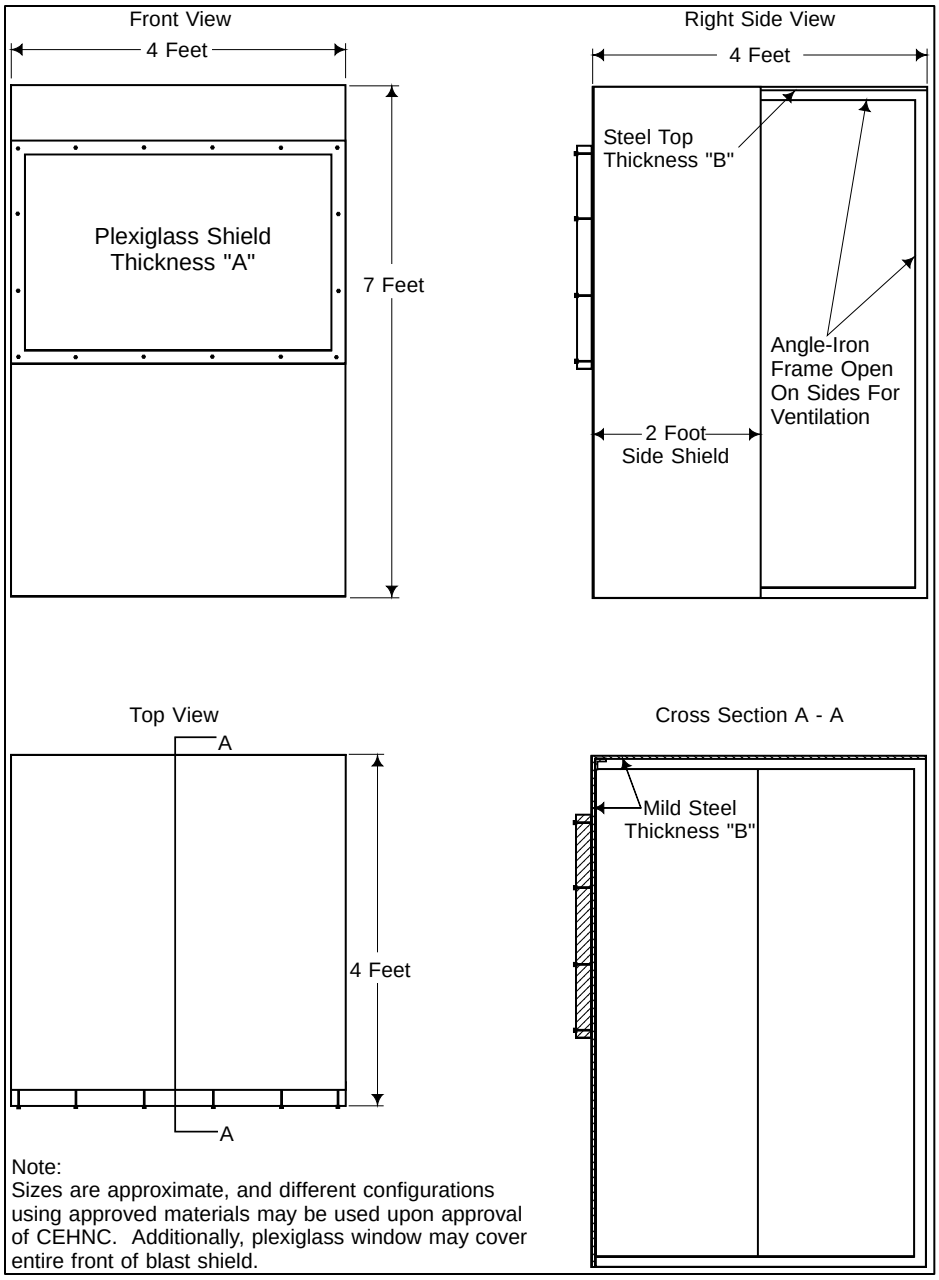
- Daily tailgate safety meetings will be conducted, and noted in the Safety Log, as to the safety and health concerns pertaining to overall operations and the use of screening equipment.

- Screening equipment and support vehicles shall be equipped with fire extinguishers.

- The excavation operations will not require barricading; however, both the excavator and the UXO personnel will be protected behind a Plexiglas (or equivalent material) window of the thickness specified in Figure 1. For the loader/excavator operator, the Plexiglas will be mounted over the existing windshield and windows. For the UXO Technician observing the excavation, the Plexiglas window will be mounted on a blast shield similar to that portrayed in Figure 1. At a minimum, the blast shield shall provide front, side, and overhead protection, and be constructed to the material thickness specifications in Figure 1. General design characteristics and dimensions of the Plexiglas and steel sides required have been specified by the Structures Branch, Engineering Directorate, U.S. Army Engineering and Support Center, Huntsville. The dimensions were selected based on the accidental detonation of the munitions with the greatest fragmentation distance (MGFD) for the specific site.

- The mechanical screening assembly will not require barricading; however, the UXO personnel controlling and monitoring the screening, along with the UXO team member monitoring the screen reject material, will be protected behind Plexiglas windows mounted on separate blast shields. The blast shields used shall be constructed similar to the blast shield depicted in Figure 1. The UXO personnel controlling the screen will do so by means of a remotely wired “kill” switch. This “kill” switch will be capable of shutting down the screening operations should the UXO team member monitoring the operation detect a MEC item within the screen or screen reject. The location of the UXO team member monitoring the screening process will be such that the UXO team member will be able to see the screening area. This may require the use of a man lift to allow for visual observation of the operation. If needed, the blast shield will be mounted on the man lift platform.

Figure 1. Barrier Specifications



- All operational observers described above will be located outside the K24 distance arc of 19.4 feet for the MGFD specified for the site. To fill the sifter hopper, the loader operator will be passing temporarily into and out of the K24 distance arc and, as such, will be required to wear hearing protection at all times. This will be in addition to the Plexiglas shielding that will be installed on all excavation and loading equipment.

- The UXO Technician III controlling the screening operation will watch for any materials that may be MEC items and any items that may become lodged or jammed in the screens. If any potential MEC are seen in the hopper (Figure 2), on the conveyors, in the screens, or in the reject material, the screening process will be shut down immediately. Additionally, if potential MEC are observed in the screen reject, the UXO team member observing the item will use radio or visual communication to order the immediate shut down of the screening operations. Once the process has been halted and secured, the potential MEC item will be inspected by the UXOSO. If the item is confirmed as being a MEC item, it will be identified and a determination made as to whether the item can be moved. Those items that are unfuzed or safe to move will be removed from the screening equipment and stored for later disposal, according to the approved WP. Those items determined to be unsafe to move will be left in place, the U.S. Army Corps of Engineers Ordnance and Explosive Safety Specialist will be notified, and the screening operations halted until a resolution can be obtained using the procedures in the approved WP. Those items identified as being MEC-related will be (if possible) removed and stored accordingly.

- Segregation of the oversized materials will be performed according to the following:

  — Debris identified as rocks, roots, shale, and/or similar will be collected and combined with the screened soil from which it came.

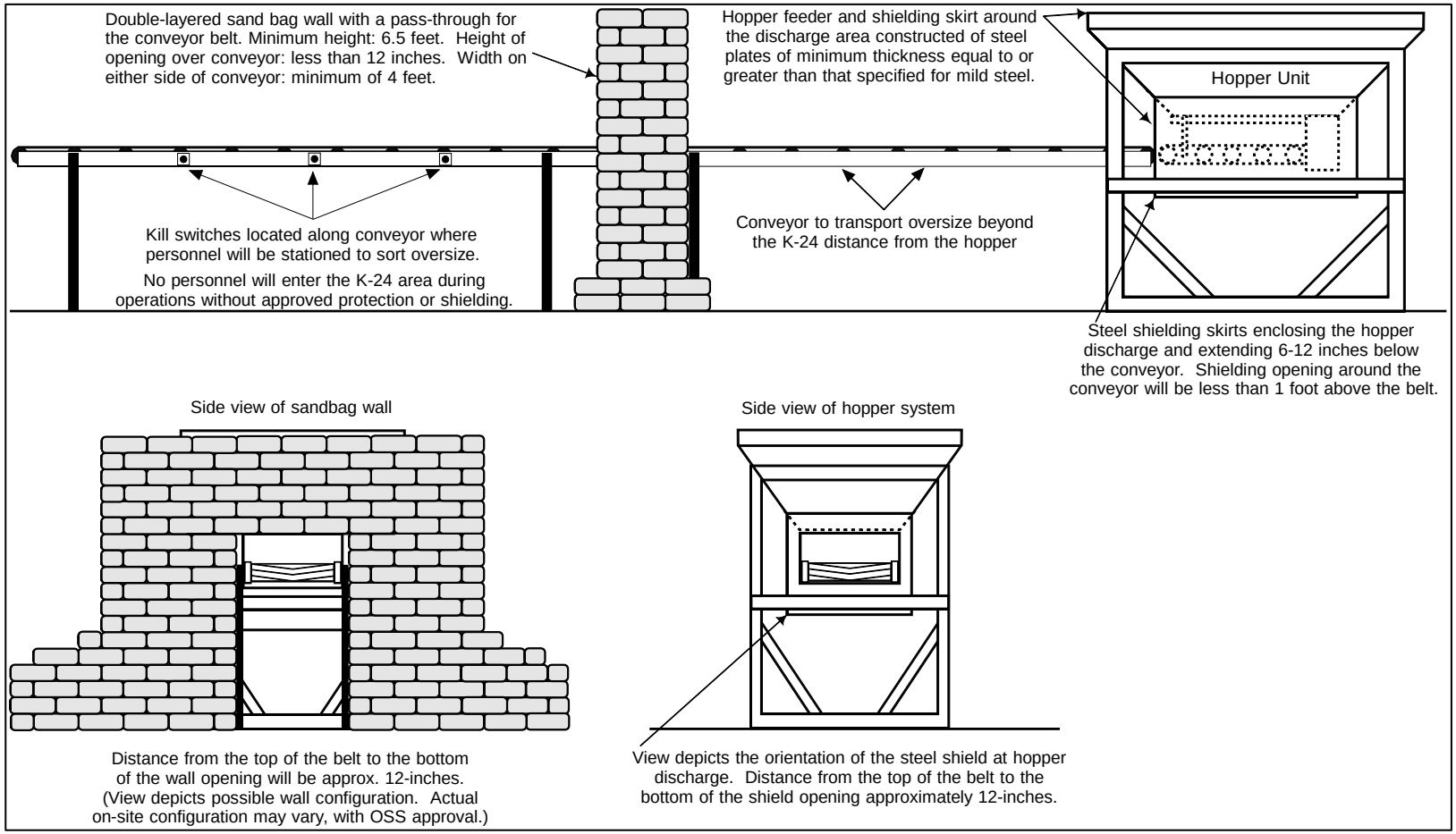
  — The metal debris identified as non-MEC scrap will be disposed of as other debris scrap.

  — The metal debris identified as munitions debris must be verified as being free of MEC hazards and segregated in a separate area from the other debris until it is moved to the holding area for all munitions debris to be certified with material potentially presenting an explosive hazard (MPPEH) procedures in accordance with SOP No. 08 (Munitions Debris Inspection).

  — The items identified as MEC that are unfuzed and safe to move will be disposed of with an existing blown-in-place item.

Figure 2: Hopper and Conveyor Assembly

Site Name:	Site Location:
MGFD:	Team Separation Distance:
Thickness "A" for the Plexiglas:	Thickness "B" for the Steel:
K24 Distance:	MSD:



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- Hazardous MEC that cannot be moved will be brought to the attention of the SUXOS who will immediately shift activities to SOP No. 06 (MEC Demolition and Disposal Operations) and/or make all notifications as outlined in the WP and APP/SSHP.

- When maintenance/servicing is performed on the sifter or conveyor system, all sources of immediate power or stored energy shall be controlled in accordance with the EA Hazardous Energy Control (lockout/tag out) SOP.

- Whenever possible, screening operations will be restricted to daylight hours, and once operations begin, only UXO-qualified personnel may enter the safety zone around the sifter operation.

- All personnel involved in the screening operations shall be informed of the "kill" switch location, as well as the procedures for summoning emergency support.

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6. PERSONAL PROTECTIVE EQUIPMENT

The following PPE shall be used in preventing or reducing exposures associated with screening operations. These requirements will be implemented unless superseded by site-specific requirements stated in the SSHP.

- Hard hats, safety-toe work boots, and protective gloves shall be worn at all times (i.e., maintenance, adjustment, screening material on the conveyor, or clearing of the sifter) during sifting operations.

- Safety glasses, full face shield, or goggles shall be worn around screening equipment unless full face respirators are required.

- Any PPE that will be worn when investigating MEC, suspect MEC, or maintenance in the sifter will be secured to the wearer to ensure that it does not fall off and strike suspect items.

- Hearing protection shall be worn when screening equipment is in operation unless the UXOSO has measured and determined the noise levels to be less than 85 decibels on the "A" scale over an 8-hour time-weighted average.

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7. MUNITIONS AND EXPLOSIVES OF CONCERN DISPOSITION

Since the purpose of MEC screening activities is normally a remedial action activity, the UXO team may be tasked with performing MEC disposition. MEC disposition will be covered in the WP for the project; therefore, the UXO team is capable of and equipped to perform MEC disposition. In the event that MEC are encountered that cannot be avoided or, based on its fuzing or current condition, present an imminent hazard requiring immediate attention, the UXO team will notify the Site Supervisor who will make all notifications as designated in the WP and SOP No. 06 (Demolition and Disposal Operations). The UXO team will dispose of the MEC encountered unless otherwise directed by the Work Performance Statement and WP. The Site Supervisor will notify the appropriate authority of the MEC discovery, and the UXO team will safeguard the site pending arrival of the appropriate authority or further direction.

- On active installations, MEC disposition activities will normally require reporting to the EA Project Manager, Range Control Officer, Base/Post Operations, Facility Engineer, Post Headquarters, Medical, Fire Department, and point of contact designated in the WP.

- On Formerly Used Defense Sites, the local point of contact will facilitate the local response. The local point of contact will inform the local law enforcement agency (First Responders) of the discovery and disposal activities. Unless otherwise directed in the WP, all other notifications will be made by the Site Supervisor/SUXOS.

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8. RECORDKEEPING

The senior UXO staff members and the screening team leader will maintain a field logbook that, at a minimum, will contain a record of the following:

- Weather
- Analog detector instrument details and serial number
- Screen maintenance checks, prior to startup
- Heavy equipment checks
- Screening team personnel and duties
- Areas where dirt was removed by loader
- Start and stop times
- Number of yards screened
- Weight of munitions debris and other debris
- Number and weight of MEC items
- Photo numbers and Global Positioning System coordinate (location of loader removal, if possible) for MEC items found.

The data to record for each MEC item found during screening operations will include the following:

- Type (e.g., munitions debris, MPPEH, MEC)
- Description (e.g., projectile, 20 millimeters, practice, M/MK/Mod if known, base, fuze, etc.)
- Initial condition (e.g., expended, inert, live, or to be determined)
- Approximate length
- Approximate width
- Approximate weight
- Photo number

- Initial disposition (moved to storage container or scrap pile)
- Requires demolition
- Inform SUXOS of all data at end of day.

9. DISPOSAL PROCEDURES

If encountered during the screening activities, all MEC and MPPEH will be disposed of in accordance with the project scope or the WP and applicable SOPs. All hazardous material encountered will be reported to the SUXOS for disposition.

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10. SUMMARY

EA uses proven procedures and methods to provide MEC Support Services. Only qualified UXO personnel will perform tasks associated with MEC location, identification, and item condition determination during screening operations. The procedures outlined in this SOP are based on industry standards and ensure that operations are safely and efficiently performed.

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STANDARD OPERATING PROCEDURE – SOP 13
SOIL SAMPLING

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for sampling surface and subsurface soil. Soil samples give an indication of the area and depth of site contamination, so a representative sample is very important.

2.0 MATERIALS

- Disposable spoon, trowel, knife, spatula, spoonula
- Split-spoon sampler
- Hand auger or push tube sampler
- Stainless steel bowl
- Personal protective equipment (PPE) as required by the Accident Prevention Plan (APP)
- Sample Collection Field Data Sheet (Appendix A)
- Field Log Book

3.0 MAINTENANCE

The Project Manager (PM), in collaboration with the Site Supervisor and or Senior Unexploded Supervisor (SUXOS) is responsible for the maintenance of this procedure. Approval authority rests with the Program Quality Control Manager (PQCM).

4.0 SURFACE SOIL SAMPLES

Don PPE. Collect a sample from 0-6 inches (unless Quality Assurance Project Plan [QAPP] identifies a different interval) below the ground surface, including the vegetative mat, with a sample-specific stainless steel (or plastic if metals are an issue) trowel, disposable spoon, push tube sampler, or hand auger.

If a representative sample is desired over the depth of a shallow hole or if several shallow samples are to be taken to represent an area, composite as follows:

- As each sample is collected, place a standard volume in a stainless-steel bowl.
- After all samples from each hole or area are in the bucket, homogenize the sample thoroughly with a decontaminated stainless-steel spoon or spatula.

If no compositing is to occur, place sample directly into the sample jars. Place the leftover soil in the auger borings and holes left by sampling. If necessary, add lean sand to bring the subsurface sampling areas back to original grade. Soil samples will not include rocks or pebbles, unless they are part of the overall soil matrix.

Sample containers will be capped then labeled with waterproof labels marked with indelible ink. The sample containers will be bubble-wrapped and taped for shipping and placed into iced coolers for transport under chain-of-custody protocol to the analytical laboratory. Copies of the chain-of-custody forms and shipping documents will be made and entered into the project file.

5.0 SUBSURFACE SOIL SAMPLES

Don PPE. Subsurface soil samples will be collected using a hand auger, manually-driven split-barrel samplers. The sampler will be augered or driven to the required depth; then the sampler will be removed from the borehole.

The soil sample for the interval of interest will be removed from the sampler using a stainless steel or plastic (if metals are a concern) trier or spoonula and the required volume of the sample will then be placed into laboratory-cleaned sampling containers and handled per Section 4.0. If a representative sample is desired over the depth of a shallow hole or if several shallow samples are to be taken to represent an area, composite as follows:

- As each sample is collected, place a standard volume in a stainless-steel bowl.
- After all samples from each hole or area are in the bucket, homogenize the sample thoroughly with a decontaminated stainless-steel spoon or spatula.

The leftover soil and cuttings will be disposed into the borehole. Remaining soil cuttings will be spread at the surface around the borehole. Deep boreholes may require filling with either bentonite or cement-bentonite grout depending on site conditions and state/local regulations.

6.0 DOCUMENTATION

All samples will be documented in a Field Log Book as the sample is collected and verified by the site supervisor at the completion of each days sampling. Each sample will be placed on the appropriate chain-of-custody from the laboratory.

7.0 PRECAUTIONS

If completing in uncleared areas, MEC avoidance procedures will be conducted utilizing qualified Unexploded Ordnance
(UXO) Technicians.

8.0 REFERENCES

ASTM Method D1586-84, Penetration Test and Split-Barrel Sampling of Soils.

ASTM Method D1587-83, Thin Walled Sampling of Soils.

Department of the Army, Office of the Chief of Engineers, Engineer Manual 1110-1-1804 Geotechnical Investigations, 1 January 2001

STANDARD OPERATING PROCEDURE – SOP 14
CHAIN OF CUSTODY FORM

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for use of the chain of custody form. An example is provided at the end of this SOP. Other formats with similar levels of detail are acceptable.

2.0 MATERIALS

The following materials may be required: chain of custody form and indelible ink pen.

3.0 PROCEDURE

- Give the site name and project name/number.
- Enter the sample identification code.
- Indicate the sampling dates for all samples.
- List the sampling times (military format) for all samples.
- Indicate "grab" or "composite" sample with an "X."
- Specify the sample location.
- Enter the total number of containers per cooler.
- List the analyses/container volume.
- Obtain the signature of sample team leader.
- State the carrier service and airbill number, analytical laboratory, and custody seal numbers.
- Sign, date, and time the "relinquished by" section.
- Upon completion of the form, retain the shipper copy, and affix the other copies to the inside of the sample cooler, in a zip-seal bag to protect from moisture, to be sent to the designated laboratory.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCES

U.S. Environmental Protection Agency (U.S. EPA). 1980. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, QAMS-005/80.

U.S. EPA. 1990. Sampler's Guide to the Contract Laboratory Program. EPA/540/P-90/006, Directive 9240.0-06, Office of Emergency and Remedial Response, Washington, D.C. December.

U.S. EPA. 1991. User's Guide to the Contract Laboratory Program. EPA/540/O-91/002, Directive 9240.0-01D, Office of Emergency and Remedial Response. January.

Rev. 4/2010 **CHAIN OF CUSTODY** **Page _____ of _____**

Company:
Project Contact:
Telephone:
Project Name:
Project #:
Location:
Sampled By:

CT LABORATORIES
1230 Lange Court, Baraboo, WI 53913
608-356-2760 Fax 608-356-2766
www.ctlaboratories.com

Lab Use Only
Place Header Sticker Here

Program:
QSM RCRA SDWA NPDES
Solid Waste Other _____

PO #

Report To:
EMAIL:
Company:
Address:

Invoice To*
EMAIL:
Company:
Address:

** Party listed is responsible for payment of invoice as per CT Laboratories' terms and conditions*

Client Special Instructions

Matrix:
GW - groundwater SW - surface water WW - wastewater DW - drinking water
S - soil/sediment SL - sludge A - air M - misc/waste

ANALYSES REQUESTED

Filtered? Y/N | Total # Containers | Designated MS/MSD

Turnaround Time
Normal RUSH*
Date Needed:
_____
Rush analysis requires prior CT Laboratories' approval
Surcharges:
24 hr 200%
2-3 days 100%
4-9 days 50%

Collection Date	Collection Time	Matrix	Grab/ Comp	Sample ID Description	Fill in Spaces with Bottles per Test	CT Lab ID # (Lab use only)

Relinquished By:	Date/Time	Received By:	Date/Time	*Lab Use Only*
Received by:	Date/Time	Received for Laboratory by:	Date/Time	Ice Present Yes No Temperature _____ Cooler # _____

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STANDARD OPERATING PROCEDURE – SOP 15
SAMPLE PACKING AND SHIPPING

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for the packing and shipping of samples to the laboratory for analysis.

2.0 MATERIALS

The following materials may be required:

Clear Tape	Plastic garbage bags
Custody Seals	Sample documentation
Ice	Waterproof coolers (hard plastic or metal)
Metal Cans with friction-seal lids (e.g. paint cans)	Zip-seal plastic bags
	Packing material[1]

3.0 PROCEDURE

Check cap tightness and verify that clear tape covers label and encircles container. Wrap sample container in bubble wrap or closed cell foam sheets. Enclose each sample in a clear zip-seal plastic bag.

Place several layers of bubble wrap, or at least 1 in. of vermiculite on the bottom of the cooler. Line cooler with open garbage bag, place all the samples upright inside a garbage bag, and tie the bag.

Double bag and seal loose ice to prevent melting ice from soaking the packing material. Place the ice outside the garbage bags containing the samples.

Pack shipping containers with packing material (closed-cell foam, vermiculite, or bubble wrap). Place this packing material around the sample bottles or metal cans to avoid breakage during shipment.

Enclose all sample documentation (i.e., Field Parameter Forms, chain of custodies) in a waterproof plastic bag and tape the bag to the underside of the cooler lid. If more than one cooler is being used, each cooler will have its own documentation.

[1] Permissible packing materials are: (a) (non-absorbent) bubble wrap or closed cell foam packing sheets, or (b) (absorbent) vermiculite. Organic materials such as paper, wood shavings (excelsior), and cornstarch packing "peanuts" will not be used.

Seal the coolers with signed and dated custody seals so that if the cooler were opened, the custody seal would be broken. Place clear tape over the custody seal to prevent damage to the seal.

Tape the cooler shut with packing tape over the hinges and place tape over the cooler drain. Ship all samples via overnight delivery on the same day they are collected if possible.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Any samples suspected to be of medium/high contaminant concentration or containing dioxin (none of which are anticipated, as per the Quality Assurance Project Plan) must be enclosed in a metal can with a clipped or sealable lid (e.g., similar to a paint can). Label the outer metal container with the sample number of the sample inside.

6.0 REFERENCES

U.S. Environmental Protection Agency (U.S. EPA). 1980. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, QAMS-005/80.

U.S. EPA. 1990. Sampler's Guide to the Contract Laboratory Program. EPA/540/P-90/006, Directive 9240.0-06, Office of Emergency and Remedial Response, Washington, D.C. December.

U.S. EPA. 1991. User's Guide to the Contract Laboratory Program. EPA/540/O-91/002, Directive 9240.0-01D, Office of Emergency and Remedial Response. January.

STANDARD OPERATING PROCEDURE – SOP 16
FIELD DECONTAMINATION

1.0 SCOPE AND APPLICATION

All personnel or equipment involved in intrusive sampling must be thoroughly decontaminated prior to leaving the site to minimize the spread of contamination and prevent adverse health effects. This Standard Operating Procedure (SOP) describes the normal decontamination of sampling equipment and site personnel.

2.0 MATERIALS

The following materials may be required:

0.01 N hydrochloric acid	Non-phosphate laboratory detergent (Liquinox)
0.10 N nitric acid	Plastic garbage bags
Aluminum foil or clean plastic sheeting	Plastic sheeting, buckets, etc. to collect wash water and rinsates
Approved water	Pressure sprayer, rinse bottles, brushes
High Performance liquid chromatography (HPLC)-grade water[1]	Reagent grade alcohol[2]

3.0 PROCEDURE

3.1 SAMPLE BOTTLES

At the completion of each sampling activity, the exterior surfaces of the sample bottles must be decontaminated as follows:

- Ensure the bottle lids are on tight.
- Wipe the outside of the bottle with a paper towel to remove gross contamination.

3.2 PERSONNEL DECONTAMINATION

Review the project Accident Prevention Plan for the appropriate decontamination procedures.

[1] For the purposes of this Standard Operating Procedure, HPLC-grade water is considered equivalent to "deionized ultra filtered water," "reagent-grade distilled water," and "deionized organic-free water." The end product being water which is pure with no spurious ions or organics to contaminate the sample. The method of generation is left to the individual contractor.

[2] For the purposes of this Standard Operating Procedure, the term "reagent grade alcohol" refers to either pesticide grade isopropanol or reagent grade methanol.

3.3 EQUIPMENT DECONTAMINATION

3.3.1 Solid Materials Samplers

Solid materials samplers include soil sampling probes, augers, trowels, shovels, sludge samplers, and sediment samplers, which will be decontaminated as follows:

- Scrub the sampler to remove gross (visible) contamination, using appropriate brush(es), approved water, and non-phosphate laboratory detergent.
- Rinse off detergent with approved water.
- Rinse sampler with reagent grade alcohol.
- Rinse sampler with HPLC-grade water.
- For non-metallic samplers only, rinse sampler with 0.10N nitric acid solution.
- For non-metallic samplers only, rinse sampler with HPLC-grade water.
- Allow sampler to air dry.
- Wrap sampler in aluminum foil clean plastic sheeting, or store in a new zip seal bag (size permitting) or clean, dedicated polyvinyl chloride or PTFE storage container.
- Dispose used decontamination solutions properly according to the site-specific Health and Safety Plan.
- Rinse sampler with HPLC-grade water immediately prior to re-use.

3.3.2 Other Sampling Probes

Measuring tapes that become contaminated through contact with soil during field use will be decontaminated as follows:

- Wipe tape with a clean cloth or laboratory wipe that has been soaked with non-phosphate laboratory detergent solution to remove gross contamination. Rinse cloth in the solution and continue wiping until tape is clean.
- Wipe tape with a second clean, wet cloth (or laboratory wipe) to remove soap residues.
- Dry tape with a third cloth (or laboratory wipe) and rewind into case, or re-coil tape.

3.3.3 Ice Chests and Reusable Shipping Containers

- Scrub exterior/interior with approved brush and Liquinox detergent.
- Rinse off detergent three times with approved water.
- Let air dry and properly store until re-use.

NOTE: If container/ice chest is severely contaminated, clean as thoroughly as possible, render unusable, and properly dispose.

4.0 MAINTENANCE

HPLC-grade water will be stored only in decontaminated glass containers with aluminum foil lids as stipulated above. The water may not be stored for more than nor used more than 3 days after manufacture.

HPLC-grade water will be manufactured onsite. An approved tap water source will be used as the influent to the system. Procedures for system setup, operation, and maintenance will conform to manufacturer's specifications.

5.0 PRECAUTIONS

Dispose of all wash water, rinse water, rinsates, and other sampling wastes (tubing, plastic sheeting, etc.) in properly marked, sealable containers, or as directed by the Health and Safety Plan.

Once a piece of equipment has been decontaminated, be careful to keep it in such condition until needed.

Do not eat, smoke, or drink onsite.

6.0 REFERENCES

None.

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STANDARD OPERATING PROCEDURE – SOP 17
XRF ANALYSIS OF SOIL

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure is to describe protocols for using the x-ray tube-based x-ray fluorescence (XRF) analyzer for field analysis of soil samples for metals.

Use of brand names in this Standard Operating Procedure is not intended as endorsement or mandate that a given brand be used. Alternative equivalent brands of detectors, sensors, meters, etc. are acceptable.

2.0 MATERIALS

The following materials may be required:

Innov-X Systems x-ray tube-based XRF	Mylar, Kapton, Spectroleen, polypropylene, or equivalent film
Compaq PDA with appropriate expansion card with Innov-X Software	Plastic zipper-type bags
Laptop computer	Containers (for sample collection and storage)
Battery for XRF	2-mm mesh sieve(s)
Battery charger for PC	Silicon blank
Standard Reference Material (SRM) for calibration check of XRF	Paper towels
Soil test stand/bulk sample analyzer sled	Paperwork (applicable regulations and licenses, XRF Operators' Manual, and emergency contacts)
Polyethylene sample cups (31- to 40-millimeters [mm] in diameter with collar)	Proper site-specific personal protective equipment and dosimetry

3.0 PROCEDURE

The XRF should be operated in a clean environment, out of direct sunlight, and without significant concentrations of dust.

The XRF shall be operated by a trained operator, knowledgeable in aspects of radiation safety.

The XRF shall be in direct control of a trained XRF operator at all times. When not in use, the XRF shall be stored within a locked case.

After each portable operation, the instrument batteries must be recharged before resuming operations.

4.0 QUALITY CONTROL

Prior to arriving onsite, the XRF will be factory calibrated to perform peak deconvolution and obtain a Crompton normalized count rate for the compound(s) of interest. Once onsite, the

operator shall analyze a site-specific sample with a known concentration of the compound(s) of interest. Calibration verification will be performed on additional site samples with known concentrations described as follows.

The accuracy of the XRF can be evaluated by performing calibration verification checks. These checks are performed by analyzing SRMs traceable to the National Institute of Standards and Technology. A minimum of two SRMs will be analyzed daily: once at the beginning of the day and end of the day, or at the beginning of the day and after every 20th sample, whichever occurs first. The actual concentration of the SRM as well as the concentration displayed by the XRF will be recorded. The relative percent difference (RPD) between the actual and displayed concentrations will be calculated as follows:

$$RPD = [2(SRM-R)/(SRM+R)] \times 100$$

where

SRM = Concentration of the standard reference material.
R = Displayed concentration from XRF.

The result will be compared to the project data quality objectives (DQOs), if applicable, to evaluate if the XRF accuracy is within project limits. A typical DQO for this indicator is +/20 percent. Note that a site-specific sample with a known concentration of the compound(s) of interest may be used in lieu of an SRM to perform the calibration verification checks.

Precision analysis should be performed at a minimum of once per day but may be required more often depending upon the project DQOs. A typical DQO for this indicator is <20 percent. To assess precision, perform 10 replicate analyses on the same site sample and calculate the relative standard deviation (RSD) of the sample mean as follows:

$$RSD = (SD/Mean\ Concentration) \times 100$$

where

RSD = Relative standard deviation for the precision measurement for the analyte.
SD = Standard deviation of the reported analyte concentration for the precision sample.
Mean Concentration = Mean analyte concentration of the seven replicate analyses.

The site sample should have detectable concentrations of metals (i.e., above the instrument's detection limits). Precision analysis should be performed at a minimum of once per day but may be required more often depending upon the project DQOs. A typical DQO for this indicator is <20 percent.

Duplicate analysis may also be required by the project-specific DQOs. A typical duplicate analysis scheme would require the preparation and analysis of a duplicate sample at a rate of 1 per every 20 normal site samples. Duplicates are a second sample collected and prepared as a

normal sample would be. The duplicate is analyzed, and the results compared to the normal sample by calculating the RPD. The DQO for duplicate samples is project specific; however, a typical objective is an RPD of no more than 30 percent.

An alternative to duplicate sample analysis would be replicate sample analysis. Replicate sample analyses are two analyses of the same prepared sample. Generally, the sample is moved/rotated; re-homogenized; or, if prepared in a sample cup, inverted (on a double open-ended cup) for the second analysis. This approach assesses comparability between results without interference from field sampling variability. The replicate sample results are compared to the normal sample results in the same manner as a duplicate sample analysis.

Blank analyses may be performed to assess whether equipment cross contamination is occurring. Two types of blank sample analyses are typical: instrument blank and method blank.

The instrument blank is performed by analyzing silicon dioxide (or clean sand), a Teflon block, or a quartz block. The frequency of blank analysis is dependent upon project DQOs but is often scheduled for twice daily, prior to and after sample analyses for that day. Typically, the instrument blank analysis is performed concurrently with the SRM calibration verification analysis. Instrument blanks may also be performed after every 20 samples; again, depending on project DQOs. Results should be below detection.

Method blanks are performed to monitor decontamination efficiency on equipment that is not dedicated. The blank is performed by substituting clean sand in the sample preparation process and analyzing in the same manner as a site sample. Results should be below detection.

5.0 SITE SAMPLE PREPARATION AND ANALYSIS

Sample preparation is dependent upon project DQOs and may be different than the preparation described herein. More rigorous sample preparation protocols are available (e.g., U.S. Environmental Protection Agency Method 6200 [1998]). The project planning document and DQOs should be referenced to determine if the method described herein is adequate for any specific project.

- Ex-situ Sampling:

    - Don appropriate personal protective equipment.

    - Collect soil sample as described in the project planning documents, including a minimum of 50 grams of soil for XRF analysis.

    - If the sample is noticeably wet, dry the sample in an oven. Alternatively, the samples may be dried with paper towels and/or by allowing the sun to evaporate the moisture.

    - Inspect the sample to ensure no foreign (non-soil) materials are present in the sample, i.e., paint chips, lead shot, concrete chips, or asphalt. Note the presence

of foreign matter in the project log. If the quantity of foreign material is such that removal is impractical, note in the project log that the foreign material could not be removed.

- Pass soil through a decontaminated 2-mm mesh sieve collecting the soil in a dedicated zipper-type plastic bag, labeled with the sample identification. Depending on the project- specific DQOs, this step may be eliminated in lieu of hand processing (removal of stone, debris, lead shot, paint chips, and organic material) of the sample simultaneously with the following step.

- Homogenize the soil by rolling the soil within the bag.

- Assemble a sample cup, label with sample identification, and pack the soil tightly into the cup. Cover the cup with polypropylene (or equivalent) film and use the collar to secure in place. This step may be eliminated if project-specific DQOs allow for the analysis of the sample through the zipper-type plastic bag.

- Place the sample cup/zipper-type bag onto the soil test platform.

- Initiate the XRF reading using the trigger or start button on the PDA.

- Allow the analyzer to run and collect data for the appropriate, project-specific nominal sample time, e.g., 60 seconds.

- Record the sample designation and result(s) in either a field log book or on appropriate data sheets.

- Retain the cupped/bagged sample for possible laboratory confirmatory analysis.

- Use the same procedure for the analysis of method blank, duplicate, replicate, SRMs, and precision analysis samples.

- Download the XRF data daily to a computer (if possible). Back up the data to a server, disc, or CD.

6.0 PRECAUTIONS

The XRF produces ionizing radiation in the x-ray spectrum. This Standard Operating Procedure and the precautions herein are applicable to the Innov-X tube-based instrument. Additional precautions not contained herein are necessary if utilizing a radioactive source-based XRF. The tube-based instrument is capable of producing x-rays when the instrument is powered, and an analysis initiated. The instrument has a red light near the shutter which will flash when the instrument is emitting x-rays. When the shutter is open, the light is flashing, the instrument is emitting x-rays. At this time, the following must be observed:

- Always be aware of the location of the tube and direction of the x-ray beam.

- Open the shutter only to conduct a test.

- The person conducting the XRF analysis must be a trained operator.

The XRF is able to function as a handheld screening tool by wielding the detector by hand and pressing it to the sample for analysis. For soil screening, this has the potential of exposing the operator to inadvertent x-ray radiation. For this reason, it is highly recommended that the operator makes use of the Innov-X soil stand (or equivalent stand) that incorporates x-ray shielding and protects the operator from exposure.

7.0 REFERENCES

Innov-x Systems X-Ray Tube-Based XRF User's Manual.

U.S. Environmental Protection Agency. 1998. Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment. Method 6200. May.

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Appendix G

Field Forms

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FIELD FORMS

Form G-1 – Field Personnel Qualifications and Verification Form
Form G-2 – Non-Conformance Report
Form G-3 – Corrective Action Request
Form G-4 – Corrective Action Plan
Form G-5 – Preparatory Phase Inspection Checklist
Form G-6 – Initial Phase Inspection Checklist
Form G-7 – Follow Up Inspection Checklist
Form G-8 – Final Inspection Checklist
Form G-9 – Inspection Schedule and Tracking Form
Form G-10 – Site Supervisor/SUXOS Daily Report
Form G-11 – Daily QC Report
Form G-12 – Field Change Request Form

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FIELD PERSONNEL QUALIFICATIONS AND VERIFICATION FORM (G-1)

CANDIDATE:_____ *POSITION/LEVEL:_____*

PROJECT:_____

REVIEW ITEMS		*CANDIDATE QUALIFICATIONS*	*VERIFIED BY & DATE*
EXPERIENCE	*REQUIRED: AREA & YEARS*		
	ACTUAL: AREA AND YEARS		
EDUCATION	*REQUIRED: AREA & YEARS*		
	ACTUAL: AREA AND YEARS		
CERTIFICATION & REGISTRATIONS	*REQUIRED: AREA & YEARS*		
	ACTUAL: AREA AND YEARS		
TRAINING	*REQUIRED: AREA & YEARS*		
	ACTUAL: AREA AND YEARS		
OTHER	*REQUIRED: AREA & YEARS*		
	ACTUAL: AREA AND YEARS		

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NON-CONFORMANCE REPORT (G-2)

PROJECT:	**NCR NO.**	**DATE:**
TO:		
ORIGINAL TO EA CORPORATE QC MANAGER		

ITEM: _____

WORK PLAN REFERENCE

REQUIREMENT:_____

NONCONFORMANCE:

ISSUED BY: NAME:	**TITLE:**	**ORGANIZATION:**
DATE:		
DISPOSITION: _____**ACCEPT** _____**REJECT**		
DISPOSITION APPROVALS:		
UXOQCS DATE	FCR REQUIRED? ☐ YES ☐ NO	
PROJECT MANAGER DATE	DISTRIBUTION	
REMARKS:		

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CORRECTIVE ACTION REQUEST (CAR) (G-3)

PART A: TO BE COMPLETED BY PROJECT MANAGER OR DESIGNEE

(1)PROJECT:		
(2) PROJECT MGR.:	(3) QC MGR./STAFF:	
(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 QCS SYSTEM MANGER OR DESIGNEE

(10) CAP REVIEWED BY DATE
(11) REVIEWER COMMENTS
(12) CAP DISPOSITION: (CHECK ONLY ONE AND EXPLAIN STIPULATIONS, IF ANY. ☐ APPROVED WITHOUT STIPULATIONS ☐ APPROVED WITH STIPULATIONS ☐ APPROVED DELAYED, FURTHER PLANNING REQUIRED COMMENTS:
(13) QC MANAGER SIGNATURE DATE

CORRECTIVE ACTION REQUEST (CAR) INSTRUCTION SHEET

(1) QC Manager: Verify that the total number of pages includes all attachments.

(2) QC Manager: Fill in CAR number from CAR log.

(3) CQC System Manager: 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 deficiencies 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) QC Manager: 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.

(13) QC Manager: 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) QC Manager: Identify date by which proposed corrective action is due to QC for concurrence.

(15) QC Manager: 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) QC Manager: Initial to identify concurrence with corrective action response from responsible manager.

(20) QC Manager: 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) QC Manager: Indicate document closeout by signing and dating.

CORRECTIVE ACTION PLAN (G-4)

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

PART A: NOTICE OF DEFICIENCY

(5) PROJECT:	
(6) PROJECT MGR:	(7) QC MGR/STAFF:
(8) CONSTRUCTION MGR:	(9) MRS MANAGER:
(10) ISSUED TO (INDIVIDUAL & ORGANIZATION)	
(11) REQUIREMENT & REFERENCE	
(12) PROBLEM DESCRIPTION & LOCATION: (13) CAP REQUIRED? YES ☐ NO ☐ (14) RESPONSE DUE:	
(15) ISSUED BY (PRINTED NAME & TITLE) SIGNATURE: DATE:	(16) MANAGEMENT CONCURRENCE:

PART B CORRECTIVE ACTION

(17) PROPOSED CORRECTIVE ACTION/ACTION TAKEN	
(18) PART B COMPLETED BY (NAME & TITLE) DATE	(19) QC CONCURRENCE

PART C

(20) CAR VERIFICATION AND CLOSE OUT: (CHECK ONLY ONE & AND EXPLAIN STIPULATIONS, IF ANY)

☐ APPROVED FOR CLOSURE WITHOUT STIPULATIONS

☐ APPROVED FOR CLOSURE WITH FOLLOWING STIPULATIONS

COMMENTS/STIPULATIONS:

(21) CLOSED BY (PRINTED NAME AND TITLE)

SIGNATURE: DATE:

CORRECTIVE ACTION PLAN INSTRUCTION SHEET

(1) QC Manager: Verify that the total number of pages includes all attachments.

(2) QC Manager: Fill in CAR number from CAR log.

(3) CQC System Manager: 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 deficiencies 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) QC Manager: 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.

(13) QC Manager: 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) QC Manager: Identify date by which proposed corrective action is due to QC for concurrence.

(15) QC Manager: 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) QC Manager: Initial to identify concurrence with corrective action response from responsible manager.

(20) QC Manager: 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) QC Manager: Indicate document closeout by signing and dating.

PREPARATORY PHASE INSPECTION CHECKLIST (PART I) (G-5)

PROJECT: _____ DATE:_____

TITLE AND NO. OF THE TECHNICIAL SECTION:

_____

_____

_____

WORK PLAN REFERENCE:_____

A. ATTENDANTS:

	NAME	POSITION	COMPANY
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

B. SUBMITTALS REQUIRED TO BEGIN WORK:

ITEM	SUBMITTAL NO.	ACTION CODE
1.		
2.		
3.		
4.		
5.		
6.		

C. EQUIPMENT TO BE USED IN EXECUTING WORK:

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

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:

_____
_____
_____

PART II

A. PERSONS IN ATTENDANCE: SEE MEETING ATTENDANCE SHEET (ATTACHED)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____

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.

NAME OF PROJECT QC SPECIALIST: _____

DATE:_____

SIGNATURE OF PROJECT QC SPECIALIST:_____

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INITIAL PHASE INSPECTION CHECKLIST (PART I) (G-6)

PROJECT: _____ DATE:_____

TITLE AND NO. OF THE TECHNICIAL SECTION:

_____

_____

_____

DESCRIPTION AND LOCATION OF WORK INSPECTION

_____

_____

A. KEY PERSONNEL PRESENT:

NAME	POSITION	COMPANY
1.		
2.		
3.		
4.		
5.		
6.		

B. MATERIALS BEING USED ARE IN STRICT COMPLIANCE WITH THE CONTRACT SPECIFICATIONS: YES ☐ NO ☐

IF NOT EXPLAIN BELOW:

_____

_____

_____

_____

C. PROCEDURES AND/OR WORK WITNESSED ARE IN STRICT COMPLIANCE WITH THE CONTRACT SPECIFICATIONS: YES ☐ NO ☐

IF NOT EXPLAIN BELOW:

_____

_____

_____

_____

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:

_____

_____

_____

_____

NAME OF PROJECT QC SPECIALIST: _____

DATE:_____

SIGNATURE OF PROJECT QC SPECIALIST:_____

FOLLOW-UP PHASE INSPECTION CHECKLIST (G-7)

DATE:_____

COMPANY/CONTRACTOR:_____

PROJECT:_____

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

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

INSPECTION PERFORMED & WHO PERFORMED TEST

NAME OF PROJECT QC SPECIALIST: _____

DATE:_____

SIGNATURE OF PROJECT QC SPECIALIST:_____

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FINAL INSPECTION CHECKLIST (G-8)

(PART I)

PROJECT_____ DATE:_____

AREA OF INSPECTION :

_____

_____

_____

_____

A. DEFINABLE FEATURE OF WORK: STATUS OF INSPECTION:_____

_____

_____

_____

_____

_____

_____

_____

I HEREBY CERTIFY, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, THAT THE WORK INSPECTED IS COMPLETE AND ALL MATERIALS AND EQUIPMENT USED AND WORK PERFORMED WERE COMPLETED IN ACCORDANCE WITH THE APPROVED PLANS.

NAME OF PROJECT QC SPECIALIST: _____

DATE:_____

SIGNATURE OF PROJECT QC SPECIALIST:_____

FINAL INSPECTION CHECKLIST (H-8)
MEETING ARRENDANCE LIST
(PART II)

MEETING:		DATE:
NAME	ORGNAIZATION	PHONE NUMBER

INSPECTION SCHEDULE AND TRACKING FORM (G-9)

PROJECT:	PROJECT MANAGER:	PROJECT QC MGR/STAFF:

REFERENCE NUMBER	DEFINABLE FEATURE OF WORK	PREPARATORY		INITIAL		FOLLOW-UP		COMPLETION		
		DATE PLANNED	ACTUAL DATE	DATE PLANNED	ACTUAL DATE	PLANNED BEGIN/END	ACTUAL DATE	PLANNED BEGIN/END	ACTUAL DATE	STATUS

REMARKS:

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EA ENGINEERING, PC.

SITE SUPERVISOR/SUXOS
DAILY REPORT
NON-TIME CRITICAL REMOVAL ACTION
Hancock Field, New York

Report Project Report No:

WORKDAY WEATHER:

Weather Description	High (°F)	Low (°F)	Humidity (%)	Rainfall (%)

WORK PERFORMED BY CONTRACTORS/SUBCONTRACTORS:

Contractor	Title	Hours	Description of Work
EA Engineering, P.C.			
Subcontractors			

OPERATING EQUIPMENT DATA (Not hand tools):

Equipment	Equipment ID/TAG	Rental In	Rental Return	Hours Used

WORK PERFORMED TODAY:

EA ENGINEERING, P.C.

SITE SUPERVISOR/SUXOS
DAILY REPORT
INTERIM REMOVAL ACTION
Hancock Field, New York

Report | Project | Report No:

QUALITY CONTROL INSPECTIONS AND RESULTS:

QUALITY CONTROL TESTING AND RESULTS:

SAFETY INSPECTIONS:

REMARKS:

CONTRACTOR'S VERIFICATION:
I certify that to the best of my knowledge the above report is complete and correct. All material, equipment used, and work performed during this reporting period is in compliance with the contract plans and specifications except as noted above.

Ordnance and Explosives Safety Specialist (OESS)
USACE - OMAHA

Site Supervisor / SUXOS
EA ENGINEERING, P;C.

DAILY QC REPORT (G-11)

PROJECT:_____

LOCATION OF WORK:_____

DESCRIPTION OF WORK:_____

WEATHER: ☐ **(CLEAR)** ☐ **(FOG)** ☐ **(P. CLOUDY)** ☐ **(RAIN)** ☐ **(WINDY)**

TEMPERATURE: MIN._____ ^{0}**F** **MAX.**_____ ^{0}**F**

1. WORK COMPLETED TODAY:

_____

_____

_____

_____

2. WORK COMPLETED BY QC STAFF:

_____

_____

_____

_____

3. ALL WORK PERFORMED IN CONFORMANCE WITH WORK PLAN REQUIREMENTS? YES ☐ **NO** ☐

IF NOT EXPLAIN

_____

_____

_____

4. NON-CONFORMANCE/DEFICIENCIES REPORTED:

_____

_____

_____

5. **COMMENTS**_____

_____

_____

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 and have determined to the best of my knowledge and belief that noted work activities are in compliance with work plans and specifications, except as may be noted above.

Project QC Specialist Date

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Field Change Request (FCR) Form (G-12)		
FCR #:	**DATE:**	
PROJECT NAME:	**ARMY REP:**	
1. Description (Items involved, submit sketch, if applicable): (Use continuation sheet if necessary)		
2. Reason for Change (Use continuation sheet if necessary)		
3. Recommended Disposition (Submit sketch, if applicable): (Use continuation sheet if necessary)		
Preparer of FCR (Print name and sign)	Preparer's Title	Date
PM- Reviewed (Print name and sign)	Accepted (Y/N)	Date
QCM – Reviewed (Print name and sign)	Accepted (Y/N)	Date
SUXOS – Reviewed (Print name and sign)	Accepted (Y/N)	Date
Air Force – Reviewed (Print name and sign)	Accepted (Y/N)	Date

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Appendix H

Laboratory Certification

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CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board
500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404

has been assessed by ANAB
and meets the requirements of international standard

ISO/IEC 17025:2005

and DoD Quality Systems Manual for Environmental Laboratories (DoD QSM V 5.1)

while demonstrating technical competence in the fields of

TESTING

Refer to the accompanying Scope of Accreditation for information regarding the types of calibrations and/or tests to which this accreditation applies.

L2463
Certificate Number

ANAB Approval

Certificate Valid: 03/19/2018-09/22/2019
Version No. 001 Issued: 03/19/2018

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

ANSI-ASQ National Accreditation Board

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005 AND DOD QUALITY SYSTEMS MAUAL FOR ENVIRONMENTAL LABORATORIES (DOD QSM V5.1)

TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Whitney Palefsky
912-354-7858

TESTING

Valid to: **September 22, 2019** Certificate Number: **L2463**

Environmental

Non-Potable Water		
Technology	**Method**	**Analyte**
General Chemistry	EPA 1664A	Oil and Grease
General Chemistry	EPA 1664A	Total Petroleum Hydrocarbons
General Chemistry	EPA 1664B	Oil and Grease
General Chemistry	EPA 1664B	Total Petroleum Hydrocarbons
ICP	EPA 6010C	Aluminum
ICP	EPA 6010C	Antimony
ICP	EPA 6010C	Arsenic
ICP	EPA 6010C	Barium
ICP	EPA 6010C	Beryllium
ICP	EPA 6010C	Boron
ICP	EPA 6010C	Cadmium
ICP	EPA 6010C	Calcium
ICP	EPA 6010C	Chromium
ICP	EPA 6010C	Cobalt
ICP	EPA 6010C	Copper

Non-Potable Water		
Technology	**Method**	**Analyte**
ICP	EPA 6010C	Iron
ICP	EPA 6010C	Lead
ICP	EPA 6010C	Magnesium
ICP	EPA 6010C	Manganese
ICP	EPA 6010C	Molybdenum
ICP	EPA 6010C	Nickel
ICP	EPA 6010C	Potassium
ICP	EPA 6010C	Selenium
ICP	EPA 6010C	Silica
ICP	EPA 6010C	Silicon
ICP	EPA 6010C	Silver
ICP	EPA 6010C	Sodium
ICP	EPA 6010C	Strontium
ICP	EPA 6010C	Thallium
ICP	EPA 6010C	Tin
ICP	EPA 6010C	Titanium
ICP	EPA 6010C	Vanadium
ICP	EPA 6010C	Zinc
ICP	EPA 6010D	Aluminum
ICP	EPA 6010D	Antimony
ICP	EPA 6010D	Arsenic
ICP	EPA 6010D	Barium
ICP	EPA 6010D	Beryllium
ICP	EPA 6010D	Boron
ICP	EPA 6010D	Cadmium
ICP	EPA 6010D	Calcium
ICP	EPA 6010D	Chromium
ICP	EPA 6010D	Cobalt
ICP	EPA 6010D	Copper

Non-Potable Water		
Technology	**Method**	**Analyte**
ICP	EPA 6010D	Iron
ICP	EPA 6010D	Lead
ICP	EPA 6010D	Magnesium
ICP	EPA 6010D	Manganese
ICP	EPA 6010D	Molybdenum
ICP	EPA 6010D	Nickel
ICP	EPA 6010D	Potassium
ICP	EPA 6010D	Selenium
ICP	EPA 6010D	Silica
ICP	EPA 6010D	Silicon
ICP	EPA 6010D	Silver
ICP	EPA 6010D	Sodium
ICP	EPA 6010D	Strontium
ICP	EPA 6010D	Thallium
ICP	EPA 6010D	Tin
ICP	EPA 6010D	Titanium
ICP	EPA 6010D	Vanadium
ICP	EPA 6010D	Zinc
ICP/MS	EPA 6020A	Aluminum
ICP/MS	EPA 6020A	Antimony
ICP/MS	EPA 6020A	Arsenic
ICP/MS	EPA 6020A	Barium
ICP/MS	EPA 6020A	Beryllium
ICP/MS	EPA 6020A	Boron
ICP/MS	EPA 6020A	Cadmium
ICP/MS	EPA 6020A	Calcium
ICP/MS	EPA 6020A	Chromium
ICP/MS	EPA 6020A	Cobalt
ICP/MS	EPA 6020A	Copper

Non-Potable Water		
Technology	**Method**	**Analyte**
ICP/MS	EPA 6020A	Iron
ICP/MS	EPA 6020A	Lead
ICP/MS	EPA 6020A	Magnesium
ICP/MS	EPA 6020A	Manganese
ICP/MS	EPA 6020A	Mercury
ICP/MS	EPA 6020A	Molybdenum
ICP/MS	EPA 6020A	Nickel
ICP/MS	EPA 6020A	Potassium
ICP/MS	EPA 6020A	Selenium
ICP/MS	EPA 6020A	Silver
ICP/MS	EPA 6020A	Sodium
ICP/MS	EPA 6020A	Strontium
ICP/MS	EPA 6020A	Thallium
ICP/MS	EPA 6020A	Tin
ICP/MS	EPA 6020A	Titanium
ICP/MS	EPA 6020A	Vanadium
ICP/MS	EPA 6020A	Zinc
ICP/MS	EPA 6020B	Aluminum
ICP/MS	EPA 6020B	Antimony
ICP/MS	EPA 6020B	Arsenic
ICP/MS	EPA 6020B	Barium
ICP/MS	EPA 6020B	Beryllium
ICP/MS	EPA 6020B	Boron
ICP/MS	EPA 6020B	Cadmium
ICP/MS	EPA 6020B	Calcium
ICP/MS	EPA 6020B	Chromium
ICP/MS	EPA 6020B	Cobalt
ICP/MS	EPA 6020B	Copper
ICP/MS	EPA 6020B	Iron

Non-Potable Water		
Technology	**Method**	**Analyte**
ICP/MS	EPA 6020B	Lead
ICP/MS	EPA 6020B	Magnesium
ICP/MS	EPA 6020B	Manganese
ICP/MS	EPA 6020B	Mercury
ICP/MS	EPA 6020B	Molybdenum
ICP/MS	EPA 6020B	Nickel
ICP/MS	EPA 6020B	Potassium
ICP/MS	EPA 6020B	Selenium
ICP/MS	EPA 6020B	Silver
ICP/MS	EPA 6020B	Sodium
ICP/MS	EPA 6020B	Strontium
ICP/MS	EPA 6020B	Thallium
ICP/MS	EPA 6020B	Tin
ICP/MS	EPA 6020B	Titanium
ICP/MS	EPA 6020B	Vanadium
ICP/MS	EPA 6020B	Zinc
Colorimetry	EPA 7196A	Chromium 3+
Colorimetry	EPA 7196A	Chromium 6+
CVAA	EPA 7470A	Mercury
GC/ECD	EPA 8011	1,2,3-Trichloropropane
GC/ECD	EPA 8011	1,2-Dibromo-3-chloropropane (DBCP)
GC/ECD	EPA 8011	1,2-Dibromoethane (EDB)
GC/FID	EPA 8015C	#2 Diesel Fuel
GC/FID	EPA 8015C	Diesel Range Organics
GC/FID	EPA 8015C	Gasoline Range Organics
GC/FID	EPA 8015C	Kerosene
GC/FID	EPA 8015C	Mineral Spirits
GC/FID	EPA 8015C	Motor Oil
GC/FID	EPA 8015C	Oil Range Organics

Non-Potable Water		
Technology	**Method**	**Analyte**
GC/FID	EPA 8015C-DAI	2,2'-Oxybisethanol
GC/FID	EPA 8015C-DAI	2-Butoxyethanol
GC/FID	EPA 8015C-DAI	2-Propoxy ethanol
GC/FID	EPA 8015C-DAI	Cellosolve acetate
GC/FID	EPA 8015C-DAI	Di-propylene glycol
GC/FID	EPA 8015C-DAI	Di-propylene glycol methyl ether
GC/FID	EPA 8015C-DAI	Ethanol
GC/FID	EPA 8015C-DAI	Ethyl acetate
GC/FID	EPA 8015C-DAI	Ethylene glycol
GC/FID	EPA 8015C-DAI	Isoamyl acetate
GC/FID	EPA 8015C-DAI	Isobutanol
GC/FID	EPA 8015C-DAI	Isobutyl acetate
GC/FID	EPA 8015C-DAI	Isopropanol
GC/FID	EPA 8015C-DAI	Isopropyl acetate
GC/FID	EPA 8015C-DAI	Methanol
GC/FID	EPA 8015C-DAI	Methyl acetate
GC/FID	EPA 8015C-DAI	n-Butanol
GC/FID	EPA 8015C-DAI	n-Butyl acetate
GC/FID	EPA 8015C-DAI	n-Heptanol
GC/FID	EPA 8015C-DAI	n-Propanol
GC/FID	EPA 8015C-DAI	n-Propyl acetate
GC/FID	EPA 8015C-DAI	Phenol
GC/FID	EPA 8015C-DAI	Propylene glycol
GC/FID	EPA 8015C-DAI	sec-Butanol
GC/FID	EPA 8015C-DAI	sec-Butyl acetate
GC/FID	EPA 8015C-DAI	Tert-amyl alcohol
GC/FID	EPA 8015C-DAI	tert-Butyl alcohol
GC/FID	EPA 8015C-DAI	Tetraethylene glycol
GC/FID	EPA 8015C-DAI	Triethylene glycol

Non-Potable Water		
Technology	**Method**	**Analyte**
GC/ECD	EPA 8081B	2,4’ DDE
GC/ECD	EPA 8081B	2,4’-DDD
GC/ECD	EPA 8081B	2,4’-DDT
GC/ECD	EPA 8081B	4,4’ DDE
GC/ECD	EPA 8081B	4,4’-DDD
GC/ECD	EPA 8081B	4,4’-DDT
GC/ECD	EPA 8081B	Aldrin
GC/ECD	EPA 8081B	alpha-BHC
GC/ECD	EPA 8081B	beta-BHC
GC/ECD	EPA 8081B	Chlordane (alpha)
GC/ECD	EPA 8081B	Chlordane (gamma)
GC/ECD	EPA 8081B	Chlordane (technical)
GC/ECD	EPA 8081B	Chlorobenzilate
GC/ECD	EPA 8081B	delta-BHC
GC/ECD	EPA 8081B	Dieldrin
GC/ECD	EPA 8081B	Endosulfan I (alpha)
GC/ECD	EPA 8081B	Endosulfan II (beta)
GC/ECD	EPA 8081B	Endosulfan sulfate
GC/ECD	EPA 8081B	Endrin
GC/ECD	EPA 8081B	Endrin aldehyde
GC/ECD	EPA 8081B	Endrin ketone
GC/ECD	EPA 8081B	gamma-BHC
GC/ECD	EPA 8081B	Heptachlor
GC/ECD	EPA 8081B	Heptachlor epoxide
GC/ECD	EPA 8081B	Isodrin
GC/ECD	EPA 8081B	Methoxychlor
GC/ECD	EPA 8081B	Mirex
GC/ECD	EPA 8081B	Toxaphene
GC/ECD	EPA 8082A	PCB-1016

Non-Potable Water		
Technology	**Method**	**Analyte**
GC/ECD	EPA 8082A	PCB-1221
GC/ECD	EPA 8082A	PCB-1232
GC/ECD	EPA 8082A	PCB-1242
GC/ECD	EPA 8082A	PCB-1248
GC/ECD	EPA 8082A	PCB-1254
GC/ECD	EPA 8082A	PCB-1260
GC/ECD	EPA 8082A	PCB-1262
GC/ECD	EPA 8082A	PCB-1268
GC/ECD	EPA 8082A	PCBs, Total
GC/ECD	EPA 8151A	2,4,5-T
GC/ECD	EPA 8151A	2,4,5-TP (Silvex)
GC/ECD	EPA 8151A	2,4,6-Trichlorophenol
GC/ECD	EPA 8151A	2,4-D
GC/ECD	EPA 8151A	2,4-DB
GC/ECD	EPA 8151A	2,6-Dichlorophenol
GC/ECD	EPA 8151A	Dalapon
GC/ECD	EPA 8151A	DCPA (Dacthal)
GC/ECD	EPA 8151A	Dicamba
GC/ECD	EPA 8151A	Dichloroprop
GC/ECD	EPA 8151A	Dinoseb
GC/ECD	EPA 8151A	MCPA
GC/ECD	EPA 8151A	MCPP
GC/ECD	EPA 8151A	Pentachlorophenol
GC/ECD	EPA 8151A	Picloram
GC/MS	EPA 8260B	1,1,1,2-Tetrachloroethane
GC/MS	EPA 8260B	1,1,1-Trichloroethane
GC/MS	EPA 8260B	1,1,2,2-Tetrachloroethane
GC/MS	EPA 8260B	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
GC/MS	EPA 8260B	1,1,2-Trichloroethane

Non-Potable Water		
Technology	**Method**	**Analyte**
GC/MS	EPA 8260B	1,1-Dichloroethane
GC/MS	EPA 8260B	1,1-Dichloroethene
GC/MS	EPA 8260B	1,1-Dichloropropene
GC/MS	EPA 8260B	1,2,3-Trichlorobenzene
GC/MS	EPA 8260B	1,2,3-Trichloropropane
GC/MS	EPA 8260B	1,2,4-Trichlorobenzene
GC/MS	EPA 8260B	1,2,4-Trimethylbenzene
GC/MS	EPA 8260B	1,2-Dibromo-3-chloropropane (DBCP)
GC/MS	EPA 8260B	1,2-Dibromoethane (EDB)
GC/MS	EPA 8260B	1,2-Dichlorobenzene
GC/MS	EPA 8260B	1,2-Dichloroethane
GC/MS	EPA 8260B	1,2-Dichloroethene, Total
GC/MS	EPA 8260B	1,2-Dichloropropane
GC/MS	EPA 8260B	1,3,5-Trimethylbenzene
GC/MS	EPA 8260B	1,3-Dichlorobenzene
GC/MS	EPA 8260B	1,3-Dichloropropane
GC/MS	EPA 8260B	1,3-Dichloropropene, Total
GC/MS	EPA 8260B	1,4-Dichlorobenzene
GC/MS	EPA 8260B	1,4-Dioxane
GC/MS	EPA 8260B	1-Chlorohexane
GC/MS	EPA 8260B	2,2-Dichloropropane
GC/MS	EPA 8260B	2-Butanone
GC/MS	EPA 8260B	2-Chloroethyl vinyl ether
GC/MS	EPA 8260B	2-Chlorotoluene
GC/MS	EPA 8260B	2-Hexanone
GC/MS	EPA 8260B	3-Chloro-1-propene
GC/MS	EPA 8260B	4-Chlorotoluene
GC/MS	EPA 8260B	4-Isopropyltoluene
GC/MS	EPA 8260B	Acetone

Non-Potable Water		
Technology	**Method**	**Analyte**
GC/MS	EPA 8260B	Acetonitrile
GC/MS	EPA 8260B	Acrolein
GC/MS	EPA 8260B	Acrylonitrile
GC/MS	EPA 8260B	Benzene
GC/MS	EPA 8260B	Bromobenzene
GC/MS	EPA 8260B	Bromochloromethane
GC/MS	EPA 8260B	Bromodichloromethane
GC/MS	EPA 8260B	Bromoform
GC/MS	EPA 8260B	Bromomethane
GC/MS	EPA 8260B	BTEX, Total
GC/MS	EPA 8260B	Carbon disulfide
GC/MS	EPA 8260B	Carbon tetrachloride
GC/MS	EPA 8260B	Chlorobenzene
GC/MS	EPA 8260B	Chloroethane
GC/MS	EPA 8260B	Chloroform
GC/MS	EPA 8260B	Chloromethane
GC/MS	EPA 8260B	Chloroprene
GC/MS	EPA 8260B	cis-1,2-Dichloroethene
GC/MS	EPA 8260B	cis-1,3-Dichloropropene
GC/MS	EPA 8260B	Cyclohexane
GC/MS	EPA 8260B	Dibromochloromethane
GC/MS	EPA 8260B	Dibromomethane
GC/MS	EPA 8260B	Dichlorodifluoromethane
GC/MS	EPA 8260B	Diethyl ether
GC/MS	EPA 8260B	Ethanol
GC/MS	EPA 8260B	Ethyl benzene
GC/MS	EPA 8260B	Ethyl methacrylate
GC/MS	EPA 8260B	Furan
GC/MS	EPA 8260B	Hexachlorobutadiene

Non-Potable Water		
Technology	**Method**	**Analyte**
GC/MS	EPA 8260B	Hexane
GC/MS	EPA 8260B	Iodomethane
GC/MS	EPA 8260B	Isobutanol
GC/MS	EPA 8260B	Isopropyl ether
GC/MS	EPA 8260B	Isopropylbenzene
GC/MS	EPA 8260B	m & p-Xylene
GC/MS	EPA 8260B	Methacrylonitrile
GC/MS	EPA 8260B	Methyl acetate
GC/MS	EPA 8260B	Methyl cyclohexane
GC/MS	EPA 8260B	Methyl isobutyl ketone
GC/MS	EPA 8260B	Methyl methacrylate
GC/MS	EPA 8260B	Methyl tert-butyl ether (MTBE)
GC/MS	EPA 8260B	Methylene chloride
GC/MS	EPA 8260B	Naphthalene
GC/MS	EPA 8260B	n-Butylbenzene
GC/MS	EPA 8260B	n-Heptane
GC/MS	EPA 8260B	n-Propylbenzene
GC/MS	EPA 8260B	o-Xylene
GC/MS	EPA 8260B	Pentachloroethane
GC/MS	EPA 8260B	Propionitrile
GC/MS	EPA 8260B	sec-Butylbenzene
GC/MS	EPA 8260B	Styrene
GC/MS	EPA 8260B	Tert-butyl alcohol (TBA)
GC/MS	EPA 8260B	tert-Butylbenzene
GC/MS	EPA 8260B	Tetrachloroethene
GC/MS	EPA 8260B	Tetrahydrofuran
GC/MS	EPA 8260B	Toluene
GC/MS	EPA 8260B	trans-1,2-Dichloroethene
GC/MS	EPA 8260B	trans-1,3-Dichloropropene

Non-Potable Water		
Technology	**Method**	**Analyte**
GC/MS	EPA 8260B	trans-1,4-dichloro-2-butene
GC/MS	EPA 8260B	Trichloroethene
GC/MS	EPA 8260B	Trichlorofluoromethane
GC/MS	EPA 8260B	Vinyl acetate
GC/MS	EPA 8260B	Vinyl chloride
GC/MS	EPA 8260B	Xylenes, total
GC/MS	EPA 8260C	1,1,1,2-Tetrachloroethane
GC/MS	EPA 8260C	1,1,1-Trichloroethane
GC/MS	EPA 8260C	1,1,2,2-Tetrachloroethane
GC/MS	EPA 8260C	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
GC/MS	EPA 8260C	1,1,2-Trichloroethane
GC/MS	EPA 8260C	1,1-Dichloroethane
GC/MS	EPA 8260C	1,1-Dichloroethene
GC/MS	EPA 8260C	1,1-Dichloropropene
GC/MS	EPA 8260C	1,2,3-Trichlorobenzene
GC/MS	EPA 8260C	1,2,3-Trichloropropane
GC/MS	EPA 8260C	1,2,4-Trichlorobenzene
GC/MS	EPA 8260C	1,2,4-Trimethylbenzene
GC/MS	EPA 8260C	1,2-Dibromo-3-chloropropane (DBCP)
GC/MS	EPA 8260C	1,2-Dibromoethane (EDB)
GC/MS	EPA 8260C	1,2-Dichlorobenzene
GC/MS	EPA 8260C	1,2-Dichloroethane
GC/MS	EPA 8260C	1,2-Dichloroethene, Total
GC/MS	EPA 8260C	1,2-Dichloropropane
GC/MS	EPA 8260C	1,3,5-Trimethylbenzene
GC/MS	EPA 8260C	1,3-Dichlorobenzene
GC/MS	EPA 8260C	1,3-Dichloropropane
GC/MS	EPA 8260C	1,3-Dichloropropene, Total
GC/MS	EPA 8260C	1,4-Dichlorobenzene

Non-Potable Water		
Technology	**Method**	**Analyte**
GC/MS	EPA 8260C	1,4-Dioxane
GC/MS	EPA 8260C	1-Chlorohexane
GC/MS	EPA 8260C	2,2-Dichloropropane
GC/MS	EPA 8260C	2-Butanone
GC/MS	EPA 8260C	2-Chloroethyl vinyl ether
GC/MS	EPA 8260C	2-Chlorotoluene
GC/MS	EPA 8260C	2-Hexanone
GC/MS	EPA 8260C	3-Chloro-1-propene
GC/MS	EPA 8260C	4-Chlorotoluene
GC/MS	EPA 8260C	4-Isopropyltoluene
GC/MS	EPA 8260C	Acetone
GC/MS	EPA 8260C	Acetonitrile
GC/MS	EPA 8260C	Acrolein
GC/MS	EPA 8260C	Acrylonitrile
GC/MS	EPA 8260C	Benzene
GC/MS	EPA 8260C	Bromobenzene
GC/MS	EPA 8260C	Bromochloromethane
GC/MS	EPA 8260C	Bromodichloromethane
GC/MS	EPA 8260C	Bromoform
GC/MS	EPA 8260C	Bromomethane
GC/MS	EPA 8260C	BTEX, Total
GC/MS	EPA 8260C	Carbon disulfide
GC/MS	EPA 8260C	Carbon tetrachloride
GC/MS	EPA 8260C	Chlorobenzene
GC/MS	EPA 8260C	Chloroethane
GC/MS	EPA 8260C	Chloroform
GC/MS	EPA 8260C	Chloromethane
GC/MS	EPA 8260C	Chloroprene
GC/MS	EPA 8260C	cis-1,2-Dichloroethene

Non-Potable Water		
Technology	**Method**	**Analyte**
GC/MS	EPA 8260C	cis-1,3-Dichloropropene
GC/MS	EPA 8260C	Cyclohexane
GC/MS	EPA 8260C	Dibromochloromethane
GC/MS	EPA 8260C	Dibromomethane
GC/MS	EPA 8260C	Dichlorodifluoromethane
GC/MS	EPA 8260C	Diethyl ether
GC/MS	EPA 8260C	Ethanol
GC/MS	EPA 8260C	Ethyl benzene
GC/MS	EPA 8260C	Ethyl methacrylate
GC/MS	EPA 8260C	Furan
GC/MS	EPA 8260C	Hexachlorobutadiene
GC/MS	EPA 8260C	Hexane
GC/MS	EPA 8260C	Iodomethane
GC/MS	EPA 8260C	Isobutanol
GC/MS	EPA 8260C	Isopropyl ether
GC/MS	EPA 8260C	Isopropylbenzene
GC/MS	EPA 8260C	m & p-Xylene
GC/MS	EPA 8260C	Methacrylonitrile
GC/MS	EPA 8260C	Methyl acetate
GC/MS	EPA 8260C	Methyl cyclohexane
GC/MS	EPA 8260C	Methyl isobutyl ketone
GC/MS	EPA 8260C	Methyl methacrylate
GC/MS	EPA 8260C	Methyl tert-butyl ether (MTBE)
GC/MS	EPA 8260C	Methylene chloride
GC/MS	EPA 8260C	Naphthalene
GC/MS	EPA 8260C	n-Butylbenzene
GC/MS	EPA 8260C	n-Heptane
GC/MS	EPA 8260C	n-Propylbenzene
GC/MS	EPA 8260C	o-Xylene

Non-Potable Water		
Technology	**Method**	**Analyte**
GC/MS	EPA 8260C	Pentachloroethane
GC/MS	EPA 8260C	Propionitrile
GC/MS	EPA 8260C	sec-Butylbenzene
GC/MS	EPA 8260C	Styrene
GC/MS	EPA 8260C	Tert-butyl alcohol (TBA)
GC/MS	EPA 8260C	tert-Butylbenzene
GC/MS	EPA 8260C	Tetrachloroethene
GC/MS	EPA 8260C	Tetrahydrofuran
GC/MS	EPA 8260C	Toluene
GC/MS	EPA 8260C	trans-1,2-Dichloroethene
GC/MS	EPA 8260C	trans-1,3-Dichloropropene
GC/MS	EPA 8260C	trans-1,4-dichloro-2-butene
GC/MS	EPA 8260C	Trichloroethene
GC/MS	EPA 8260C	Trichlorofluoromethane
GC/MS	EPA 8260C	Vinyl acetate
GC/MS	EPA 8260C	Vinyl chloride
GC/MS	EPA 8260C	Xylenes, total
GC/MS	EPA 8270D	1,1-Biphenyl
GC/MS	EPA 8270D	1,2,3-Trichlorobenzene
GC/MS	EPA 8270D	1,2,4,5-Tetrachlorobenzene
GC/MS	EPA 8270D	1,2,4-Trichlorobenzene
GC/MS	EPA 8270D	1,2-Dichlorobenzene
GC/MS	EPA 8270D	1,2-Diphenylhydrazine
GC/MS	EPA 8270D	1,3,5-Trichlorobenzene
GC/MS	EPA 8270D	1,3,5-Trinitrobenzene
GC/MS	EPA 8270D	1,3-Dichlorobenzene
GC/MS	EPA 8270D	1,3-Dinitrobenzene
GC/MS	EPA 8270D	1,4-Dichlorobenzene
GC/MS	EPA 8270D	1,4-Dioxane

Non-Potable Water		
Technology	**Method**	**Analyte**
GC/MS	EPA 8270D	1,4-Naphthoquinone
GC/MS	EPA 8270D	1-Methylnaphthalene
GC/MS	EPA 8270D	1-Naphthylamine
GC/MS	EPA 8270D	2,3,4,6-Tetrachlorophenol
GC/MS	EPA 8270D	2,3,6-Trichlorophenol
GC/MS	EPA 8270D	2,3-Dimethylphenol
GC/MS	EPA 8270D	2,3-Xylenol
GC/MS	EPA 8270D	2,4 & 2,5-Dimethylphenol
GC/MS	EPA 8270D	2,4,5-Trichlorophenol
GC/MS	EPA 8270D	2,4,6-Trichlorophenol
GC/MS	EPA 8270D	2,4-Dichlorophenol
GC/MS	EPA 8270D	2,4-Dimethylphenol
GC/MS	EPA 8270D	2,4-Dinitrophenol
GC/MS	EPA 8270D	2,4-Dinitrotoluene
GC/MS	EPA 8270D	2,5-Dimethylphenol
GC/MS	EPA 8270D	2,6-Dichlorophenol
GC/MS	EPA 8270D	2,6-Dimethylphenol
GC/MS	EPA 8270D	2,6-Dinitrotoluene
GC/MS	EPA 8270D	2-Acetylaminofluorene
GC/MS	EPA 8270D	2-Chloronaphthalene
GC/MS	EPA 8270D	2-Chlorophenol
GC/MS	EPA 8270D	2-Methyl-4,6-Dinitrophenol
GC/MS	EPA 8270D	2-Methylnaphthalene
GC/MS	EPA 8270D	2-Methylphenol
GC/MS	EPA 8270D	2-Naphthylamine
GC/MS	EPA 8270D	2-Nitroaniline
GC/MS	EPA 8270D	2-Nitrophenol
GC/MS	EPA 8270D	2-Picoline
GC/MS	EPA 8270D	2-sec-Butyl-4,6-dinitrophenol

Non-Potable Water		
Technology	**Method**	**Analyte**
GC/MS	EPA 8270D	2-Toluidine (o-Toluidine)
GC/MS	EPA 8270D	3 & 4-Methylphenol
GC/MS	EPA 8270D	3,3-Dichlorobenzidine
GC/MS	EPA 8270D	3,3'-Dimethylbenzidine
GC/MS	EPA 8270D	3,4-Dimethylphenol
GC/MS	EPA 8270D	3,4-Xylenol
GC/MS	EPA 8270D	3-Methylcholanthrene
GC/MS	EPA 8270D	3-Nitroaniline
GC/MS	EPA 8270D	4-Aminobiphenyl
GC/MS	EPA 8270D	4-Bromophenylphenyl ether
GC/MS	EPA 8270D	4-Chloro-3-methylphenol
GC/MS	EPA 8270D	4-Chloroaniline
GC/MS	EPA 8270D	4-Chlorophenol
GC/MS	EPA 8270D	4-Chlorophenyl phenyl ether
GC/MS	EPA 8270D	4-Nitroaniline
GC/MS	EPA 8270D	4-Nitrophenol
GC/MS	EPA 8270D	4-Nitroquinoline-1-oxide
GC/MS	EPA 8270D	7,12-Dimethylbenz (a) anthracene
GC/MS	EPA 8270D	Acenaphthene
GC/MS	EPA 8270D	Acenaphthylene
GC/MS	EPA 8270D	Acetophenone
GC/MS	EPA 8270D	alpha-, alpha-Dimethylphenethylamine
GC/MS	EPA 8270D	alpha-Pinene
GC/MS	EPA 8270D	Aniline
GC/MS	EPA 8270D	Anthracene
GC/MS	EPA 8270D	Aramite, Total
GC/MS	EPA 8270D	Atrazine
GC/MS	EPA 8270D	Benzaldehyde
GC/MS	EPA 8270D	Benzidine

Non-Potable Water		
Technology	**Method**	**Analyte**
GC/MS	EPA 8270D	Benzo (a) anthracene
GC/MS	EPA 8270D	Benzo (a) pyrene
GC/MS	EPA 8270D	Benzo (b) fluoranthene
GC/MS	EPA 8270D	Benzo (ghi) perylene
GC/MS	EPA 8270D	Benzo (k) fluoranthene
GC/MS	EPA 8270D	Benzoic acid
GC/MS	EPA 8270D	Benzyl alcohol
GC/MS	EPA 8270D	Bis (2-chloroethoxy) methane
GC/MS	EPA 8270D	Bis (2-chloroethyl) ether
GC/MS	EPA 8270D	Bis (2-chloroisopropyl) ether
GC/MS	EPA 8270D	Bis (2-ethylhexyl) phthalate
GC/MS	EPA 8270D	Butyl benzyl phthalate
GC/MS	EPA 8270D	Caprolactam
GC/MS	EPA 8270D	Carbazole
GC/MS	EPA 8270D	Chrysene
GC/MS	EPA 8270D	Cresols
GC/MS	EPA 8270D	Di(2-ethylhexyl)adipate
GC/MS	EPA 8270D	Diallate
GC/MS	EPA 8270D	Dibenz(a,h) anthracene
GC/MS	EPA 8270D	Dibenzofuran
GC/MS	EPA 8270D	Diethyl phthalate
GC/MS	EPA 8270D	Dimethoate
GC/MS	EPA 8270D	Dimethyl phthalate
GC/MS	EPA 8270D	Di-n-butyl phthalate
GC/MS	EPA 8270D	Di-n-octyl phthalate
GC/MS	EPA 8270D	Diphenyl ether
GC/MS	EPA 8270D	Disulfoton
GC/MS	EPA 8270D	Ethyl methane sulfonate
GC/MS	EPA 8270D	Famphur

Non-Potable Water		
Technology	**Method**	**Analyte**
GC/MS	EPA 8270D	Fluoranthene
GC/MS	EPA 8270D	Fluorene
GC/MS	EPA 8270D	Hexachlorobenzene
GC/MS	EPA 8270D	Hexachlorocyclopentadiene
GC/MS	EPA 8270D	Hexachloroethane
GC/MS	EPA 8270D	Hexachlorophene
GC/MS	EPA 8270D	Hexachloropropene
GC/MS	EPA 8270D	Hexachlrobutadiene
GC/MS	EPA 8270D	Indeno (1,2,3-cd) pyrene
GC/MS	EPA 8270D	Isophorone
GC/MS	EPA 8270D	Isosafrole
GC/MS	EPA 8270D	Methapyrilene
GC/MS	EPA 8270D	Methyl methane sulfonate
GC/MS	EPA 8270D	Methylbenzoate
GC/MS	EPA 8270D	Naphthalene
GC/MS	EPA 8270D	Nitrobenzene
GC/MS	EPA 8270D	N-Nitrosodiethylamine
GC/MS	EPA 8270D	N-Nitrosodimethylamine
GC/MS	EPA 8270D	N-Nitroso-di-n-butylamine
GC/MS	EPA 8270D	N-Nitrosodi-n-propylamine
GC/MS	EPA 8270D	N-Nitrosodiphenylamine
GC/MS	EPA 8270D	N-Nitrosomethylethylamine
GC/MS	EPA 8270D	N-Nitrosomorpholine
GC/MS	EPA 8270D	N-Nitrosopiperidine
GC/MS	EPA 8270D	N-Nitrosopyrrolidine
GC/MS	EPA 8270D	o,o',o''-Triethylphosphorothioate
GC/MS	EPA 8270D	Parathion ethyl
GC/MS	EPA 8270D	Parathion methyl
GC/MS	EPA 8270D	p-Dimethylaminoazobenzene

Non-Potable Water		
Technology	**Method**	**Analyte**
GC/MS	EPA 8270D	Pentachlorobenzene
GC/MS	EPA 8270D	Pentachlorophenol
GC/MS	EPA 8270D	Pentachlronitrobenzene
GC/MS	EPA 8270D	Phenacetin
GC/MS	EPA 8270D	Phenanthrene
GC/MS	EPA 8270D	Phenol
GC/MS	EPA 8270D	Phenyl ether
GC/MS	EPA 8270D	Phorate
GC/MS	EPA 8270D	p-Phenylene diamine
GC/MS	EPA 8270D	Pronamide
GC/MS	EPA 8270D	Pyrene
GC/MS	EPA 8270D	Pyridine
GC/MS	EPA 8270D	Safrole, Total
GC/MS	EPA 8270D	Sulfotepp
GC/MS	EPA 8270D	Thionazin
General Chemistry	EPA 9012B	Cyanide
General Chemistry	EPA 9013 EPA 9012B	Cyanide amenable to chlorination
General Chemistry	EPA 9020B	Total organic halides
General Chemistry	EPA 9030B EPA 9034	Sulfide
General Chemistry	EPA 9038	Sulfate
General Chemistry	EPA 9040C	pH
General Chemistry	EPA 9050A	Specific conductance
IC	EPA 9056A	Bromide
IC	EPA 9056A	Chloride
IC	EPA 9056A	Fluoride
IC	EPA 9056A	Nitrate (as N)
IC	EPA 9056A	Nitrate (as NO3)
IC	EPA 9056A	Nitrate-nitrite (as N)

Non-Potable Water		
Technology	**Method**	**Analyte**
IC	EPA 9056A	Nitrate-nitrite (as NO3-NO2)
IC	EPA 9056A	Nitrite (as N)
IC	EPA 9056A	Nitrite (as NO2)
IC	EPA 9056A	Sulfate
General Chemistry	EPA 9060A	Dissolved carbon
General Chemistry	EPA 9060A	Dissolved inorganic carbon
General Chemistry	EPA 9060A	Dissolved organic carbon
General Chemistry	EPA 9060A	Total carbon
General Chemistry	EPA 9060A	Total inorganic carbon
General Chemistry	EPA 9060A	Total organic carbon
General Chemistry	EPA 9065A	Phenols
General Chemistry	EPA 9251	Chloride
GC/FID/TCD	RSK-175	Ethane (FID)
GC/FID/TCD	RSK-175	Ethene (FID)
GC/FID/TCD	RSK-175	Methane (FID)
GC/FID/TCD	RSK-175	Methane (TCD)
Preparation	**Method**	**Type**
Organic Extraction	EPA 3520C	Continuous Liquid-Liquid Extraction
TLCP Preparation	EPA 1311	Toxicity Characteristics Leaching Procedure
SPLP Preparation	EPA 1312	Synthetic Precipitation Leaching Procedure
Purge & Trap	EPA 5030B	Purge & Trap for Aqueous volatile
Acid Digestion	EPA 3005A	Metals Prep
Acid Digestion (Aqueous samples)	EPA 3010A	Acid Digestion for Metals (Aqueous samples)
Distillation	EPA 9030B	Sulfide

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
General Chemistry	EPA 1030	Ignitability
ICP	EPA 6010C	Aluminum
ICP	EPA 6010C	Antimony
ICP	EPA 6010C	Arsenic
ICP	EPA 6010C	Barium
ICP	EPA 6010C	Beryllium
ICP	EPA 6010C	Boron
ICP	EPA 6010C	Cadmium
ICP	EPA 6010C	Calcium
ICP	EPA 6010C	Chromium
ICP	EPA 6010C	Cobalt
ICP	EPA 6010C	Copper
ICP	EPA 6010C	Iron
ICP	EPA 6010C	Lead
ICP	EPA 6010C	Magnesium
ICP	EPA 6010C	Manganese
ICP	EPA 6010C	Molybdenum
ICP	EPA 6010C	Nickel
ICP	EPA 6010C	Potassium
ICP	EPA 6010C	Selenium
ICP	EPA 6010C	Silver
ICP	EPA 6010C	Sodium
ICP	EPA 6010C	Strontium
ICP	EPA 6010C	Thallium
ICP	EPA 6010C	Tin
ICP	EPA 6010C	Titanium
ICP	EPA 6010C	Vanadium
ICP	EPA 6010C	Zinc
ICP	EPA 6010D	Aluminum

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
ICP	EPA 6010D	Antimony
ICP	EPA 6010D	Arsenic
ICP	EPA 6010D	Barium
ICP	EPA 6010D	Beryllium
ICP	EPA 6010D	Boron
ICP	EPA 6010D	Cadmium
ICP	EPA 6010D	Calcium
ICP	EPA 6010D	Chromium
ICP	EPA 6010D	Cobalt
ICP	EPA 6010D	Copper
ICP	EPA 6010D	Iron
ICP	EPA 6010D	Lead
ICP	EPA 6010D	Magnesium
ICP	EPA 6010D	Manganese
ICP	EPA 6010D	Molybdenum
ICP	EPA 6010D	Nickel
ICP	EPA 6010D	Potassium
ICP	EPA 6010D	Selenium
ICP	EPA 6010D	Silver
ICP	EPA 6010D	Sodium
ICP	EPA 6010D	Strontium
ICP	EPA 6010D	Thallium
ICP	EPA 6010D	Tin
ICP	EPA 6010D	Titanium
ICP	EPA 6010D	Vanadium
ICP	EPA 6010D	Zinc
ICP/MS	EPA 6020A	Aluminum
ICP/MS	EPA 6020A	Antimony
ICP/MS	EPA 6020A	Arsenic

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
ICP/MS	EPA 6020A	Barium
ICP/MS	EPA 6020A	Beryllium
ICP/MS	EPA 6020A	Boron
ICP/MS	EPA 6020A	Cadmium
ICP/MS	EPA 6020A	Calcium
ICP/MS	EPA 6020A	Chromium
ICP/MS	EPA 6020A	Cobalt
ICP/MS	EPA 6020A	Copper
ICP/MS	EPA 6020A	Iron
ICP/MS	EPA 6020A	Lead
ICP/MS	EPA 6020A	Magnesium
ICP/MS	EPA 6020A	Manganese
ICP/MS	EPA 6020A	Mercury
ICP/MS	EPA 6020A	Molybdenum
ICP/MS	EPA 6020A	Nickel
ICP/MS	EPA 6020A	Potassium
ICP/MS	EPA 6020A	Selenium
ICP/MS	EPA 6020A	Silver
ICP/MS	EPA 6020A	Sodium
ICP/MS	EPA 6020A	Strontium
ICP/MS	EPA 6020A	Thallium
ICP/MS	EPA 6020A	Tin
ICP/MS	EPA 6020A	Titanium
ICP/MS	EPA 6020A	Vanadium
ICP/MS	EPA 6020A	Zinc
ICP/MS	EPA 6020B	Aluminum
ICP/MS	EPA 6020B	Antimony
ICP/MS	EPA 6020B	Arsenic
ICP/MS	EPA 6020B	Barium

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
ICP/MS	EPA 6020B	Beryllium
ICP/MS	EPA 6020B	Boron
ICP/MS	EPA 6020B	Cadmium
ICP/MS	EPA 6020B	Calcium
ICP/MS	EPA 6020B	Chromium
ICP/MS	EPA 6020B	Cobalt
ICP/MS	EPA 6020B	Copper
ICP/MS	EPA 6020B	Iron
ICP/MS	EPA 6020B	Lead
ICP/MS	EPA 6020B	Magnesium
ICP/MS	EPA 6020B	Manganese
ICP/MS	EPA 6020B	Mercury
ICP/MS	EPA 6020B	Molybdenum
ICP/MS	EPA 6020B	Nickel
ICP/MS	EPA 6020B	Potassium
ICP/MS	EPA 6020B	Selenium
ICP/MS	EPA 6020B	Silver
ICP/MS	EPA 6020B	Sodium
ICP/MS	EPA 6020B	Strontium
ICP/MS	EPA 6020B	Thallium
ICP/MS	EPA 6020B	Tin
ICP/MS	EPA 6020B	Titanium
ICP/MS	EPA 6020B	Vanadium
ICP/MS	EPA 6020B	Zinc
CVAA	EPA 7471B	Mercury
GC/FID	EPA 8015C	#2 Diesel Fuel
GC/FID	EPA 8015C	Diesel Range Organics
GC/FID	EPA 8015C	Gasoline Range Organics
GC/FID	EPA 8015C	Kerosene

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC/FID	EPA 8015C	Mineral Spirits
GC/FID	EPA 8015C	Motor Oil
GC/FID	EPA 8015C	Oil Range Organics
GC/FID	EPA 8015C	2,2'-Oxybisethanol
GC/FID	EPA 8015C	2-Butoxyethanol
GC/FID	EPA 8015C	2-Propoxy ethanol
GC/FID	EPA 8015C	Cellosolve acetate
GC/FID	EPA 8015C	Di-propylene glycol
GC/FID	EPA 8015C	Di-propylene glycol methyl ether
GC/FID	EPA 8015C	Ethanol
GC/FID	EPA 8015C	Ethanol
GC/FID	EPA 8015C	Ethyl acetate
GC/FID	EPA 8015C	Ethylene glycol
GC/FID	EPA 8015C	Isoamyl acetate
GC/FID	EPA 8015C	Isobutanol
GC/FID	EPA 8015C	Isobutyl acetate
GC/FID	EPA 8015C	Isopropanol
GC/FID	EPA 8015C	Isopropyl acetate
GC/FID	EPA 8015C	Methanol
GC/FID	EPA 8015C	Methyl acetate
GC/FID	EPA 8015C	n-Butanol
GC/FID	EPA 8015C	n-Butyl acetate
GC/FID	EPA 8015C	n-Heptanol
GC/FID	EPA 8015C	n-Propanol
GC/FID	EPA 8015C	n-Propyl acetate
GC/FID	EPA 8015C	Phenol
GC/FID	EPA 8015C	Propylene glycol
GC/FID	EPA 8015C	sec-Butanol
GC/FID	EPA 8015C	sec-Butyl acetate

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC/FID	EPA 8015C	Tert-amyl alcohol
GC/FID	EPA 8015C	tert-Butyl alcohol
GC/FID	EPA 8015C	Tetraethylene glycol
GC/FID	EPA 8015C	Triethylene glycol
GC/ECD	EPA 8081B	2,4’ DDE
GC/ECD	EPA 8081B	2,4’-DDD
GC/ECD	EPA 8081B	2,4’-DDT
GC/ECD	EPA 8081B	4,4’ DDE
GC/ECD	EPA 8081B	4,4’-DDD
GC/ECD	EPA 8081B	4,4’-DDT
GC/ECD	EPA 8081B	Aldrin
GC/ECD	EPA 8081B	alpha-BHC
GC/ECD	EPA 8081B	beta-BHC
GC/ECD	EPA 8081B	Chlordane (alpha)
GC/ECD	EPA 8081B	Chlordane (gamma)
GC/ECD	EPA 8081B	Chlordane (technical)
GC/ECD	EPA 8081B	Chlorobenzilate
GC/ECD	EPA 8081B	delta-BHC
GC/ECD	EPA 8081B	Dieldrin
GC/ECD	EPA 8081B	Endosulfan I (alpha)
GC/ECD	EPA 8081B	Endosulfan II (beta)
GC/ECD	EPA 8081B	Endosulfan sulfate
GC/ECD	EPA 8081B	Endrin
GC/ECD	EPA 8081B	Endrin aldehyde
GC/ECD	EPA 8081B	Endrin ketone
GC/ECD	EPA 8081B	gamma-BHC
GC/ECD	EPA 8081B	Heptachlor
GC/ECD	EPA 8081B	Heptachlor epoxide
GC/ECD	EPA 8081B	Isodrin

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC/ECD	EPA 8081B	Methoxychlor
GC/ECD	EPA 8081B	Mirex
GC/ECD	EPA 8081B	Toxaphene
GC/ECD	EPA 8082A	PCB-1016
GC/ECD	EPA 8082A	PCB-1221
GC/ECD	EPA 8082A	PCB-1232
GC/ECD	EPA 8082A	PCB-1242
GC/ECD	EPA 8082A	PCB-1248
GC/ECD	EPA 8082A	PCB-1254
GC/ECD	EPA 8082A	PCB-1260
GC/ECD	EPA 8082A	PCB-1262
GC/ECD	EPA 8082A	PCB-1268
GC/ECD	EPA 8082A	PCBs, Total
GC/ECD	EPA 8151A	2,4,5-T
GC/ECD	EPA 8151A	2,4,5-TP (Silvex)
GC/ECD	EPA 8151A	2,4,6-Trichlorophenol
GC/ECD	EPA 8151A	2,4-D
GC/ECD	EPA 8151A	2,4-DB
GC/ECD	EPA 8151A	2,6-Dichlorophenol
GC/ECD	EPA 8151A	Dalapon
GC/ECD	EPA 8151A	DCPA (Dacthal)
GC/ECD	EPA 8151A	Dicamba
GC/ECD	EPA 8151A	Dichloroprop
GC/ECD	EPA 8151A	Dinoseb
GC/ECD	EPA 8151A	MCPA
GC/ECD	EPA 8151A	MCPP
GC/ECD	EPA 8151A	Pentachlorophenol
GC/ECD	EPA 8151A	Picloram
GC/MS	EPA 8260B	1,1,1,2-Tetrachloroethane

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC/MS	EPA 8260B	1,1,1-Trichloroethane
GC/MS	EPA 8260B	1,1,2,2-Tetrachloroethane
GC/MS	EPA 8260B	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
GC/MS	EPA 8260B	1,1,2-Trichloroethane
GC/MS	EPA 8260B	1,1-Dichloroethane
GC/MS	EPA 8260B	1,1-Dichloroethene
GC/MS	EPA 8260B	1,1-Dichloropropene
GC/MS	EPA 8260B	1,2,3-Trichlorobenzene
GC/MS	EPA 8260B	1,2,3-Trichloropropane
GC/MS	EPA 8260B	1,2,4-Trichlorobenzene
GC/MS	EPA 8260B	1,2,4-Trimethylbenzene
GC/MS	EPA 8260B	1,2-Dibromo-3-chloropropane (DBCP)
GC/MS	EPA 8260B	1,2-Dibromoethane (EDB)
GC/MS	EPA 8260B	1,2-Dichlorobenzene
GC/MS	EPA 8260B	1,2-Dichloroethane
GC/MS	EPA 8260B	1,2-Dichloroethene, Total
GC/MS	EPA 8260B	1,2-Dichloropropane
GC/MS	EPA 8260B	1,2-Xylene
GC/MS	EPA 8260B	1,3 & 1,4-Xylene
GC/MS	EPA 8260B	1,3,5-Trimethylbenzene
GC/MS	EPA 8260B	1,3-Dichlorobenzene
GC/MS	EPA 8260B	1,3-Dichloropropane
GC/MS	EPA 8260B	1,3-Dichloropropene, Total
GC/MS	EPA 8260B	1,4-Dichlorobenzene
GC/MS	EPA 8260B	1,4-Dioxane
GC/MS	EPA 8260B	1-Chlorohexane
GC/MS	EPA 8260B	2,2-Dichloropropane
GC/MS	EPA 8260B	2-Butanone
GC/MS	EPA 8260B	2-Chlorotoluene

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC/MS	EPA 8260B	2-Hexanone
GC/MS	EPA 8260B	3-Chloro-1-propene
GC/MS	EPA 8260B	4-Chlorotoluene
GC/MS	EPA 8260B	4-Chlorotoluene
GC/MS	EPA 8260B	4-Isopropyltoluene
GC/MS	EPA 8260B	Acetone
GC/MS	EPA 8260B	Acetonitrile
GC/MS	EPA 8260B	Acrolein
GC/MS	EPA 8260B	Acrylonitrile
GC/MS	EPA 8260B	Benzene
GC/MS	EPA 8260B	Bromobenzene
GC/MS	EPA 8260B	Bromochloromethane
GC/MS	EPA 8260B	Bromodichloromethane
GC/MS	EPA 8260B	Bromoform
GC/MS	EPA 8260B	Bromomethane
GC/MS	EPA 8260B	BTEX, Total
GC/MS	EPA 8260B	Carbon disulfide
GC/MS	EPA 8260B	Carbon tetrachloride
GC/MS	EPA 8260B	Chlorobenzene
GC/MS	EPA 8260B	Chloroethane
GC/MS	EPA 8260B	Chloroform
GC/MS	EPA 8260B	Chloromethane
GC/MS	EPA 8260B	Chloroprene
GC/MS	EPA 8260B	cis-1,2-Dichloroethene
GC/MS	EPA 8260B	cis-1,3-Dichloropropene
GC/MS	EPA 8260B	Cyclohexane
GC/MS	EPA 8260B	Dibromochloromethane
GC/MS	EPA 8260B	Dibromomethane
GC/MS	EPA 8260B	Dichlorodifluoromethane

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC/MS	EPA 8260B	Diethyl ether
GC/MS	EPA 8260B	Ethanol
GC/MS	EPA 8260B	Ethyl benzene
GC/MS	EPA 8260B	Ethyl methacrylate
GC/MS	EPA 8260B	Furan
GC/MS	EPA 8260B	Hexachlorobutadiene
GC/MS	EPA 8260B	Hexane
GC/MS	EPA 8260B	Iodomethane
GC/MS	EPA 8260B	Isobutanol
GC/MS	EPA 8260B	Isopropyl ether
GC/MS	EPA 8260B	Isopropylbenzene
GC/MS	EPA 8260B	Methacrylonitrile
GC/MS	EPA 8260B	Methyl acetate
GC/MS	EPA 8260B	Methyl cyclohexane
GC/MS	EPA 8260B	Methyl isobutyl ketone
GC/MS	EPA 8260B	Methyl methacrylate
GC/MS	EPA 8260B	Methyl tert-butyl ether (MTBE)
GC/MS	EPA 8260B	Methylene chloride
GC/MS	EPA 8260B	Naphthalene
GC/MS	EPA 8260B	n-Butylbenzene
GC/MS	EPA 8260B	n-Heptane
GC/MS	EPA 8260B	n-Propylbenzene
GC/MS	EPA 8260B	Pentachloroethane
GC/MS	EPA 8260B	Propionitrile
GC/MS	EPA 8260B	sec-Butylbenzene
GC/MS	EPA 8260B	Styrene
GC/MS	EPA 8260B	Tert-butyl alcohol (TBA)
GC/MS	EPA 8260B	tert-Butylbenzene
GC/MS	EPA 8260B	Tetrachloroethene

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC/MS	EPA 8260B	Tetrahydrofuran
GC/MS	EPA 8260B	Toluene
GC/MS	EPA 8260B	trans-1,2-Dichloroethene
GC/MS	EPA 8260B	trans-1,3-Dichloropropene
GC/MS	EPA 8260B	trans-1,4-dichloro-2-butene
GC/MS	EPA 8260B	Trichloroethene
GC/MS	EPA 8260B	Trichlorofluoromethane
GC/MS	EPA 8260B	Vinyl acetate
GC/MS	EPA 8260B	Vinyl chloride
GC/MS	EPA 8260B	Xylenes, total
GC/MS	EPA 8260C	1,1,1,2-Tetrachloroethane
GC/MS	EPA 8260C	1,1,1-Trichloroethane
GC/MS	EPA 8260C	1,1,2,2-Tetrachloroethane
GC/MS	EPA 8260C	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)
GC/MS	EPA 8260C	1,1,2-Trichloroethane
GC/MS	EPA 8260C	1,1-Dichloroethane
GC/MS	EPA 8260C	1,1-Dichloroethene
GC/MS	EPA 8260C	1,1-Dichloropropene
GC/MS	EPA 8260C	1,2,3-Trichlorobenzene
GC/MS	EPA 8260C	1,2,3-Trichloropropane
GC/MS	EPA 8260C	1,2,4-Trichlorobenzene
GC/MS	EPA 8260C	1,2,4-Trimethylbenzene
GC/MS	EPA 8260C	1,2-Dibromo-3-chloropropane (DBCP)
GC/MS	EPA 8260C	1,2-Dibromoethane (EDB)
GC/MS	EPA 8260C	1,2-Dichlorobenzene
GC/MS	EPA 8260C	1,2-Dichloroethane
GC/MS	EPA 8260C	1,2-Dichloroethene, Total
GC/MS	EPA 8260C	1,2-Dichloropropane
GC/MS	EPA 8260C	1,2-Xylene

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC/MS	EPA 8260C	1,3 & 1,4-Xylene
GC/MS	EPA 8260C	1,3,5-Trimethylbenzene
GC/MS	EPA 8260C	1,3-Dichlorobenzene
GC/MS	EPA 8260C	1,3-Dichloropropane
GC/MS	EPA 8260C	1,3-Dichloropropene, Total
GC/MS	EPA 8260C	1,4-Dichlorobenzene
GC/MS	EPA 8260C	1,4-Dioxane
GC/MS	EPA 8260C	1-Chlorohexane
GC/MS	EPA 8260C	2,2-Dichloropropane
GC/MS	EPA 8260C	2-Butanone
GC/MS	EPA 8260C	2-Chlorotoluene
GC/MS	EPA 8260C	2-Hexanone
GC/MS	EPA 8260C	3-Chloro-1-propene
GC/MS	EPA 8260C	4-Chlorotoluene
GC/MS	EPA 8260C	4-Isopropyltoluene
GC/MS	EPA 8260C	Acetone
GC/MS	EPA 8260C	Acetonitrile
GC/MS	EPA 8260C	Acrolein
GC/MS	EPA 8260C	Acrylonitrile
GC/MS	EPA 8260C	Benzene
GC/MS	EPA 8260C	Bromobenzene
GC/MS	EPA 8260C	Bromochloromethane
GC/MS	EPA 8260C	Bromodichloromethane
GC/MS	EPA 8260C	Bromoform
GC/MS	EPA 8260C	Bromomethane
GC/MS	EPA 8260C	BTEX, Total
GC/MS	EPA 8260C	Carbon disulfide
GC/MS	EPA 8260C	Carbon tetrachloride
GC/MS	EPA 8260C	Chlorobenzene

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC/MS	EPA 8260C	Chloroethane
GC/MS	EPA 8260C	Chloroform
GC/MS	EPA 8260C	Chloromethane
GC/MS	EPA 8260C	Chloroprene
GC/MS	EPA 8260C	cis-1,2-Dichloroethene
GC/MS	EPA 8260C	cis-1,3-Dichloropropene
GC/MS	EPA 8260C	Cyclohexane
GC/MS	EPA 8260C	Dibromochloromethane
GC/MS	EPA 8260C	Dibromomethane
GC/MS	EPA 8260C	Dichlorodifluoromethane
GC/MS	EPA 8260C	Diethyl ether
GC/MS	EPA 8260C	Ethanol
GC/MS	EPA 8260C	Ethyl benzene
GC/MS	EPA 8260C	Ethyl methacrylate
GC/MS	EPA 8260C	Furan
GC/MS	EPA 8260C	Hexachlorobutadiene
GC/MS	EPA 8260C	Hexane
GC/MS	EPA 8260C	Iodomethane
GC/MS	EPA 8260C	Isobutanol
GC/MS	EPA 8260C	Isopropyl ether
GC/MS	EPA 8260C	Isopropylbenzene
GC/MS	EPA 8260C	Methacrylonitrile
GC/MS	EPA 8260C	Methyl acetate
GC/MS	EPA 8260C	Methyl cyclohexane
GC/MS	EPA 8260C	Methyl isobutyl ketone
GC/MS	EPA 8260C	Methyl methacrylate
GC/MS	EPA 8260C	Methyl tert-butyl ether (MTBE)
GC/MS	EPA 8260C	Methylene chloride
GC/MS	EPA 8260C	Naphthalene

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC/MS	EPA 8260C	n-Butylbenzene
GC/MS	EPA 8260C	n-Heptane
GC/MS	EPA 8260C	n-Propylbenzene
GC/MS	EPA 8260C	Pentachloroethane
GC/MS	EPA 8260C	Propionitrile
GC/MS	EPA 8260C	sec-Butylbenzene
GC/MS	EPA 8260C	Styrene
GC/MS	EPA 8260C	Tert-butyl alcohol (TBA)
GC/MS	EPA 8260C	tert-Butylbenzene
GC/MS	EPA 8260C	Tetrachloroethene
GC/MS	EPA 8260C	Tetrahydrofuran
GC/MS	EPA 8260C	Toluene
GC/MS	EPA 8260C	trans-1,2-Dichloroethene
GC/MS	EPA 8260C	trans-1,3-Dichloropropene
GC/MS	EPA 8260C	trans-1,4-dichloro-2-butene
GC/MS	EPA 8260C	Trichloroethene
GC/MS	EPA 8260C	Trichlorofluoromethane
GC/MS	EPA 8260C	Vinyl acetate
GC/MS	EPA 8260C	Vinyl chloride
GC/MS	EPA 8260C	Xylenes, total
GC/MS	EPA 8270D	1,1-Biphenyl
GC/MS	EPA 8270D	1,2,3-Trichlorobenzene
GC/MS	EPA 8270D	1,2,4,5-Tetrachlorobenzene
GC/MS	EPA 8270D	1,2,4,5-Tetrachlorobenzene
GC/MS	EPA 8270D	1,2,4,5-Tetrachlorobenzene
GC/MS	EPA 8270D	1,2,4-Trichlorobenzene
GC/MS	EPA 8270D	1,2-Dichlorobenzene
GC/MS	EPA 8270D	1,2-Diphenylhydrazine
GC/MS	EPA 8270D	1,3,5-Trichlorobenzene

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC/MS	EPA 8270D	1,3,5-Trinitrobenzene
GC/MS	EPA 8270D	1,3-Dichlorobenzene
GC/MS	EPA 8270D	1,3-Dinitrobenzene
GC/MS	EPA 8270D	1,4-Dichlorobenzene
GC/MS	EPA 8270D	1,4-Dioxane
GC/MS	EPA 8270D	1,4-Naphthoquinone
GC/MS	EPA 8270D	1-Methylnaphthalene
GC/MS	EPA 8270D	1-Naphthylamine
GC/MS	EPA 8270D	2,3,4,6-Tetrachlorophenol
GC/MS	EPA 8270D	2,3,6-Trichlorophenol
GC/MS	EPA 8270D	2,3-Dimethylphenol
GC/MS	EPA 8270D	2,3-Xylenol
GC/MS	EPA 8270D	2,4 & 2,5-Dimethylphenol
GC/MS	EPA 8270D	2,4,5-Trichlorophenol
GC/MS	EPA 8270D	2,4,6-Trichlorophenol
GC/MS	EPA 8270D	2,4-Dichlorophenol
GC/MS	EPA 8270D	2,4-Dimethylphenol
GC/MS	EPA 8270D	2,4-Dinitrophenol
GC/MS	EPA 8270D	2,4-Dinitrotoluene
GC/MS	EPA 8270D	2,5-Dimethylphenol
GC/MS	EPA 8270D	2,6-Dichlorophenol
GC/MS	EPA 8270D	2,6-Dimethylphenol
GC/MS	EPA 8270D	2,6-Dinitrotoluene
GC/MS	EPA 8270D	2-Acetylaminofluorene
GC/MS	EPA 8270D	2-Chloronaphthalene
GC/MS	EPA 8270D	2-Chlorophenol
GC/MS	EPA 8270D	2-Methyl-4,6-Dinitrophenol
GC/MS	EPA 8270D	2-Methylnaphthalene
GC/MS	EPA 8270D	2-Methylphenol

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC/MS	EPA 8270D	2-Naphthylamine
GC/MS	EPA 8270D	2-Nitroaniline
GC/MS	EPA 8270D	2-Nitrophenol
GC/MS	EPA 8270D	2-Picoline
GC/MS	EPA 8270D	2-sec-Butyl-4,6-dinitrophenol
GC/MS	EPA 8270D	2-Toluidine (o-Toluidine)
GC/MS	EPA 8270D	3 & 4-Methylphenol
GC/MS	EPA 8270D	3,3-Dichlorobenzidine
GC/MS	EPA 8270D	3,3'-Dimethylbenzidine
GC/MS	EPA 8270D	3,4-Dimethylphenol
GC/MS	EPA 8270D	3,4-Xylenol
GC/MS	EPA 8270D	3-Methylcholanthrene
GC/MS	EPA 8270D	3-Nitroaniline
GC/MS	EPA 8270D	4-Aminobiphenyl
GC/MS	EPA 8270D	4-Bromophenylphenyl ether
GC/MS	EPA 8270D	4-Chloro-3-methylphenol
GC/MS	EPA 8270D	4-Chloroaniline
GC/MS	EPA 8270D	4-Chlorophenol
GC/MS	EPA 8270D	4-Chlorophenyl phenyl ether
GC/MS	EPA 8270D	4-Nitroaniline
GC/MS	EPA 8270D	4-Nitrophenol
GC/MS	EPA 8270D	4-Nitroquinoline-1-oxide
GC/MS	EPA 8270D	7,12-Dimethylbenz (a) anthracene
GC/MS	EPA 8270D	Acenaphthene
GC/MS	EPA 8270D	Acenaphthylene
GC/MS	EPA 8270D	Acetophenone
GC/MS	EPA 8270D	alpha-, alpha-Dimethylphenethylamine
GC/MS	EPA 8270D	alpha-Pinene
GC/MS	EPA 8270D	Aniline

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC/MS	EPA 8270D	Anthracene
GC/MS	EPA 8270D	Aramite, Total
GC/MS	EPA 8270D	Atrazine
GC/MS	EPA 8270D	Benzaldehyde
GC/MS	EPA 8270D	Benzidine
GC/MS	EPA 8270D	Benzo (a) anthracene
GC/MS	EPA 8270D	Benzo (a) pyrene
GC/MS	EPA 8270D	Benzo (b) fluoranthene
GC/MS	EPA 8270D	Benzo (ghi) perylene
GC/MS	EPA 8270D	Benzo (k) fluoranthene
GC/MS	EPA 8270D	Benzoic acid
GC/MS	EPA 8270D	Benzyl alcohol
GC/MS	EPA 8270D	Bis (2-chloroethoxy) methane
GC/MS	EPA 8270D	Bis (2-chloroethyl) ether
GC/MS	EPA 8270D	Bis (2-chloroisopropyl) ether
GC/MS	EPA 8270D	Bis (2-ethylhexyl) phthalate
GC/MS	EPA 8270D	Butyl benzyl phthalate
GC/MS	EPA 8270D	Caprolactam
GC/MS	EPA 8270D	Carbazole
GC/MS	EPA 8270D	Chrysene
GC/MS	EPA 8270D	Cresols
GC/MS	EPA 8270D	Di(2-ethylhexyl)adipate
GC/MS	EPA 8270D	Diallate
GC/MS	EPA 8270D	Dibenz(a,h) anthracene
GC/MS	EPA 8270D	Dibenzofuran
GC/MS	EPA 8270D	Diethyl phthalate
GC/MS	EPA 8270D	Dimethoate
GC/MS	EPA 8270D	Dimethyl phthalate
GC/MS	EPA 8270D	Di-n-butyl phthalate

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC/MS	EPA 8270D	Di-n-octyl phthalate
GC/MS	EPA 8270D	Diphenyl ether
GC/MS	EPA 8270D	Disulfoton
GC/MS	EPA 8270D	Ethyl methane sulfonate
GC/MS	EPA 8270D	Famphur
GC/MS	EPA 8270D	Fluoranthene
GC/MS	EPA 8270D	Fluorene
GC/MS	EPA 8270D	Hexachlorobenzene
GC/MS	EPA 8270D	Hexachlorocyclopentadiene
GC/MS	EPA 8270D	Hexachloroethane
GC/MS	EPA 8270D	Hexachlorophene
GC/MS	EPA 8270D	Hexachloropropene
GC/MS	EPA 8270D	Hexachlrobutadiene
GC/MS	EPA 8270D	Indeno (1,2,3-cd) pyrene
GC/MS	EPA 8270D	Isophorone
GC/MS	EPA 8270D	Isosafrole
GC/MS	EPA 8270D	Methapyrilene
GC/MS	EPA 8270D	Methyl methane sulfonate
GC/MS	EPA 8270D	Methylbenzoate
GC/MS	EPA 8270D	Naphthalene
GC/MS	EPA 8270D	Nitrobenzene
GC/MS	EPA 8270D	N-Nitrosodiethylamine
GC/MS	EPA 8270D	N-Nitrosodimethylamine
GC/MS	EPA 8270D	N-Nitroso-di-n-butylamine
GC/MS	EPA 8270D	N-Nitrosodi-n-propylamine
GC/MS	EPA 8270D	N-Nitrosodiphenylamine
GC/MS	EPA 8270D	N-Nitrosomethylethylamine
GC/MS	EPA 8270D	N-Nitrosomorpholine
GC/MS	EPA 8270D	N-Nitrosopiperidine

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
GC/MS	EPA 8270D	N-Nitrosopyrrolidine
GC/MS	EPA 8270D	o,o',o''-Triethylphosphorothioate
GC/MS	EPA 8270D	Parathion ethyl
GC/MS	EPA 8270D	Parathion methyl
GC/MS	EPA 8270D	p-Dimethylaminoazobenzene
GC/MS	EPA 8270D	Pentachlorobenzene
GC/MS	EPA 8270D	Pentachlorophenol
GC/MS	EPA 8270D	Pentachlronitrobenzene
GC/MS	EPA 8270D	Phenacetin
GC/MS	EPA 8270D	Phenanthrene
GC/MS	EPA 8270D	Phenol
GC/MS	EPA 8270D	Phenyl ether
GC/MS	EPA 8270D	Phorate
GC/MS	EPA 8270D	p-Phenylene diamine
GC/MS	EPA 8270D	Pronamide
GC/MS	EPA 8270D	Pyrene
GC/MS	EPA 8270D	Pyridine
GC/MS	EPA 8270D	Safrole, Total
GC/MS	EPA 8270D	Sulfotepp
GC/MS	EPA 8270D	Thionazin
General Chemistry	EPA 9012B	Cyanide
General Chemistry	EPA 9013 EPA 9012B	Cyanide amenable to chlorination
General Chemistry	EPA 9030B EPA 9034	Sulfide
General Chemistry	EPA 9038	Sulfate
General Chemistry	EPA 9045D	pH
General Chemistry	EPA 9050A	Specific conductance
IC	EPA 9056A	Bromide
IC	EPA 9056A	Chloride

Solid and Chemical Materials		
Technology	**Method**	**Analyte**
IC	EPA 9056A	Fluoride
IC	EPA 9056A	Nitrate (as N)
IC	EPA 9056A	Nitrate (as NO3)
IC	EPA 9056A	Nitrate-nitrite (as N)
IC	EPA 9056A	Nitrate-nitrite (as NO3-NO2)
IC	EPA 9056A	Nitrite (as N)
IC	EPA 9056A	Nitrite (as NO2)
IC	EPA 9056A	Sulfate
General Chemistry	EPA 9065A	Phenols
General Chemistry	EPA 9071B	Oil and Grease
General Chemistry	EPA 9071B	Total Petroleum Hydrocarbons
General Chemistry	EPA 9095B	Free Liquid
General Chemistry	EPA 9251	Chloride
Preparation	**Method**	**Type**
Organic preparation	EPA 3546	Microwave Extraction
TCLP preparation	EPA 1311	Toxicity Characteristic Leaching Procedure
SPLP Preparation	EPA 1312	Synthetic Precipitation Leaching procedure
Purge & Trap	EPA 5035A	Volatiles Prep
Acid Digestion	EPA 3050B	Metals Prep
Preparation	EPA 5050	Bomb Prep
Distillation	EPA 9030B	Sulfide

Note:

1. This scope is formatted as part of a single document including Certificate of Accreditation No. L2463.

Vice President

Appendix I

Quality Assurance Project Plan Worksheets

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SAP Worksheet #24 -- Analytical Instrument Calibration Table
(UFP-QAPP Manual Section 3.2.2)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria[1]	Corrective Action (CA)	Person Responsible for CA	SOP Reference[2]
ICP-AES	Initial Calibration (ICAL) Minimum of one high standard and a calibration blank	Prior to sample analysis.	NA	NA	Analyst	SA-ME-070
ICP-AES	Initial Calibration Verification (ICV)	Second source standard immediately following ICAL	All reported analytes ± 10% of expected value.	Correct any problems and rerun ICV. If that fails, correct problem and repeat ICAL. No samples shall be analyzed until the second-source calibration verification is successful.	Analyst	SA-ME-070
ICP-AES	Low-Level Calibration Check Standard (Low-level ICV) Spiked ≤ LOQ	Daily after one-point ICAL	All reported analytes must be within ± 20% of expected value.	Correct any problems, then reanalyze or repeat ICAL. Results cannot be reported without a valid low-level calibration check standard.	Analyst	SA-ME-070
ICP-AES	Interference Check Solution (ICS)	After ICAL and prior to sample analysis	ICS-A: Absolute value of concentration for all non-spiked project analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes); ICS-AB: Within + 20% of true value. (Not needed if instrument can read negative responses.)	Terminate analysis; locate and correct problem; reanalyze ICS, reanalyze all samples.	Analyst	SA-ME-070
ICP-AES	Continuing Calibration	After every 10 field	All reported analytes ± 10%	Evaluate failure and	Analyst	SA-ME-070

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria[1]	Corrective Action (CA)	Person Responsible for CA	SOP Reference[2]
	Verification (CCV)	samples and at the end of the sequence.	of expected value.	impact on samples. If samples non-detect for analytes which have a high bias, report non-detect results with case narrative comment with written approval from the client. or Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, take corrective action(s) and re-calibrate; then reanalyze all affected samples since the last acceptable CCV.		
ICP-AES	Initial and Continuing Calibration Blank (ICB, CCB)	Before analyzing samples, after every 10 field samples, and at the end of the analysis sequence.	No analytes detected > ½ LOQ or >1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater.	Correct any problems and repeat ICAL. All samples following the last acceptable calibration blank must be reanalyzed. CCB failures due to carryover may not require an ICAL.	Analyst	SA-ME-070

[1]This table provides a summary of the acceptance criteria. Refer to the method SOP for specific or more information.
[2]SOPs are reviewed/revised on an annual schedule. The current version will be followed at the time of sample receipt.

SAP Worksheet #28 -- Laboratory QC Samples Table
(UFP-QAPP Manual Section 3.4)

Matrix	Water / Soil
Analytical Group	Metals by ICP
Analytical Method / SOP Reference[2]	EPA 6010C SA-ME-070

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits[1]	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank (MB)	1/ Preparatory Batch (20 samples)	No Target Compounds> ½ LOQ and greater than 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Common lab contaminants: no analytes detected > LOQ.	If sufficient sample is available, reanalyze samples. Qualify data as needed. Report results if sample results >10x blank result or sample results ND.	Analyst	Accuracy/Bias-Contamination	No Target Compounds>1/2 LOQ
Laboratory Control Sample (LCS)	1/Preparatory Batch (20 samples)	QSM limits (if available) or current in-house limits if no QSM limits published.	If acceptable, report. If LCS has high bias, and samples non-detect, report with case narrative comment. If LCS has low bias, evaluate and re-prep and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available. Marginal exceedance allowed unless analyte is specified risk driver.	Analyst	Accuracy/Bias	QSM or Laboratory % Recovery / RPD Control Limits
Matrix Spike / Matrix Spike Duplicate (MS/MSD)	1 pair/Preparatory Batch (20 samples)	Recovery: QSM limits (if available) or current in-house limits if no QSM limits published. RPD: RPD between MS and MSD ≤ 20%	If MS fails, consult project-specific DQOs and contact client to see if additional measures need to be taken. For specific analyte(s) in parent sample, apply J-flag if acceptance criteria are not	Analyst	Accuracy/Bias/ Precision	QSM or Laboratory % Recovery / RPD Control Limits

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits[1]	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
			met. If MS falls outside LCS limits, evaluate data to determine the source of the difference and to determine if there is a matrix effect or analytical error.			
Dilution Test	One per preparatory batch if MS or MSD fails. Only applicable for samples with concentrations >50 x LOQ.	Five-fold dilution must agree within ± 10% of the original determination	If dilution test fails analyze post digestion spike.	Analyst	Accuracy/Bias/ Precision	N/A
Post Digestion Spike (PDS)	When dilution test fails or analyte concentration of all samples < 50 x LOQ	Recovery within 80-120% of expected results	For specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met.	Analyst	Accuracy/Bias	N/A
Method of Standard Additions (MSA)	When dilution test or post digestion spike fails and if required by the project	NA	NA	Analyst		N/A

[1]This table provides a summary of the acceptance criteria. Refer to the method SOP for specific information.
[2]SOPs are reviewed/revised on an annual schedule. The current version will be followed at the time of sample receipt.

QAPP Worksheet #34: Data Verification and Validation Inputs
(UFP-QAPP Manual Section 5.2.1 and Table 9)
(EPA 2106-G-05 Section 2.5.1)

This worksheet is used to list the inputs that will be used during data verification and validation. Inputs include planning documents, field records, and laboratory records. Data verification is a check that all specified activities involved in collecting and analyzing samples have been completed and documented and that the necessary records (objective evidence) are available to proceed to data validation. Data validation is the evaluation of conformance to stated requirements, including those in the contract, methods, SOPs and the QAPP. Examples of records subject to verification and validation are listed below. The actual inputs required should be based on the graded approach, as defined during project planning.

Item	Description	Verification (completeness)	Validation (conformance to specifications)
Planning Documents/Records			
1	Approved QAPP	**X**	
2	Contract	**X**	
4	Field SOPs	**X**	
5	Laboratory SOPs	**X**	
Field Records			
6	Field logbooks	**X**	**X**
7	Equipment calibration records	**X**	**X**
8	Chain-of-Custody Forms	**X**	**X**
9	Sampling diagrams/surveys	**X**	**X**
10	Drilling logs	**X**	**X**
11	Geophysics reports	**X**	**X**
12	Relevant Correspondence	**X**	**X**
13	Change orders/deviations	**X**	**X**
14	Field audit reports	**X**	**X**
15	Field corrective action reports	**X**	**X**
Analytical Data Package			
16	Cover sheet (laboratory identifying information)	**X**	**X**
17	Case narrative	**X**	**X**
18	Internal laboratory chain-of-custody	**X**	**X**
19	Sample receipt records	**X**	**X**
20	Sample chronology (i.e. dates and times of receipt, preparation, & analysis)	**X**	**X**
21	Communication records	**X**	**X**
22	Project-specific PT sample results	**X**	**X**
23	LOD/LOQ establishment and verification	**X**	**X**

Item	Description	Verification (completeness)	Validation (conformance to specifications)
24	Standards Traceability	**X**	**X**
25	Instrument calibration records	**X**	**X**
26	Definition of laboratory qualifiers	**X**	**X**
27	Results reporting forms	**X**	**X**
28	QC sample results	**X**	**X**
29	Corrective action reports	**X**	**X**
30	Raw data	**X**	**X**
31	Electronic data deliverable	**X**	**X**

QAPP Worksheet #35: Data Verification Procedures
(UFP-QAPP Manual Section 5.2.2)
(EPA 2106-G-05 Section 2.5.1)

This worksheet documents procedures that will be used to verify project data. It applies to both field and laboratory records. Data verification is a completeness check to confirm that all required activities were conducted, all specified records are present, and the contents of the records are complete. As illustrated in the following example, verification often is performed at more than one step by more than one person.

Records Reviewed	Requirement Documents	Process Description	Responsible Person, Organization
Field logbook	QAPP, SOP Field 02	Verify that records are present and complete for each day of field activities. Verify that all planned samples including field QC samples were collected and that sample collection locations are documented. Verify that meteorological data were provided for each day of field activities. Verify that changes/exceptions are documented and were reported in accordance with requirements. Verify that any required field monitoring was performed and results are documented.	Daily - Project Manager At conclusion of field activities - Project QA Manager
Chain-of-custody forms	QAPP, SOP Field 02	Verify the completeness of chain-of-custody records. Examine entries for consistency with the field logbook. Check that appropriate methods and sample preservation have been recorded. Verify that the required volume of sample has been collected and that sufficient sample volume is available for QC samples (e.g., MS/MSD). Verify that all required signatures and dates are present. Check for transcription errors.	Daily - Field Crew Chief At conclusion of field activities - Project Chemist

Laboratory Deliverable	QAPP	Verify that the laboratory deliverable contains all records specified in the QAPP. Check sample receipt records to ensure sample condition upon receipt was noted, and any missing/broken sample containers were noted and reported according to plan. Compare the data package with the CoCs to verify that results were provided for all collected samples. Review the narrative to ensure all QC exceptions are described. Check for evidence that any required notifications were provided to project personnel as specified in the QAPP. Verify that necessary signatures and dates are present.	Before release – Laboratory QAM Upon receipt - Project Chemist
Audit Reports, Corrective Action Reports	QAPP	Verify that all planned audits were conducted. Examine audit reports. For any deficiencies noted, verify that corrective action was implemented according to plan.	Project QAM

QAPP Worksheet #36
Data Validation Procedures
(UFP-QAPP Manual Section 5.2.2)
(EPA 2106-G-05 Section 2.5.1)

This worksheet documents procedures that will be used to validate project data. Data validation is an analyte and sample-specific process for evaluating compliance with contract requirements, methods/SOPs, and MPC. The scope of data validation needs to be defined during project planning because it affects the type and level of documentation required for both field and laboratory activities. If data validation procedures are contained in an SOP or other document, the procedures should be referenced in this table and included as an attachment to the QAPP. The example provided below makes use of terminology contained in *Guidance for Labeling Externally Validated Laboratory Data for Superfund Use*, EPA 540-R-08-005, which was developed to promote the use of consistent terminology by external data reviewer to describe the scope and content of data review activities. The validation code and label identifier table, as well as any checklists to be used should be attached to the QAPP. Any data qualifiers to be applied by the data validator must be defined. Of particular importance, third party data validation should NOT include the rejection of data (noted by the designation of the "R" data qualifier). Data validation should note when performance criteria are not met but the final rejection of any data and their use is a decision reserved specifically for the project team.

Data Validator: ABC DV, Inc.

Analytical Group/Method:	Volatile Organics – SW-846 8260 (modified)	Metals – SW-846 6010
Data deliverable requirements:	SEDD Stage 3 plus chromatograms (pdf)	SEDD Stage 3
Analytical specifications:	WS 28-1, SOP VOA-02 (modified)	WS 28-2, SOP Met-03
Measurement performance criteria:	WS 12	WS 12
Percent of data packages to be validated:	100%	100%
Percent of raw data reviewed:	100%	0
Percent of results to be recalculated:	10%	0
Validation procedure:	EPA Region 11 VOA – Level 4	EPA Region 11 Met – Level 3
Validation code (*see attached table):	SV3EM	SV3E
Electronic validation program/version:	ABC DV Tool V2.2	ABC DV Tool V2.2

Validation Code and Label Identifier Table (To be attached to the QAPP)

Validation Code*	Validation Label	Description/Reference
S1VE	Stage 1 Validation Electronic	EPA 540-R-08-005
S1VM	Stage 1 Validation Manual	
S1VEM	Stage 1 Validation Electronic and Manual	
S2aVE	Stage 2a Validation Electronic	
S2aVM	Stage 2a Validation Manual	
S2aVEM	Stage 2a Validation Electronic and Manual	
S2bVE	Stage 2b Validation Electronic	
S2bVM	Stage 2b Validation Manual	
S2bVEM	Stage 2b Validation Electronic and Manual	
S3VE	Stage 3 Validation Electronic	
S3VM	Stage 3 Validation Manual	
S3VEM	Stage 3 Validation Electronic and Manual	
S4VE	Stage 4 Validation Electronic	
S4VM	Stage 4 Validation Manual	
S4VEM	Stage 4 Validation Electronic and Manual	
NV	Not Validated	

The following data qualifiers will be applied during data validation by a third party. Potential impacts on project-specific data quality objectives will be discussed in the data validation report.

NM – Measurement Performance Criteria contained in WS 12 were not met.
J – The result is an estimated value. The nature of the bias will be discussed in the data validation report.
E – Erroneous result (e.g., improper calculation, peak integration, etc.)