



U.S. Army

**Final  
RCRA Facility Investigation Work Plan  
for Site Investigation  
at the Small Arms Range Berm Area  
Site Identification No. FTSW-006-R-01  
Fort Stewart, Georgia**



IMA

**July 2015  
(Revision 2)**

**Submitted to:**

**Directorate of Public Works  
Environmental Division  
1550 Veterans Parkway, Building 1137  
Fort Stewart, Georgia 31314-4928**

**Submitted by:**

**U.S. Army Corps of Engineers  
Savannah District  
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**Prepared by:**

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1006 Floyd Culler Court  
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under  
Contract No. W912HN-10-D-0001  
Delivery Order No. 0025**

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**SIGNATURE PAGE**

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Delivery Order No. 0025**

**Completion of Senior Technical Review**

This document has been produced within the framework of SpecPro Environmental Services LLC's quality management system, which includes a senior technical review. This review covered all elements of the document, including the technologies proposed and their applications to project objectives. This review was conducted within the framework of U.S. Army Corps of Engineers regulations for the current project.



7/1/15

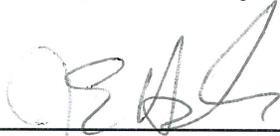
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Jeffrey C. Williams, PE  
Senior Project Manager

Date

**Completion of Independent Technical Review**

This document has been produced within the framework of SpecPro Environmental Services LLC's quality management system, which includes an independent technical review. This review covered assumptions, alternatives evaluated, the appropriateness of data used and level of data obtained, and the results, including whether the product meets the project objectives.



7/1/15

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Roy Hoekstra, PE  
Senior Program Manager/ Project Quality Control Specialist

Date

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## Acronyms and Abbreviations

AOC	area of concern
APP	accident prevention plan
bgs	below ground surface
BMP	best management practice
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CESAS	USACE Savannah District
COPC	contaminants of potential concern
DDESB	Department of Defense Explosives Safety Board
DPT	direct push technology
DPW	Directorate of Public Works
DQO	data quality objective
EDD	electronic deliverable data
EPA	Environmental Protection Agency
EPC	exposure point concentration
EPD	Environmental Protection Division
ERIS	Environmental Restoration Information System
ERT	Earth Resources Technology, Inc.
ESRI	Environmental Systems Research Institute
ESV	Ecological Screening Value
GIS	Geographic Information System
GPS	global positioning system
HHRA	human health risk assessment
HQ	hazard quotient
HRR	historical records review
ID	identification
IDW	investigative-derived waste
ISO	industry standard object
IVS	instrument verification strip
MDC	maximum detected concentration
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MILCON	military construction
MMRP	Military Munitions Response Program
MPPEH	material potentially presenting an explosive hazard
MS	matrix spike
MSD	matrix spike duplicate
OSHA	Occupational Safety and Health Administration
PDT	project delivery team
PM	project manager
POC	point of contact
PPE	personal protective equipment
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RPD	relative percent difference
RSL	Regional Screening Level
SES	SpecPro Environmental Services LLC

SLERA screening level ecological risk assessment  
SOW scope of work  
SPLP Synthetic Precipitation Leaching Procedure  
SSHO site safety and health officer  
SUXOS senior UXO specialist  
TP technical paper  
UPC Utility Protection Center  
USACE U.S. Army Corps of Engineers  
USAESCH U.S. Army Engineering Support Center, Huntsville  
USFWS U.S. Fish and Wildlife Service  
UXO unexploded ordnance  
UXOQCS UXO quality control specialist

# 1. INTRODUCTION

## 1.1 GENERAL INFORMATION AND PROJECT AUTHORIZATION

SpecPro Environmental Services LLC (SES) will conduct a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) for the U.S. Army Corps of Engineers (USACE) Savannah District (CESAS) at the Small Arms Range Berm Area site at Fort Stewart in Hinesville, Georgia. The work is being conducted as a performance-based task order under the Basewide Environmental Sustainment Support Contract (W912HN-10-D-0001, Delivery Order No. 0025).

Fort Stewart is a RCRA-permitted facility, but the Army also requires that Military Munitions Response Program (MMRP) sites comply with Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) requirements. The Georgia Environmental Protection Division (EPD) represents the state of Georgia as the primary regulatory agency for the site. Therefore, all activities also will be conducted in accordance with the regulations and published guidance documents of the Georgia EPD.

The Small Arms Range FTSW-006-R-01 was designated as an area of concern (AOC 5) during a permit modification approved by Georgia EPD in August 2007. This site is covered by Fort Stewart Hazardous Waste Facility Permit #HW-045(S), which requires Fort Stewart to properly manage the storage of hazardous wastes and to investigate and conduct corrective action at solid waste management units and AOCs. SES will follow all guidelines listed in the permit, including analyzing samples using the most appropriate methods listed in Appendix I of 40 *Code of Federal Regulations* 261, recording and reporting monitoring information related to sample collection and analysis, preparing an RFI work plan, and incorporating all permit-required elements into the RFI report.

This work plan applies to RFI activities within the Small Arms Range Berm Area and describes in detail the procedures, methods, organization, and resources that SES will use to achieve the project objectives described in the modified scope of work (SOW) dated August 7, 2013 (Appendix A). Previous Time Critical Removal Action investigations at the 287-acre site have identified lead, copper, and antimony as the contaminants of concern.

During the current investigation, SES will focus on 190 acres of the site, which have not been affected by military construction (MILCON), such as roads, parking areas, buildings, and other features where investigations are not permissible.

A meeting among Georgia EPD, Army Environmental Command, USACE Savannah District, Fort Stewart Directorate of Public Works (DPW), and SES to discuss recommendations for further action at the Small Arms Range site was held on February 15, 2012. The following recommendations were decided:

- A magnetometer survey;
- Further soil sampling for copper, antimony, and lead;
- Soil sampling for Synthetic Precipitation Leaching Procedure (SPLP); and
- Human health and ecological risk assessments.

These recommendations will be executed during the project covered by this work plan.

## 1.2 PURPOSE AND SCOPE

This work plan details the geophysical survey and further delineation of contaminants of potential concern (COPCs) antimony, copper, and lead for soil in 190 acres of the project site. The geophysical

survey will be conducted to identify the extent of potential small arms munitions and associated debris as part of an environmental and safety evaluation investigation. Lead and copper will be delineated to Fort Stewart background levels established in previous investigations. Fort Stewart has not established background levels for antimony; therefore, SES proposes to sample at the previous sampling locations that established the background concentrations for lead and copper to determine the antimony background concentrations. In addition, the delineation of COPCs will be evaluated using Environmental Protection Agency (EPA) Region 4 Screening Levels (RSLs). An RFI report will be developed documenting the results of the delineation. The RFI report will contain detailed documentation of all the work that has been completed and a human health and ecological risk assessment for the soil.

During this investigation, SES or its subcontractor will

- Conduct a magnetometer survey of the range area to identify the extent of possible small arms munitions and associated debris on site;
- Provide Geographic Information System (GIS) materials from the magnetometer survey;
- Collect two soil samples per location (surface and subsurface); samples will be analyzed for lead, copper, and antimony. Up to 400 soil samples will be collected from 200 direct push technology (DPT) soil borings. Samples will be collected from 0 to 6 inches and 2 to 4 feet below ground surface (bgs). Six samples will be collected, and SPLP will be performed to determine soil leachability;
- Sample the soil at four berms, which range from an estimated 560 feet to 670 feet in length and are 6 feet wide and 2 feet high. Up to 144 soil samples will be collected from 72 DPT soil borings. Samples will be collected from 0 to 6 inches and 2 to 4 feet bgs;
- Properly store and dispose of investigative-derived waste (IDW);
- Provide further delineation of the COPCs at the site, so an accurate assessment can be made using the EPA RSLs for Region 4 to select the appropriate method for assessing and evaluating subsurface soil constituents' leaching potential to groundwater; and
- Use the data collected to prepare an RFI report and a human health and ecological risk assessment.

### 1.3 WORK PLAN ORGANIZATION

This work plan is in general accordance with the instructions in Type I Work Plan for Munitions Response (MR-001), which requires the following elements:

- **Section 1 Introduction:** SES will conduct an RFI for the USACE Savannah District of 190 acres of the 287-acre Small Arms Range Berm Area. This work will be conducted under Contract No. W912HN-10-D-0001, Delivery Order No. 0025, and will include a magnetometer survey; soil sampling for copper, antimony, and lead; soil sampling for SPLP, and human health and ecological risk assessments.
- **Section 2 Technical Management Plan:** This project is being conducted to further delineate COPCs antimony, copper, and lead for soil in areas of the project site that have not been investigated. A magnetometer survey will be conducted to identify the extent of potential small arms munitions and associated debris. This project is being conducted for the USACE Savannah District. SES is the prime contractor, and Sterling Operations, a Georgia-licensed surveyor, Major Drilling, Empirical Laboratories, LLC, DataChek, and Brown and Caldwell are the subcontractors. As the prime contractor, SES will provide overall project management and coordination during field operations, including sampling, coordination of analytical samples, magnetic survey and clearance, coordination of subcontractors, documentation of field activities, and preparation of the RFI report.
- **Section 3 Field Investigation Plan:** SES subcontractor Sterling will conduct a magnetometer survey in support of the overall project goal of characterizing between 30 percent and 50 percent

of the 190-acre project site. SES will take 400 confirmatory soil samples from 200 soil borings at the Small Arms Range. One sample from each boring will be collected 0 and 6 inches and the other between 2 feet and 4 feet. Each sample will be analyzed for antimony, copper, and lead. In addition, SES will collect 144 samples from 72 soil borings at four berms to characterize the material. These samples will be analyzed for lead, copper, and antimony. SES will subcontractor Brown and Caldwell will use the information collected from field activities to conduct a screening level human health risk assessment (HHRA) in accordance with applicable regulatory guidance and policies. If the screening level HHRA indicates significant risks associated with one or more COPCs or if the Georgia EPD requests it, Brown and Caldwell will conduct a baseline HHRA. In addition, Brown and Caldwell will conduct a screening level ecological risk assessment in accordance with applicable regulatory guidance and policies.

- **Section 4 Quality Control Plan:** Sterling will conduct quality control by checking instrument repeatability, dynamic repeatability, geodetic equipment functionality, and geodetic repeatability. SES will record all original data from confirmatory soil sampling in field logbooks and on sample labels, chain of custody records, and receipt-for-samples forms.
- **Section 5 Environmental and Cultural Resources Protection Plan:** Fort Stewart has designated habitat management units to protect sensitive species; none of the habitat management units are in the project area. In addition, the probability of recovering prehistoric artifacts in the project area is low considering the previous use of the site. If prehistoric artifacts are discovered, the SES project manager will be notified, and he will notify the other necessary people. Sterling will only cut vegetation necessary to perform the magnetometer survey for this project. In addition, project activities will be conducted in a manner to prevent the discharge of pollutants into adjacent surface water and groundwater. Fuel will be stored in Occupational Safety and Health (OSHA)-approved containers in a designated storage area.
- **Section 6 Property Management Plan:** The field equipment to be used for this project will be owned or leased by SES or its subcontractor. No Government-furnished equipment will be used for this project.
- **Section 7 References;** and
- Appendices
  - Task order statement of work;
  - Site maps;
  - Local points of contact;
  - Contractor forms for collecting and recording quality control data, safety meeting attendance, names of site visitors, safety inspections, MEC operations daily report, explosives accountability, and work status spreadsheet;
  - Resumes; and
  - Accident prevention plan.

These elements, which are included in MR-001, do not apply to this specific project; therefore, they have been eliminated:

- Explosives management plan,
- Explosives siting plan,
- Interim holding facility siting plan,
- Physical security plan, and
- These appendices
  - Munitions constituents sampling and analysis plan,
  - MSD calculation sheets, and
  - Technical project planning worksheets.

The site maps and other figures have been inserted into the work plan on the page following their introduction. The accident prevention plan (APP) is in Appendix F.

## **1.4 SITE LOCATION**

Fort Stewart occupies approximately 280,000 acres in portions of Long, Evans, Tattnall, Bryan, and Liberty counties, Georgia, approximately 40 miles southwest of Savannah, Georgia. The nearest city is Hinesville, approximately 1½ miles to the south. The Small Arms Range Berm Area is near 15th Street, approximately 300 feet from the rear of Building 1805 (Figure 1-1). This range consists of approximately 287 acres used for small arms training during the 1940s and 1950s. According to historical documents, small arms of .50 calibers or less were used on the range (ARCADIS/ Malcolm Pirnie, Inc., September 2011).

## **1.5 SITE HISTORY AND PREVIOUS INVESTIGATIONS**

### **1.5.1 Fort Stewart**

Construction of the reservation that was to become Fort Stewart began on September 10, 1940, on what was formerly the Camp Savannah Anti-Aircraft Firing Center. On November 18, 1940, the reservation's name was changed from Camp Savannah to Camp Stewart in honor of Revolutionary War Brigadier General Daniel Stewart. The reservation was established as an anti-aircraft center with facilities to prepare artillery troops for overseas deployment. The reservation's mission of training anti-aircraft units ended on November 20, 1944, and all training terminated in December 1944. Army ground force units were to have departed by April 30, 1945. A prisoner-of-war camp operated at the reservation was also closed. The reservation's mission was reestablished as a separation center for redeployed troops from August 6, 1945, until September 2, 1945. On September 30, 1945, Camp Stewart was inactivated, and the reservation became a training location for the Georgia National Guard [Earth Resources Technology, Inc. (ERT), November 2012).

With the outbreak of hostilities in Korea in June 1950, Camp Stewart was reactivated on August 9, 1950, and was designated the 3rd Army Anti-Aircraft Artillery Training Center. In 1953, armor and tank training were added to the mission of the reservation. On March 21, 1956, Camp Stewart was redesignated Fort Stewart and became a permanent Army installation. In 1959, Fort Stewart became an armor and artillery firing center. Troop training at Fort Stewart peaked in 1961 and 1962 in response to the Berlin and Cuban crises, respectively. The 1st Armored Division was relocated to the reservation during the Cuban crisis (ERT, November 2012).

In response to a need for more helicopter and light fixed wing aircraft in support of the Vietnam conflict, an element of the U.S. Army Aviation School at Fort Rucker, Alabama, was transferred to Fort Stewart in 1966. Helicopter pilot training and helicopter gunnery courses became the new mission for Fort Stewart. In 1967, the main mission for Fort Stewart was to train Army aviators. The reservation was also used to maintain readiness for other active duty, Reserve, and National Guard personnel. In 1970, Vietnamese helicopter pilots began training at Fort Stewart. Aviation training at Fort Stewart was phased out in 1973, when all aviation training was consolidated at Fort Rucker. By 1974, Fort Stewart had become a training and maneuver area, providing tank, field artillery, helicopter gunnery, and small arms training for regular Army and National Guard units. Fort Stewart supported training by providing facilities, conducting training opportunities, and assisting in mobilizing and deploying troops (ERT, November 2012).

The current mission of Fort Stewart is to sustain a quality of life and reservation support at the level necessary for divisions and nondivisional, tenant, and Reserve units to accomplish their training missions.

The Small Arms Range at Fort Stewart consists of 287 acres. As part of this project, SES will investigate 190 acres of the Small Arms Range that have not been affected by military construction (MILCON) and determine the nature and extent of potential munitions and MEC hazards, determine the potential risks posed to human health and the environment from MEC, and collect or develop additional data for a Corrective Action Plan, as appropriate, to determine corrective measures, including no further action. The remaining area of the Small Arms Range has already been investigated

### **1.5.2 Small Arms Range**

The Small Arms Range consists of approximately 287 acres that were used for small arms training during the 1940s and 1950s. The range has four berms between 560 feet and 670 feet long by 6 feet wide by 2 feet high. According to historical documents, small arms of .50 caliber or less were used on the range (ARCADIS/Malcolm Pirnie, Inc., September 2011). For this project SES will investigate the 190 acres of the Small Arms Range that have not been affected by MILCON. The Small Arms Range is composed of the firing points of four small arms ranges and the downrange area of Range M. The Small Arms Range had previously been thought to include the HBANM Range; this range was proposed in the early 1940s but never constructed. However, individual ranges named H, B, A, N, and M were constructed in 1943. Ranges A, N, and M overlap each other (Figure 1-2). Possible and confirmed munitions used at the site include 9 mm projectiles, 25 mm cartridges, .22 cal, 0.30 cal, 0.45 cal, 0.50 cal, and 105 mm projectiles. H and B ranges are not within the footprint of this site.

Work has been conducted at the 287-acre site since 2008 to support MILCON activities. Previous investigations and other work include the following:

- In 2008 Fort Stewart transferred the berm at Range M for best management practices (BMPs).
- The USACE Savannah District conducted soil, sediment, groundwater, and surface water sampling in August 2008 of the former berm area at Range M.
- SES conducted soil, sediment, groundwater, and surface water sampling from October 2009 through February 2010 at the former berm area associated with Range M.
- In August 2010, SES removed 1,047 tons of contaminated soil from the former berm area associated with Range M and the remnants of a soil pile left from the 2008 berm removal.
- Malcolm Pirnie conducted Phase 2 confirmatory sampling in August 2010 of the entire 287 acres of the former Small Arms Range.
- In September 2010, SES sampled soil to support a sanitary sewer line that was installed in a portion of the former Small Arms Range.

In 2008, Fort Stewart transferred the berm at Range M for BMPs, and the material was placed at an active berm at the Installation.

In August 2008, the USACE Savannah District conducted soil, sediment, groundwater, and surface water sampling to test for possible contamination before requesting bids on a construction project in the area. This was a limited screening-level investigation focusing on COPCs antimony, copper, and lead. The USACE Savannah District collected 19 soil samples, three sediment samples, eight groundwater samples, three surface water samples, and associated quality assurance (QA)/ quality control (QC) samples. COPCs were detected in soil, sediment, and groundwater samples, which led to the recommendation for further investigation at the site (USACE Savannah District, October 2008).

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Between October 2009 and February 2010, SES conducted soil, sediment, groundwater, and surface water sampling at the site. Three soil and six sediment samples collected in October 2009 exceeded the EPA Residential RSLs for Region 4. Groundwater samples from five wells and two surface water samples exceeded EPA Regional Groundwater Screening Levels. Surface water samples from seven locations collected in January 2010 exceeded the EPA Regional Groundwater Screening Levels. All soil and sediment samples collected in February 2010 were below applicable screening levels (SES, November 2012).

The October 2009 soil sampling event indicated elevated levels of lead in the former berm and ditch area. In preparation for impending construction, SES excavated the former berm and ditch area to remove lead-contaminated surface soil on August 8, 2010. An excavated area of soil measuring 478 feet by 20 feet by 1 foot was removed. SES collected five confirmatory soil samples and five confirmatory sediment samples for areas identified during the October 2009 sampling event; all samples were below the EPA Residential RSL for lead. In addition, SES separated small arms projectiles from a soil pile from the initial 2008 berm removal and then disposed of the remaining soil pile (SES, November 2012).

In August 2010, Malcolm Pirnie conducted MMRP RCRA Phase 2 Confirmatory Sampling after Fort Stewart expanded its cantonment area and redesigned 4,240 acres of its operational footprint. A historical records review (HRR) conducted as part of the project identified four sites – Anti-Aircraft Range-4, Anti-Tank Range 90-MM-2, Grenade Launcher Range, and Small Arms Range-2 – as the basis for the Phase 2 Confirmatory Sampling report. The HRR indicated munitions used on the range were .50 caliber or less; however, the exact calibers are unknown. Archival documents from 1941 show the use of .30 caliber and .50 caliber machine guns on Fort Stewart. Therefore, it is assumed that .30 caliber and .50 caliber small arms were used on this Small Arms Range. Malcolm Pirnie did not conduct any MEC field activities at the Small Arms Range because historical evidence indicated only small arms were used there. Malcolm Pirnie collected 10 discrete surface soil samples, six of which were from Range N. None of the samples exceeded the EPA RSL for lead; three samples and one duplicate exceeded the Fort Stewart background levels for lead and the EPA Region 4 Ecological Screening Value (ESV) for lead in surface soil. Two samples were analyzed for aluminum, antimony, copper, and zinc, none of which exceeded the applicable EPA Region 4 ESVs or the EPA RSLs. No explosives were detected above laboratory detection or method reporting limits in the two samples analyzed (ARCADIS/ Malcolm Pirnie, September 2011).

Between August 24 and September 14, 2010, SES installed 276 soil borings in the wooded area northwest of the former berm to identify contamination that could impact impending construction (including the installation of a sanitary sewer line) and overall land use change. Antimony was not detected in any samples. Copper detections ranged from an estimated 0.779 mg/kg to 31.8 mg/kg. Lead detections ranged from an estimated 0.303 mg/kg to an estimated 1,910 mg/kg. The 1,910 mg/kg result was the only sample that exceeded the EPA RSL of 400 mg/kg (SES, November 2012).

A time critical removal action for the “hot spot” of lead contamination was performed in the area of the 1,910 mg/kg exceedance. On September 10, 2010, SES removed a 5-foot-by-6-foot area centered around the soil boring to a depth of 2 feet. The excavated soil was placed in two 55-gallon drums and stored until laboratory analyses had classified the soil as nonhazardous for off-site disposal. Confirmatory soil samples were collected from two side walls and the bottom of the excavation. The analytical results indicated that one sample result (803 mg/kg) exceeded the EPA RSL of 400 mg/kg for lead (SES, November 2012).

Therefore, on March 8, 2011, SES removed a 5-foot-by-7-foot area to a depth of 2 feet centered on the sample location that exceeded the EPA RSL. The excavated soil was placed into three 55-gallon drums and stored until laboratory analyses had classified the soil as nonhazardous for off-site disposal.

Confirmatory soil samples were collected from two side walls and the bottom of the excavation. The analytical results indicated all results were below the EPA RSL (SES, November 2012).

## **1.6 ENVIRONMENTAL SETTING**

Fort Stewart, comprising about 280,000 acres, is bordered to the north and south by agriculture and wetlands, to the east by the Ogeechee River, and to the west by agricultural lands. The nearest cities are Hinesville, next to the southern boundary and cantonment area; Richmond Hill, 1 mile east of the eastern boundary; Pembroke, 2 miles north of the northern boundary; Glennville, on the western boundary; and Savannah, about 41 miles to the northeast. Fort Stewart is in the Coastal Marine Flatlands region of the Atlantic Coastal Plain physiographic province, which is characterized by flat land areas with an average slope of less than 3 percent. The Coastal Marine Flatlands region's land surface consists of rolling terraces gently rising east to west. These terraces are separated by broad, low-lying areas with poor drainage. Elevations at Fort Stewart average 33 feet above sea level east of the Canoochee River with a peak elevation of 183 feet above sea level near the western boundary (ERT, November 2012).

Fort Stewart is a large, mostly undeveloped Installation with more than 87 percent (243,000 acres) comprised of upland forest or forested wetlands and the remaining 13 percent (37,000 acres) comprised of open areas, including the cantonment area, ranges, and impact areas. The cantonment area is the living and working portion of Fort Stewart (ERT, November 2012).

The bedrock in the area surrounding Fort Stewart is composed primarily of rock formations ranging from the Precambrian (greater than 570 million years old) to Triassic (205 to 240 million years old) ages. This local bedrock is overlain with thick wedges of unconsolidated and partially consolidated sediments (ERT, November 2012).

Most of the soil at Fort Stewart is classified as sandy and infertile. Soils in low-lying, poorly drained areas are high in organic matter and can remain saturated with water for eight months or more every year. On a broad scale, Fort Stewart has four types of ecosystems: sandhills, pine flatwoods, upland forests, and wetlands (ERT, November 2012). Wetlands are mainly of the bottomland hardwood variety with mixed types of vegetation and only occasional flooding. Isolated cypress ponds also occur.

Four watersheds occur within Fort Stewart's boundaries: the Altamaha, Canoochee, Lower Ogeechee, and Ogeechee Coastal watersheds. Most of Fort Stewart is in the Canoochee River Watershed. Fort Stewart has about 265 miles of freshwater rivers and streams and an additional 12 miles of brackish water streams (ERT, November 2012).

Deeper groundwater wells are used as drinking water sources for Fort Stewart, which has 31 groundwater wells, five of which are used to supply water through the distribution system to the cantonment area. The cantonment area wells range from 500 feet to 800 feet deep and are cased to depths of 400 to 470 feet. The potable water capacity from the five active wells is approximately 10.4 million gallons per day (ERT, November 2012).

## **1.7 INITIAL SUMMARY OF RISK FROM MUNITIONS AND EXPLOSIVES OF CONCERN**

Because of the nature of small arms ammunition, MEC are not typically expected. However, there have been two explosive ordnance disposal responses to the site: a 105 mm projectile was found in April 2003 and an unidentified munitions item found in October 2008 (ARCADIS/ Malcolm Pirnie, September 2011). Additional details about these responses are unavailable.

Two munitions debris were observed during magnetometer-assisted visual survey conducted by Malcolm Pirnie: a 9 mm projectile and an expended 25 mm cartridge. The 9 mm projectile was near the southernmost berm of Range N at a presumed firing point. The expended 25 mm cartridge was likely disposed from a Bradley fighting vehicle on the opposite side of the adjacent motor pool fence (ARCADIS/ Malcolm Pirnie, September 2011).

Currently, land use controls in the forms of signs and public education are being used around Fort Stewart. Examples of signs at the Small Arms Range Berm Area are in Photographs 1-1 and 1-2.



**Photograph 1-1 Example of warning sign at Fort Stewart Small Arms Range Berm Area.**



**Photograph 1-2 Example of warning sign at Fort Stewart Small Arms Range Berm Area.**

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## **2. TECHNICAL MANAGEMENT PLAN**

### **2.1 PROJECT OBJECTIVES**

This work plan details the magnetometer (magnetic) survey and further delineation of COPCs antimony, copper, and lead for soil in areas of the project site that have not been investigated. The magnetic survey will identify the extent of potential small arms munitions and associated debris as part of an environmental and safety evaluation investigation. The delineation of COPCs will be evaluated using EPA RSLs. An RFI report will be developed documenting the results of the delineation. The RFI report will contain detailed documentation of all the work that has been completed and a human health and ecological risk assessment for the soil.

### **2.2 PROJECT ORGANIZATION**

This project is being conducted for the USACE Savannah District by SES, the prime contractor. SES will oversee subcontractors that will conduct specific portions of the work. Figure 2-1 is the project organizational chart.

#### **2.2.1 U.S. Army Corps of Engineers**

The USACE CESAS is the overall project manager for the Small Arms Range project. Ana del R. Vergara is the district PM. The CESAS is responsible for leading and facilitating the project delivery team (PDT) toward effective project development and execution. CESAS is responsible for overall project administration and technical management services, including contracting and procurement, submittals management, cost and schedule management, and technical oversight.

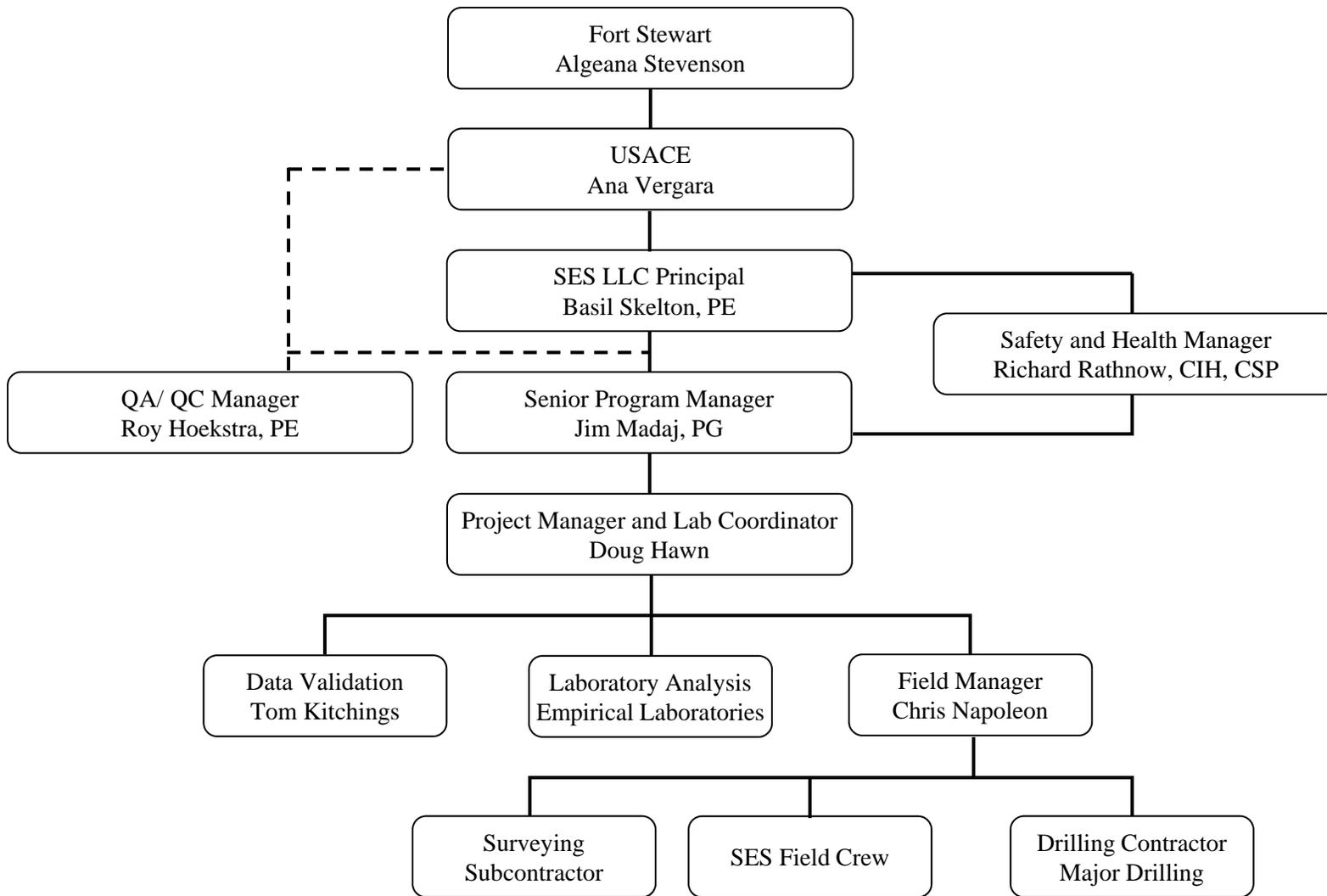
#### **2.2.2 SpecPro Environmental Services**

SES is the environmental contractor and will provide overall project management and coordination during field operations, including sampling, coordination of analytical samples, magnetic survey and clearance, coordination of subcontractors, documentation of field activities, and preparation of the RFI report. SES's senior program manager is Jim Madaj. The PM is Doug Hawn. He is supported by key personnel who are responsible for completing each of the required elements related to their respective technical areas.

#### **2.2.3 Subcontractors and Subcontractor Management**

SES subcontractors will provide the following services, as necessary:

- Sterling Operations will conduct the magnetometer survey and escort field workers during sampling and other field activities.
- A Georgia-licensed surveyor will install benchmarks and base stations as needed.
- Major Drilling will provide drilling services.
- Empirical Laboratories, LLC will analyze soil samples.
- DataChek will provide data validation services.
- Brown & Caldwell will use the validated data to conduct a human health and ecological risk assessment, which will be included in the RFI report.



Prepared for: USACE, Savannah District  
Job Title: Site Investigation Small Arms  
Range Berm Area  
Fort Stewart, Georgia

Figure 2-1 Organizational Chart

SES has subcontracted with Empirical Laboratories, LLC for laboratory analysis of soil samples. Empirical Laboratories is accredited in accordance with the National Environmental Laboratory Accreditation Conference and certified to perform the specified methods by the National Environmental Laboratory Accreditation Program and Department of Defense Environmental Laboratory Accreditation Conference, in compliance with the *Department of Defense Quality System Manual*. Empirical Laboratories will furnish all labor, tools, equipment, supplies, material, and licenses and will perform all technical, professional, supervisory, QC, and other services necessary to complete the analytical services. Invoices will be submitted to SES after the required analytical work is complete and data have been satisfactorily validated. SES PM Doug Hawn will be the point of contact (POC) with the laboratory.

SES has also subcontracted data validation services with DataChek. SES PM Doug Hawn will be the POC with DataChek.

Additional services may be subcontracted as required. For example, if the PDT determines groundwater wells are needed after the geophysical investigation results are discussed, a local driller with experience at Fort Stewart or in the surrounding area will be subcontracted for these services.

## **2.3 SES PROJECT PERSONNEL**

### **2.3.1 Project Team**

Key SES project personnel have served in their proposed capacity on numerous other similar CERCLA, RCRA, and National Oil and Hazardous Substances Pollution Contingency Plan (NCP) projects.

### **2.3.2 Project Manager**

SES PM Doug Hawn will be the direct POC for USACE. He is responsible for managing each requirement of the project, overseeing the performance of each individual on the project team, coordinating contract work, and overseeing specific task identification and resolutions. The PM will also schedule field efforts, identify field personnel to accomplish the specific project tasks as defined in this work plan, implement project QC and safety procedures, and direct personnel to achieve successful and timely completion of the project tasks. The PM will promptly implement approved and authorized changes to ongoing work orders as necessary.

### **2.3.3 Site Manager**

The site manager for this project is Chris Napoleon. He will coordinate all field efforts and on-site subcontractors while reporting back to the SES PM.

### **2.3.4 Site Safety and Health Officer**

The site safety and health officer (SSHO) for this project is LeAnn McNeal. She will ensure that procedures developed in the work plan and APP/ site-specific safety and health plan are safe and that all safety processes and procedures are implemented in the field. The SSHO will be responsible for safety audits.

### **2.3.5 Project Quality Assurance/ Quality Control Manager**

The project QA/QC manager is Roy Hoekstra, PE. He will provide analytical laboratory oversight, technical support to the field sampling teams, and will review analytical results.

## **2.4 SUBCONTRACTOR PERSONNEL**

### **2.4.1 UXO Personnel**

Unexploded ordnance (UXO) teams from Sterling will consist of qualified personnel per Department of Defense Explosives Safety Board (DDESB) Technical Paper (TP) 18. The field teams will consist of qualified UXO personnel and UXO technicians, including the senior UXO specialist (SUXOS), UXO quality control (UXOQC)/ safety officer (SO), and UXO Technicians III, II, and I. UXO Technicians I may be used to identify potential MEC and anomalies under the direct supervision of UXO-qualified personnel per DDESB TP 18. UXO personnel fall under the direct supervision of the SUXOS. For this project, the site safety and health officer (SSHO) position is the same as the UXOSO. The SSHO is qualified per EM 385-1-1 criteria.

The positions of the UXOSO and UXOQC will be dual-hatted per USACE Engineering Pamphlet 1110-1-18; this position will be referred to as the SSHO/UXOSO-QC in this document.

## **2.5 FEDERAL, STATE, AND LOCAL AGENCIES**

The lead regulatory agency involved in this project is the Georgia EPD, which will provide technical input and review the work plan and the RFI report.

## **2.6 STAKEHOLDERS**

Stakeholders in addition to the USACE, Georgia EPD, and other Army stakeholders include

- Fort Stewart staff,
- Installation Management Command, and
- U.S. Army Environmental Command.

## **2.7 PROJECT DELIVERABLES**

### **2.7.1 Monthly Progress Reports**

The actual progress of work will be updated and submitted by the fifth of each month and may be included with the request for payment. Progress charts must be revised to reflect modifications and other approved changes in scheduling. Along with the progress chart, a monthly progress report, including the period of performance end date for this delivery order, will be provided to the USACE project manager in letter form. The letter will outline the progress during the past month and the anticipated work effort for the next month. All progress reports and schedules will be submitted via electronic mail.

### **2.7.2 Resource Conservation and Recovery Act Facility Investigation Report**

SES will submit a draft RFI report to USACE Savannah District and Fort Stewart Environmental Division. The RFI report will include a human health risk assessment, an ecological risk for surface and subsurface soil, and recommendations for future actions concerning other environmental media, such as

groundwater and surface water. All copies (draft, final, and revised final) will be certified by a Professional Geologist or Professional Engineer. All submittals for review will include a cover letter stating the project title, contract and delivery order numbers, phone numbers for points of contact and USACE, and the dates by which the comments are to be received from the USACE. SES will coordinate the cover letters with the USACE.

Draft, final, and revised final copies of the work plan and RFI report will be submitted to the following addresses.

<b>Addresses</b>	<b>Copies of Reports (Hard Copies and Compact Discs)</b>		
	<b>Draft</b>	<b>Final</b>	<b>Revised Final</b>
U.S. Army Corps of Engineers P.O. Box 889 Savannah, Georgia 31401	2	2	2
Department of the Army HQ, 3d Infantry Division (Mechanized) & Fort Stewart Directorate of Public Works 1550 Veterans Parkway, Building 1137 Fort Stewart, Georgia 31314	2	4 hard copies 2 electronic copies	4 hard copies 2 electronic copies

**2.7.3 Electronic Deliverables**

SES will provide electronic deliverable data (EDD) for the analytical data in an Environmental Restoration Information System (ERIS) format; SES will load the EDD containing the analytical data relevant to the sampling conducted under this SOW into the ERIS database.

**2.8 COSTING AND BILLING**

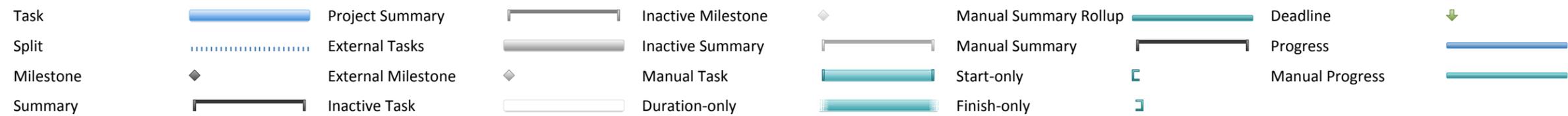
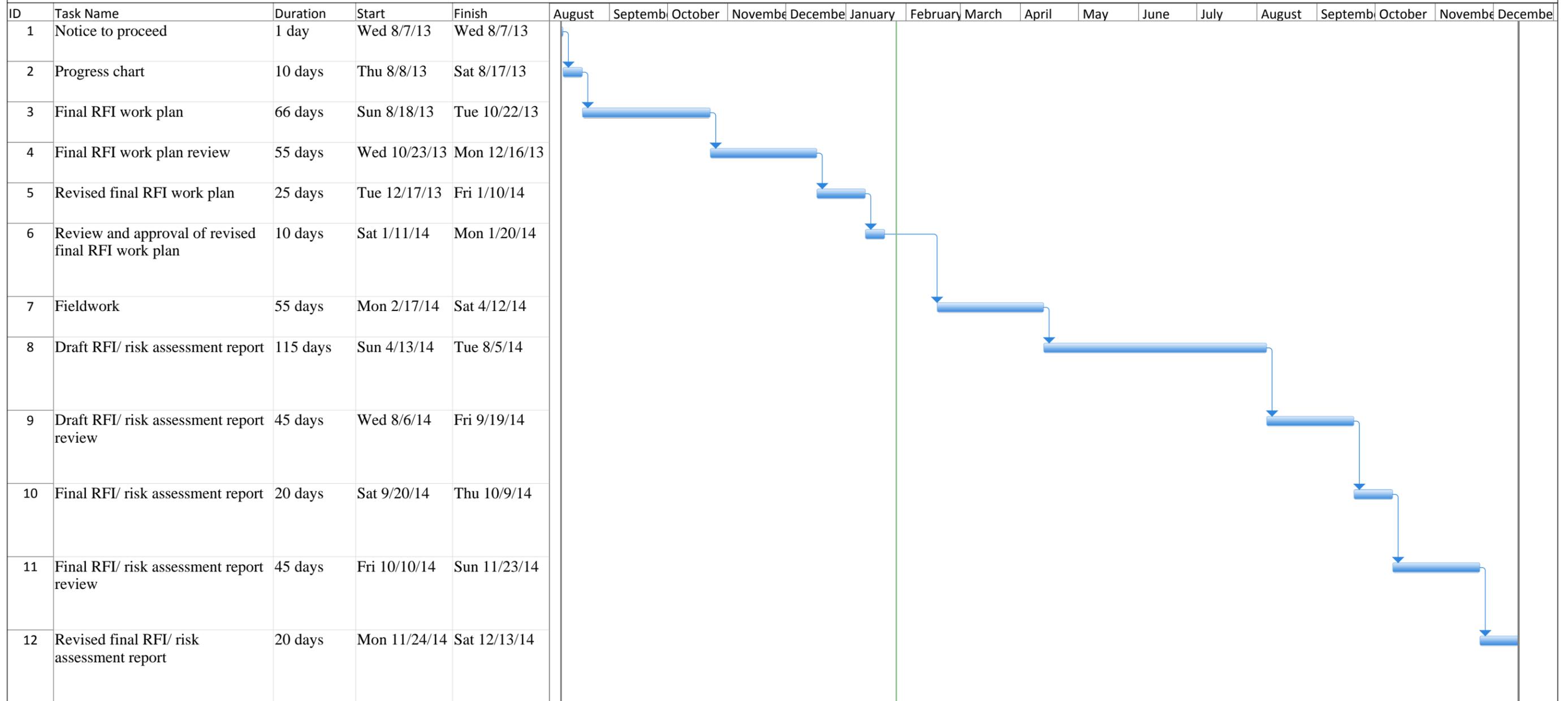
This is a firm fixed price payment project, and milestones are shown in the project schedule (Figure 2-2). The milestone payment plan provides discrete and measurable elements and activities associated with project progress. SES will invoice USACE based on these milestones as approved by the contracting officer’s representative. In addition to all contract-required documentation, the SES PM will provide summary information that supports each invoice submitted to the USACE for review. This summary information will be presented on ENG FORM 93-1.

**2.9 PROJECT COMMUNITY RELATIONS SUPPORT**

Fort Stewart will take the lead on communications with the public. SES will provide the necessary support to initiate, schedule, and address each public participation aspect of the project (preparing briefings, presentations, fact sheets, and public notices to the news media).

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**Site Investigation  
Small Arms Range Berm Area  
Site Identification No. FTSW-006-R-01  
Fort Stewart, Georgia**



**Figure 2-2 Project Schedule**

### **3. FIELD INVESTIGATION PLAN**

#### **3.1 MAGNETOMETER SURVEY**

##### **3.1.1 Overall Approach to the Site Investigation**

This section describes the approach, methods, and operational procedures SES subcontractor Sterling will use to perform a site investigation of the Fort Stewart Small Arms Range Berm area in accordance with traditional MMRP investigation techniques. A site investigation report addressing MEC and assessing the site regarding any material potentially presenting an explosive hazard (MPPEH) issues that could affect future operations will be developed after fieldwork. The project site has been divided into seven investigative areas to facilitate the transect design (Figures 3-1 and 3-2).

##### **3.1.2 Magnetometer Survey Goals**

In support of the overall project goal of characterizing between 30 percent and 50 percent of the 190-acre project site, the MEC investigation is intended to discover whether MEC is present within the project investigation site. Most of the area to be investigated is covered with dense vegetation, making it impossible to characterize 100 percent of the area without fully clearing it of vegetation first. The client, USACE Savannah District, determined that 30 percent to 50 percent is achievable. Because the former Small Arms Range area is being considered for industrial construction, after specific areas have been identified for projects, a more detailed characterization for MEC will be planned if needed.

If MEC is discovered on the site, Sterling will determine the nature and extent of MEC contamination to the degree possible with the allocated transects per the proposal. If MEC is found, Sterling will mark, log, and report each finding to SES management for further action. Sterling will not remove or dispose of any MEC.

##### **3.1.3 Mobilization/ Demobilization Plan**

This section lists some of the activities necessary to mobilize personnel and equipment and the activities needed to demobilize at the end of the fieldwork.

###### **3.1.3.1 Mobilization**

Activities before mobilization include, but are not limited to,

- Personnel medical preparations,
- Confirmation of personnel qualifications,
- Personnel travel and security briefings,
- Personnel training on designated equipment and rehearsals,
- Equipment functionality checks,
- Securing travel and billets, and
- Securing materials and equipment shipping logistics details.

Mobilization activities include, but are not limited to,

- Confirming the project site is accessible,
- Shipping material and equipment, and
- Deploying the field team.

### **3.1.3.2 Demobilization**

Demobilization activities include

- Confirming demobilization is authorized, Preparing the site for the demobilization inspection,
- Shipping material and equipment, and
- Redeploying the team.

### **3.1.3.3 Equipment and supplies**

Equipment may include, but is not limited to, analog instruments, documents, medical supplies, safety equipment, global positioning system (GPS) units, communications equipment, flagging, engineer tapes, etc. Some supplies and expendables will be purchased locally (such as marking paint, ice, work gloves, ropes, etc.). The primary pieces of equipment are the Schonstedt GA-52Cx magnetometer and the Archer XF 101 GPS receiver.

- Schonstedt GA-52Cx (Schonstedt): The Schonstedt magnetometer is a handheld unit that uses two flux-gate sensors mounted a fixed distance apart to detect changes in the earth's ambient magnetic field caused by ferrous metal. The Schonstedt magnetometer emits a sound when either sensor detects a ferrous metal target. It is an analog instrument generally used for "Mag and Dig" clearances and/or QC checks of previously conducted anomaly investigations. The Schonstedt will serve as the sensor for this project.
- Archer XF 101 Rugged Handheld (Archer): The Archer XF101 is a handheld GPS receiver. The Archer can collect real-time GPS positions or be post-processed to enhance position accuracy. The Archer will serve as the primary navigation device for this project.

### **3.1.3.4 Training and briefings**

In addition to training before mobilization, field personnel will require on-site equipment refresher training, immediate action procedures, local species environmental orientation, and documentation procedures training. Additionally, the site management team will conduct daily safety briefings, including MEC procedures.

### **3.1.4 Communications**

Mobile phones will be the primary means of on-site communications. Back-up communications will be handheld radios.

### **3.1.5 Instrument Verification Strip Plan**

The instrument verification strip (IVS) validates the geophysical data and documents the detection capabilities of the magnetometers. Collection methodologies and procedures will be evaluated for effectiveness during the establishment of the IVS.

The Schonstedt GA-52Cx magnetometer will be validated by installing and surveying the IVS, which will be in the project area and will emulate site conditions. This plan describes the approach, methods, and operational procedures Sterling will use to demonstrate and document the site-specific capabilities of the proposed sensors, navigation equipment, and associated equipment and personnel.

### 3.1.5.1 IVS design

The field team will determine the location of the IVS and the seed items in the field. The IVS is approximately 30 feet long. The end points of the IVS and the locations of the seed items will be recorded with a GPS, and the end points will be marked. The proposed plot of the IVS is in Figure 3-3.

- The selected area will have geology, soil type, and topography representing actual field conditions where field operations will be conducted.
- The area will be readily accessible.
- The area will be as free as possible from utilities (both aboveground and belowground) and other manmade structures.

Sterling personnel will follow these steps to occupy the IVS site, so the test plot duplicates site conditions as closely as possible:

1. Sterling will remove any vegetation limiting access to the IVS.
2. A UXO-qualified person will visually survey for surface ordnance before personnel enter an area potentially contaminated with MPPEH. Subsequently, UXO-qualified personnel will perform a surface clearance of metallic contamination in the test plot with a metal detector to ensure the site is free of anomalies before items are placed.
3. Baseline geophysical conditions will be documented by using the geophysical instruments and positioning methods to survey the IVS before seed items are buried. This survey will also ensure that seed items are not buried in an area that already has anomalies. Then the location of all subsurface anomalies and prominent geology will be marked. Any anomalies identified during the background survey will be investigated and removed if possible. Industry standard objects (ISOs) will be placed in holes, marked with an identification tag, and buried. These ISOs emulate common munitions items and will be placed far enough from each other to eliminate masking and prevent interference. The GPS will be used to survey the horizontal coordinates of the center of each seed item. The depth of burial will be measured from the ground surface to the center of each seed item. Table 3-1 lists proposed buried items, their orientation, and the depth at which they will be buried.

**Table 3-1 Inert Ordnance for Test Plot Seeding**

ID Number	Seed Item	X (Easting)	Y (Northing)	Orientation	Depth (inches)
S1	Small ISO (worst orientation)	*	*	Horizontal EW	14**
S2	Medium ISO (worst orientation)	*	*	Horizontal EW	26**
S3	Large ISO (worst orientation)	*	*	Horizontal EW	49**
IVS Start Point	Start Point	*	*		
IVS End Point	End Point	*	*		

\*To be determined by site personnel based on field conditions.

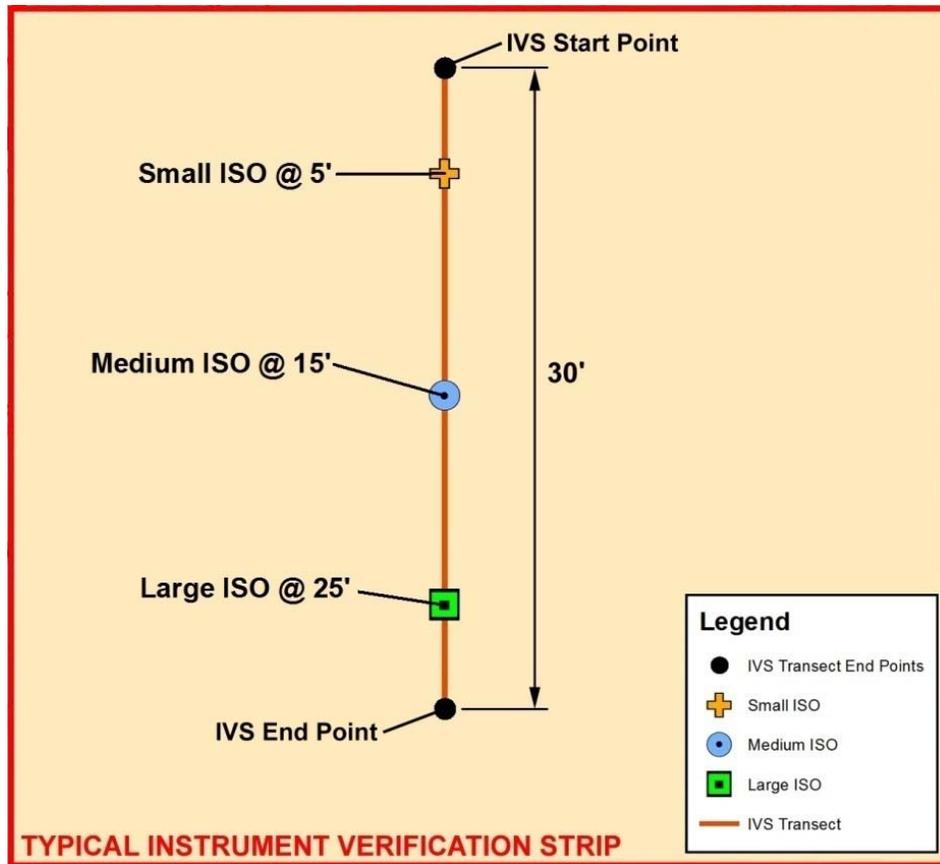
\*\*The depths of the seeds will be adjusted during the construction of the IVS to ensure the proposed detection instruments will be able to detect items at the maximum depth detection capability of the instruments.

ID = identification

ISO = industry standard object

IVS = instrument verification strip

4. Magnetometers will be tested daily at the IVS. Both the operator and the instrument will pass the test when the operator successfully detects seed items buried in the IVS.
5. All personnel must remove magnetic accessories before the test.
6. Data will be collected using the same instruments and methods as during the project.



**TYPICAL INSTRUMENT VERIFICATION STRIP**

**Figure 3-3 Proposed Instrument Verification Strip**

### **3.1.6 Site Investigation Plan**

Transect lines will cover up to 50 percent of the 190-acre investigation area. The Schonstedt will locate and identify anomalies of interest. The transect paths will be subdivided into 200-foot segments, and each end point will be marked with the Archer GPS. The operator will sweep the magnetometer from side to side over each 5-foot wide area while the field team proceeds along the transect path. Any subsequent anomalies of interest in the 200-foot transect will be counted and used to determine an anomaly density for the transect segment. The proposed transect locations for these areas are shown on Figure 3-2.

The 190-acre area will be subdivided into seven areas as shown on Figure 3-2. The routes shown on Figure 3-2 may change slightly as site conditions require. Sterling will remove limited vegetation as needed from the work sites, so teams can properly use the Schonstedt.

ISOs resembling historic small arms range items will be used in the IVS to account for the various MEC types possibly on site. The proposed geophysical survey instruments can detect items up to approximately 4 feet bgs. If a UXO item is located, the UXO technician will identify the item if possible, and the UXO Technician III will confirm it. If the item cannot be identified, the SUXOS and/or the UXO safety officer/ UXOQCS will be notified and requested to assist in identification. If Sterling cannot positively identify the item, the Fort Stewart project manager will be notified. Any UXO items will be marked, recorded, and reported to SES management. Sterling will mark, log, and report any MEC encountered to SES; the MEC will not be disposed of.

#### **3.1.6.1 Site obstructions**

Sterling will circumvent obstructions, dense vegetation, creek/ drainage areas, and refuse piles during fieldwork. There are no known geophysical conditions that will have an adverse effect on the geophysical surveys. Site utilities are not expected to affect analog geophysical data.

Interference from manmade objects is expected to be low; however, residual range and berm construction materials will present potentially higher geophysical anomaly counts.

#### **3.1.6.2 Equipment**

- The Archers handheld GPS will be used to establish known points for the transect investigation design and to mark suspected anomalies and MEC items if found.
- Schonstedt magnetometers, which are portable, will be used for the magnetometer survey and UXO avoidance. Alternative handheld metal detectors may be used in areas with strong cultural interference (such as around buildings).

#### **3.1.6.3 Analog data collection**

Sterling will survey 5-foot wide transects spaced from 10 feet to 20 feet apart throughout the area. The 10-foot spacing will be applied to the general berm area. The SUXOS will lead the analog data acquisition teams to ensure high-quality data is collected. The Archer is the primary positioning tool. The analog collection teams will survey the transect paths as close to proposed paths as possible (circumventing site obstacles as necessary).

At the end of each day of fieldwork, the Archer positional data will be downloaded to the on-site computer and transmitted to Sterling's main office in Lenoir City, Tennessee, for evaluation and input into project databases.

#### **3.1.6.4 Error mitigation**

Sterling mitigates error by

- Performing an initial operating system certification within an established IVS and daily operating system inspections monitored by the UXOQCS as part of quality control. The operating system includes both the magnetometer and the UXO technician operating it. The operating system must achieve 100 percent detection to conduct field operations; and
- Using physiological monitoring performed by the UXOSO and documented by the UXO Technician III to prevent heat or cold stress.

#### **3.1.6.5 Anomaly excavation**

Identified anomalies will not be excavated.

### **3.2 GEOGRAPHIC INFORMATION SYSTEM PLAN**

The project GIS database was developed in accordance with DID WERS-007.01, "Geophysical Information and Electronic Submittals" [U.S. Army Engineering Support Center, Huntsville (USAESCH), April 2010)], with USAESCH's ordnance and explosives GIS model based on the Spatial Data Standard Facilities Infrastructure and Engineering data structure. Sterling will produce concise ArcGIS project files in accordance with DID WERS-007.01 and submit the GIS data in an Environmental Systems Research Institute (ESRI) Geodatabase and/or Shapefiles, which are compatible with the ESRI Arcview/ ArcInfo system. The project GIS analyst will maintain the active GIS data.

#### **3.2.1 Data Management**

Geophysical data will be presented in the formats and in the schedule requirements defined in DID WERS 004.01, "Geophysics" (USAESCH, April 2010). During the project, data will be delivered daily using Sterling's file transfer protocol site or its equivalent. At the end of each week, Sterling will deliver a compact disc equivalent of the data processed, including field notes.

#### **3.2.2 MEC Accountability and Records Management**

MEC items or significant anomaly instrument signals will be recorded separately and shall include the Global Positioning System coordinates and a unique anomaly identification number. This number will follow the transect segment number preceded by a dash nomenclature, description of the item, and a photograph and photo identification number, which will be the same as the anomaly identification number.

### **3.3 UXO AVOIDANCE**

A UXO Technician II or higher will conduct UXO avoidance with a handheld magnetometer. The purpose of UXO avoidance is to safely escort people who are not UXO-qualified and their equipment into an area suspected of containing surface or buried UXO, ensure they do not come into contact with UXO

while they perform their duties (soil sampling, drilling, etc.), and then escort them safely out of the area. If UXO is discovered during escort, it will be identified and marked, its location will be recorded for later disposal, and the Fort Stewart project manager will be notified.

### **3.4 SITE RECONNAISSANCE, PREPARATION, AND RESTORATION PROCEDURES FOR INTRUSIVE FIELD ACTIVITIES**

Before intrusive field activities begin, all excavation permits and utility clearances for the site will be obtained in coordination with the Georgia Utility Protection Center (UPC). These requests can be made by calling (800) 282-7411 or by visiting [www.gaupc.com](http://www.gaupc.com) and clicking on the IRTM login. UPC requires preregistration for online requests. Then, the excavating contractor must mark the boundaries of the proposed excavation site using white paint, flags, or stakes.

UPC officials locate utility lines based on DPW information. The DPW accepts responsibility for accuracy of the locates pertaining to gas and fuel lines, water lines, electrical lines (including secondary electricity), airfield lighting, low voltage, fire systems, sewer lines, roof drain lines, storm drain lines, industrial waste lines, chilled water lines, high temperature water lines, irrigation systems, and DPW nonfiber computer lines. These requests will be forwarded to all utility companies with services in the excavation site.

- Permits will be issued within 48 hours of the next business day after UPC gets the request.
- Permits will be valid for 21 days. Renewal requests should be submitted at least three days before expiration.
- Requesting contractors are responsible for maintaining marks during the 21-day period.
- If after acquiring a permit, a utility is damaged during the excavation process, please notify the appropriate utility company. The Fort Stewart DPW POC is  
Jim Maddox (912) 767-6669.

### **3.5 CONFIRMATORY SOIL SAMPLING**

In accordance with the SOW, 400 soil samples will be collected from the Small Arms Range during the confirmatory soil sampling. Figure 3-4 depicts the proposed grid for soil boring locations; actual locations will be determined in the field. Each sample location will be surveyed to provide horizontal and vertical coordinates accurate to plus or minus 1 foot. All equipment used to sample will be properly decontaminated in accordance with Federal, state, and local guidance.

Two samples from each soil boring will be collected between 0 and 6 inches and between 2 and 4 feet. The samples will be collected from a 5-foot cellulite acetate butyrate liner at each boring location (EPA, November 2007). Each sample will be analyzed for antimony, copper, and lead. Table 3-2 lists quantities and types of soil samples. In addition, SES will collect six samples for SPLP analysis.

These samples will be collected immediately above the soil/ groundwater interface. Results from the SPLP analysis will be used to evaluate subsurface soil for leaching potential of COPCs into groundwater.

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**Table 3-2 Soil Samples  
for Small Arms Range**

<b>Sample Type</b>	<b>Lab Analytes- Antimony, Copper, and Lead</b>
Primary samples	400
Field duplicates	40
Equipment rinseseates	20
Field blanks	0
Trip blanks	0
MS/MSD	20
Field source	4
<b>Total number of samples</b>	<b>484</b>

Notes:

- 1) Equipment rinseseates will be taken at 5 percent of the total number of primary samples, and field duplicates will be taken at a rate of 10 percent of the total number of primary samples for antimony, copper, and lead.
- 2) Matrix spike and matrix spike duplicates will be analyzed on representative matrix at a rate of a minimum of one sample per batch or 1 in 20 samples.

MS = matrix spike

MSD = matrix spike duplicate

Geoprobe DPT will be used to collect surface and subsurface soil samples from specified intervals of soil borings. The direct push method involves inserting sampling devices directly into the soil to be sampled without drilling or borehole excavation. Direct push sampling consists of advancing a sampling device into the subsurface by applying static pressure, impacts, vibration, or a combination to the aboveground portion of the sampler extensions until the sampler has been advanced its full length into the desired soil strata. No specific guidance or standards document the “direct push sampling method,” but the guidance is a modification of standards from the Shelby tube, split spoon, piston, and penetrometer methods. The method is employed under various protocols by commercial entities and called by various proprietary names (Geoprobe).

Direct push methods may be used to collect soil, and in some cases, the method may be combined with sampling devices capable of water and/or vapor sampling. The equipment generally used in direct push sampling is small and relatively compact allowing for better mobility around the site and access to confined areas. Direct push insertion methods include static push, impact, percussion, other vibratory driving, and combinations of these methods using direct push equipment adapted to drilling rigs, cone penetrometer units (the reference standard for which is ASTM D 5778-95), and specially designed percussion/ direct push combination machines. Standard drilling rods, used for rotary drilling, are sometimes used when sampling is done at the base of drill holes. A direct push soil sampling system consists of a sample collection tool; hollow extension rods for advancement, retrieval, and transmission of energy to the sampler; and an energy source to force penetration by the sampler.

The sampling procedure is as follows:

1. Assemble the decontaminated direct push sampling device that will be pushed into the ground to collect data or samples.
2. Advance the sampling device into subsurface soil by applying static pressure, impacts, vibration, or a combination to the aboveground portion of the sampler extensions until the sampler has been advanced its full length into the desired soil strata.
3. Sampling can be continuous for full-depth borehole logging or incremental for specific strata sampling. Samplers can be protected for controlled specimen gathering or unprotected for general data collection.

4. Recover the sampler from the borehole and remove the soil sample from the sampler.
5. Begin sampling with the acquisition of any volatile organic compound samples, conducting the sampling with as little disturbance as possible to the media.
6. If homogenization of the sample location is appropriate for the remaining analytical parameters or if compositing of a different location is desired, transfer the sample to a stainless steel bowl for mixing.
7. Transfer sample into an appropriate sample bottle using a stainless steel spoon or equivalent.
8. Check that a Teflon liner is present in the cap. Secure the cap tightly.
9. Label the sample bottle. Fill out the label completely and clearly, addressing all categories and parameters.
10. Place filled sample containers on ice immediately.
11. Complete chain-of-custody documents and field sheets and record in the logbook.
12. Prepare samples for shipment.
13. Decontaminate the equipment following each probe or sample.

A UXO specialist will be on site during the field effort for characterization. If explosive or chemical agent contamination or UXO is discovered at any time during site operations, SES will immediately stop operations in the affected areas, mark the location, and notify the Fort Stewart and USACE PMs.

### 3.5.1 Data Quality Objectives

Data quality objectives (DQOs) are qualitative and quantitative statements that specify the quality and level of data required to support the decision-making processes for a project. *Data Quality Objectives Process for Hazardous Waste Site Investigations (QA/G-4HW)* (EPA, January 2000) provides general, non-mandatory guidance on developing DQOs for environmental data collection operations in support of hazardous waste site investigations. The DQOs are based on the overall objective of the RFI, which is to determine whether the Small Arms Range warrants further corrective action pursuant to RCRA based on a characterization of the nature and extent of MEC contamination and a determination of the potential risks to human health and the environment from MEC.

Table 3-3 presents the overall DQOs for MEC characterization and removal activities. Table 3-4 presents the overall DQOs for soil sampling activities, which are the primary means for identifying the nature and extent of munitions constituents (lead, antimony, and copper) contamination.

**Table 3-3 Data Quality Objectives – Munitions and Explosives of Concern Characterization**

Data Quality Objective Element	Site-Specific DQO Statement
Project objective(s) satisfied	To characterize site for MEC presence and anomaly density
Data user perspective(s)	To obtain data that satisfy compliance, risk, and corrective action requirements if needed
Contaminant or characteristic of interest	MEC, signs of MEC, anomaly count per transect
Media of interest	Ground surface
Required sampling locations or areas and depths	Transects evenly distributed across the investigation area.
Number of samples required	Minimum of 30 percent coverage
Sampling method	Visual inspection while traversing transects as well as anomaly counts per transect to determine anomaly density. Anomaly detection method using the Schonstedt GA-52cx
Analytical method	Convert anomaly counts per transect into anomalies per acre to develop anomaly density map to display

MEC = munitions and explosives of concern

**Table 3-4 Data Quality Objectives – Soil Sampling for the Small Arms Range**

<b>Data Quality Objective Element</b>	<b>Site-Specific DQO Statement</b>
Project objective(s) satisfied	To characterize the nature and extent of lead, antimony, and copper contamination in surface and subsurface soil.
Data user perspective(s)	To obtain data that satisfy compliance, risk, and corrective action requirements if needed
Contaminant or characteristic of interest	Analyze for metals (lead, antimony, and copper) as identified in the SOW
Media of interest	Soil
Required sampling locations or areas and depths	<ul style="list-style-type: none"> <li>• Two samples will be collected from each soil boring in the project area: One from 0-6 inches bgs, and the other between 2 and 4 feet bgs.</li> <li>• Up to two samples will be collected from each soil boring within the four berms.</li> </ul>
Number of samples required	<ul style="list-style-type: none"> <li>• 400 samples will be collected from 200 soil borings in the project area.</li> <li>• Up to 144 samples will be collected from the four berm locations from 72 soil borings.</li> </ul>
Reference concentration of interest or other performance criteria	<ul style="list-style-type: none"> <li>• EPA Regional Screening Levels</li> <li>• Fort Stewart background levels</li> </ul>
Sampling method	Soil samples will be collected by DPT rig
Analytical Method	Metals analysis (exclusively lead, antimony, and copper) by SW-846 Method

bgs = below ground surface

EPA = Environmental Protection Agency

DPT = direct push technology

SOW = scope of work

### **3.5.2 Sample Documentation and Shipping Procedures**

The following discussion outlines standard practices and procedures to be used when documenting a sampling episode. This includes identifying procedures required for field documentation, labeling samples, and maintaining chain of custody. Applicable requirements are identified in the following sections. Proper completion of all documentation with indelible ink is necessary to support the use of these records in any potential enforcement actions that may result. Protocols for corrections to documentation should not obliterate data entries, but a single line should be placed through the incorrect entry, noting corrected information, recorder’s initials, and the date correction was performed. Maintaining sample integrity through proper documentation is essential. After site activities, all project documentation becomes part of the final evidence file. These records should be maintained for a certain period of retention time.

#### **3.5.2.1 Field logbooks**

Sampling situations vary widely. No general rules can specify the exact information that must be entered in a field logbook for a particular site. However, the logbook should contain sufficient information to enable the sampling activity to be reconstructed without relying on the collector’s memory. Project field logbooks should be bound and have numbered, water-resistant pages.

Record the site name and project name and number on the inside front cover of the logbook. All pertinent information regarding the site and sampling procedures must be documented as near to real-time as possible.

At the conclusion of each day, the person maintaining the logbook should sign and date the day's documentation entries. Notations should be made in logbook fashion, noting the time and date of all entries.

Information recorded in other project documents (boring logs, well installation/development logs, or drum logs) should not be repeated in the field logbook except in summary form to avoid transcription errors.

Logbooks should be kept in the field team member's possession or in a secure place during fieldwork. After site activities or if the logbook is completely filled, the logbook becomes part of the project final evidence file as noted previously. The following are some suggested topics to include in the field logbook:

- Name and exact location of site of investigation or interest;
- Name and title of person maintaining logbook (author);
- Date and time of arrival and departure at site location;
- Purpose of site visit or sampling activity;
- Name and address of field contact. This may also include information on access agreements;
- Names and responsibilities of all persons on site;
- Names, affiliations, and purpose of all site visitors;
- Level of personal protective equipment (PPE) worn at the site;
- Weather conditions on the day of sampling, and any additional environmental conditions or observations pertinent to field activities;
- Field instrumentation or equipment used and purpose of use (health and safety screening, sample selection for laboratory analysis). Note source, quality, or lot numbers for any supplies or reagents (sample containers, preservatives, reagents, water for field blanks/ field control samples, and decontamination procedures). Retain any certificates or information supplied with the equipment used;
- Type of waste, suspected waste concentrations if known, and sample matrices to be handled;
- Document the sample collection method and any sample handling procedures, such as filtration, compositing, and executed preservation techniques used;
- Document the sample location. If a compositing scheme is used, clearly identify appropriate locations for all sample aliquots included within each composite sample. Prepare a dimensional sketch of the general surroundings of the sampling area (site), and/or support with other forms of documentation (such as photographic log). Sample identification numbers should correspond directly with sample locations;
- Identify sample numbers, volumes, and containers (number, size, type) used for each sample collected. Note the date and time of each sample, identify any associated QC samples, or any factors that may affect the quality;
- Record any field measurements, field screening/ analytical results generated, calibration methods used, field results, and QC information;
- Identify decontamination procedures for sampling equipment;
- Document appropriate references to maps and photographic logs of the sampling site;
- Record information on scheduling modifications, change orders, sampling or drilling decisions/ changes;
- Describe the number of shipping coolers packed, note chain of custody numbers or attach a copy of the chain of custody, and record the mode of transportation and applicable tracking numbers;
- Record the name and address of all receiving laboratories; and
- Maintain appropriate documentation for IDW. Note contents and volumes of waste generated, storage, and disposal methods used.

The exact locations of sampling points should be documented to develop an accurate representation of the site conditions using the data generated to date, define data gaps, and identify potential future data needs. A monument should be chosen at each site to act as a stationary reference point from which all sampling points can be measured using a compass and measuring tape. If a building or other stationary structure exists, its corner may act as this reference point. If no monument exists, it will be necessary to create one. A piece of wood, approximately 5 centimeters by 5 centimeters (2 inches by 2 inches), should be hammered into the ground to almost ground level, making it difficult to remove and thus ensuring its permanence. The stake should then be marked with flagging tape or fluorescent paint. In addition, GPS locations for each sampling point need to be recorded in the field logbook. When applicable, sampling points associated with coordinates that are referenced to a position on the earth must comply with ER 1110-1-8156, which requires geospatial data to be documented using the Federal Geographic Data Committee's content standards for digital geospatial metadata. Geospatial data are nontactical data, referenced either directly or indirectly to a location and boundaries on the earth. Additional guidance on geospatial data systems may be found in EM 1110-1-2909.

To establish a sampling point, the following procedure is recommended:

- Standing at the monument and facing the sampling point, use the compass hairlines to determine the degree of direction.
- Ensure that the line of sight runs from the monument, through both hairline needles on the compass, to the sampling point.
- When first establishing the sampling point, record the degree and direction reading from the compass in the field logbook, along with the distance measurement from the monument to the sampling point.

All sampling points should be documented on film. A film record of a sampling event allows positive identification of the sampling point. In some cases, a photograph of the actual sample collected may also be required. Photographs are the most accurate and convenient record of field personnel observations. Photographs taken to document sampling points should include two or more reference points to facilitate finding the point at a later date. Keeping a record of photographs taken is crucial to their validity as a representation of an existing situation. Photographic documentation is invaluable if the sampling and subsequent analytical data end in litigation, enforcement, or cost recovery actions. In addition to photographs, video coverage of a sampling episode can be equally as valuable as or even more valuable than photographs because it can be used to prove that samples were taken properly as well as verify the location at which they were taken. Video coverage can be used as a record of site conditions and can give those who have not been on site an idea of the circumstances. For each photograph taken, the following items should be noted in the field logbook:

- Date,
- Time,
- Photographer (signature),
- Name of site,
- General direction faced and description of the subject,
- Sequential number of the photograph and the roll number, and
- Site photo map.

### **3.5.2.2 Sample documentation**

Sample labels are required for properly identifying samples and evidence. All samples must be properly labeled with the label affixed to the container prior to transportation to the laboratory. It is also recommended that samples be photographed so that labels are clearly readable for later identification.

Information on sample labels should include, but not be limited to, the following:

- Project code: An assigned contractor, project number, site name;
- Station number: A unique identifier assigned to a sampling point by the sampling team;
- Sample identification number: Each sample, including field control samples, collected for a project should be assigned a unique number. This assigned number incorporates information on the sample type and date;
- Samplers: Each sampler's name and signature or initials;
- Preservative: Whether a preservative is used and the type of preservative;
- Analysis: The type of analysis requested;
- Date/Time: Identify the date and time the sample was taken; and
- Type of Sample: The type of sample should be identified as discrete or composite.

A sample numbering system should be used to identify each sample collected and submitted for analysis. The purpose of the numbering system is to help track samples and to facilitate retrieval of analytical results. The sample identification numbers for each sampling effort should be used on sample labels, sample tracking matrix forms, chain of custody forms, field logbooks, and all other applicable documentation. A listing of all sample identification numbers should be recorded in the field logbook. The sample numbering system may vary depending upon the number and type of samples that will be collected at the site. An example of a sample numbering system follows. Location and sample identification numbers should consist of the following designations to identify the location (AABBB-CC), sample sequence number, date (MMDDYY), and sample depth interval for soils (00-00):

- For soil: AABBB-CC/MMDDYY/00-00,
- For QC samples: AABBB-CC/MMDDYY.

Example: SB001-01/081492/08-10 = Soil Boring SB001 Sample Number 1, sampled on August 14, 1992, from a sample depth interval of 8 to 10 feet (2.4 to 3 meters). Duplicate samples should be numbered in sequential order. For example, a duplicate sample collected from this soil boring example would have a designation as follows: SB001-02/081492/08-10. Each sample collected must be assigned a unique sample number. Sample numbers should change when the media or location changes. Sample numbers should not change because different analyses are requested. For example, water samples collected at the same location, date, and time for volatile organics, semivolatile organics, and metals analyses would all have the same sample number, although the various sample aliquots would be collected in different containers.

Chain of custody procedures provide documentation of the handling of each sample from the time it is collected until it is destroyed. Chain of custody procedures are implemented so that a record of sample collection, transfer of samples between personnel, sample shipping, and receipt by the laboratory that will analyze the sample is maintained. Records concerning the cleaning of empty sample containers, container shipment from the laboratory to the site, and security of empty containers at the site should also be maintained. The chain of custody record serves as a legal record of possession of the sample. The chain of custody record is initiated with the acquisition of the sample. The chain of custody record remains with the sample at all times and bears the name of the person (field investigator) assuming responsibility for the samples. The field investigator is tasked with ensuring secure and appropriate handling of the bottles and samples. To simplify the chain of custody record and eliminate potential litigation problems, as few people as possible should handle the sample or physical evidence during the investigation. A sample is considered to be under custody if one or more of the following criteria are met:

- The sample is in the sampler's possession,
- The sample is in the sampler's view after being in possession,
- The sample was in the sampler's possession and then was locked up to prevent tampering, or
- The sample is in a designated secure area.

In addition to the chain of custody record, there is also a chain of custody seal, which is an adhesive seal placed in areas such that if a sealed container is opened, the seal would be broken. The chain of custody seal ensures that no sample tampering occurred between the field and the laboratory analysis.

All sample sets should be accompanied by a chain of custody record. When transferring possession of samples, the individual receiving the samples should sign, date, and note the time that he/she received the samples on the chain of custody record. This chain of custody record documents transfer of custody of samples from the field investigator to another person, other laboratories, or other organizational units. Samples must be properly packaged for shipment and delivered or shipped to the designated laboratory for analyses. Shipping containers must be secured by using nylon strapping tape and custody seals. The custody seals must be placed on the container so that it cannot be opened without breaking the seals. The seal must be signed and dated by the field investigator. When samples are split with a facility, state regulatory agency, or other government agency, the agency representative must sign the chain of custody record if present. All samples should be accompanied by the chain of custody record. The USACE tracking number (laboratory information management system number) that is used in conjunction with the Government QA sample shipment must be written on the chain of custody record of the QA sample. The original and one copy of the record will be placed in a plastic bag taped to the inside lid of the secured shipping container. One copy of the record will be retained by the field investigator or project leader. The original record will be transmitted to the field investigator or project leader after the laboratory accepts the samples. This copy will become part of the project file. If sent by mail, the package should be registered with return receipt requested. If sent by common carrier, an air bill should be used. Receipts from post offices and air bills should be retained as part of the documentation of the chain of custody. The air bill number or registered mail serial number should be recorded in the remarks section of the chain of custody record.

To ensure that proper analysis is performed on the samples, additional paperwork may need to be filled out, as required by the laboratory performing the analysis. This form identifies samples by number, location, and time collected and allows the collector to indicate the desired analysis. This form should act as a supplement/confirmation to the chain of custody record and laboratory contacts made prior to the sample event initiation.

### **3.6 BERM MATERIAL CHARACTERIZATION**

Four berms between 560 feet and 670 feet long by 6 feet wide by 2 feet high have been identified on the Small Arms Range site. Figure 3-4 shows the four berms. One berm contains concrete barriers behind the wall of soil. Surface and subsurface soil samples will be collected to characterize each berm. A total of 144 soil samples will be collected from 72 locations along the length and width of the berms (Table 3-5). Samples will be analyzed for lead, copper, and antimony. Results from the berm characterization will be included in the RFI report.

A UXO specialist will be on site during the field effort for characterization. If explosive or chemical agent contamination or UXO is discovered at any time during site operations, SES will immediately stop operations in the affected areas, mark the location, and notify the Fort Stewart and USACE project managers.

**Table 3-5 Berm Soil Samples  
for Small Arms Range**

<b>Sample Type</b>	<b>Lab Analytes Antimony, Copper, and Lead</b>
Primary samples	144
Field duplicates	15
Equipment rinseates	8
Field blanks	0
Trip blanks	0
MS/MSD	8
Field source	2
<b>Total number of samples</b>	<b>177</b>

Notes:

- 1) Equipment rinseates will be taken at 5 percent of the total number of primary samples, and field duplicates will be taken at a rate of 10 percent of the total number of primary samples for antimony, copper, and lead.
- 2) Matrix spike and matrix spike duplicates will be analyzed on representative matrix at a rate of a minimum of one sample per batch or 1 in 20 samples.

MS = matrix spike

MSD = matrix spike duplicate

### **3.7 INVESTIGATIVE-DERIVED WASTE**

All IDW will be properly disposed in accordance with state and Federal regulations. IDW is expected to be minimal and contain soil (from the soil borings) and liquid (decontamination water). It will be stored in drums and placed on pallets at a nearby area designated by USACE or Fort Stewart representatives pending receipt of characterization results required to determine appropriate off-site disposal.

Each IDW container will be labeled in accordance with applicable state and Federal requirements. IDW shall be labeled “UNCLASSIFIED WASTE, ANALYSIS PENDING” with a weather-resistant label. In addition, the following information shall be included on the label:

- The location where the IDW originated,
- The SES POC and telephone number,
- The Fort Stewart POC,
- The USACE POC and telephone number, and
- A description of the contents.

The area(s) in which the IDW is stored will be flagged with surveying tape and stakes. All other wastes (for example, trash, Tyvek suits, gloves, respirator cartridges, etc.) will be disposed off site in accordance with all applicable regulations.

IDW will be characterized for disposal within 60 days of the date of generation and properly disposed (on site and/or off site) within 90 days of generation. All IDW will be disposed at an approved, permitted facility. SES will remove all emptied drums, pallets, etc.

SES will complete all required manifests for waste disposal, and a 72-hour notice will be provided to DPW personnel (Note: a DPW representative will sign each manifest). SES will be on site during all waste removal activities.

### 3.8 REGIONAL SCREENING LEVELS

The soil data that is collected and analyzed will be compared to EPA RSLs, which are in Table 3-6.

**Table 3-6 Regional Screening Levels**

Contaminant of Potential Concern	Regional Screening Levels (mg/kg)
Antimony	3.1
Copper	310
Lead	400

mg/kg= milligrams per kilogram

### 3.9 REPORTING

Field activities will be documented in an RFI report, which will include an HHRA and an ecological risk assessment based on the results of the soil sample analyses.

#### 3.9.1 Screening Level Human Health Risk Assessment

SES subcontractor Brown and Caldwell will conduct a screening level HHRA for the site in accordance with applicable regulatory guidance and policies, particularly available EPA and Georgia EPD risk guidance. If EPA and Georgia EPD risk guidance conflict, Georgia EPD guidance will take precedence.

The screening level HHRA will compare representative surficial and subsurface soil concentrations of COPCs lead, copper, and antimony to appropriate Georgia EPD soil benchmarks and to background soil concentrations. For this screening level HHRA, representative soil COPC concentrations will be compared to the maximum detected concentration (MDC) for each medium, based on analytical results after field activities. The results of the screening level HHRA will be included in the RFI report. If the screening level HHRA indicates no significant risks to relevant receptors, then a baseline HHRA will not be prepared unless specifically requested.

The background concentration for lead is from *Phase 2 Confirmatory Sampling Report, Fort Stewart, Georgia* (ARCADIS/ Malcolm Pirnie, Inc., September 2011). The background concentration for copper is from *Final Revised MMRP RCRA Facility Investigation Report for the Anti-Aircraft Range 90-mm – 2 MRS (FTW-002-R-01) and the Hero Road Trench Area MRS (FTSW-008-R-01), Fort Stewart, GA* (ERT, Inc., August 2014). Surface and subsurface soil sampling will be conducted from the sampling locations used from both (copper and lead) referenced documents, using the same sampling protocol.

#### 3.9.2 Baseline Human Health Risk Assessment

If the screening level HHRA indicates significant risks associated with one or more COPCs or if the Georgia EPD requests it, SES subcontractor Brown and Caldwell will conduct a baseline HHRA. Only those COPCs with representative surficial and/ or subsurface soil concentrations exceeding appropriate Georgia EPD soil benchmarks and/ or background concentrations as identified in the screening level HHRA will be included in the baseline HHRA. The baseline HHRA will be conducted in accordance with applicable regulatory guidance and policies, particularly EPA and Georgia EPD risk guidance. If EPA and Georgia EPD risk guidance conflict, Georgia EPD guidance will take precedence.

Appropriate receptor populations consistent with commercial/ industrial and construction use will be identified and evaluated as part of the baseline HHRA. Likely receptor populations include

- Commercial/ industrial worker who primarily works indoors (office worker),
- Commercial/ industrial worker who primarily works outdoors (landscape worker),
- Excavation/ construction worker, and
- Trespasser.

In addition the future residents and trespassers scenarios will be included to determine the need for land use controls, which will evaluate the future resident adult and child receptors.

Appropriate exposure pathways for these receptors will also be identified and evaluated. Likely exposure pathways include

- Incidental soil ingestion,
- Dermal contact with soil, and
- Inhalation of resuspended soil.

Lead, copper, and antimony are considered noncarcinogens; therefore, only noncancer risks will be evaluated. If lead is not screened out based on comparison to the Georgia EPD soil standards and/ or background concentrations, lead risks will be evaluated using the Georgia Adult Lead Model, the results of which will be incorporated into the baseline HHRA. Likewise, based on a residential child receptor, the Integrated Exposure Uptake Biokinetic model will be used. The inputs and outputs of these models will be included in the RFI report.

The baseline HHRA will include a screening of selected COPCs, exposure assessment, toxicity assessment, risk characterization, and uncertainty assessment. The exposure point concentrations (EPCs) for each COPC and media will be selected for the previously mentioned exposure pathways and receptors based on the remedial investigation analytical results. EPCs will be derived using ProUCL software. The screening of COPCs included in the baseline HHRA will supplement the screening level HHRA.

The RFI report will include the methods and results of the risk assessment, a description of each component of the risk assessment process (screening of COPCs, exposure assessment, toxicity assessment, risk characterization, and uncertainty assessment), exposure assumptions, chemical-specific parameters, equations used in the risk assessment, and copies of calculations. The baseline HHRA will not include site-specific cleanup target levels for soil.

### **3.9.3 Screening Level Ecological Risk Assessment**

SES subcontractor Brown and Caldwell will conduct a screening level ecological risk assessment (SLERA) for the site in accordance with applicable regulatory guidance and policies, particularly EPA and Georgia EPD guidance. If EPA and Georgia EPD risk guidance conflict, Georgia EPD guidance will take precedence. This SLERA will be included in the RFI.

The SLERA will characterize current and potential threats to ecological receptors from COPCs at the site based on analytical results from soil sampling. The SLERA will be based on comparing MDCs of COPCs to appropriate ESVs, such as EPA Region 4 ESVs, and background concentrations if available. For those COPCs with MDCs that exceed ESVs or background concentrations, MDCs will be compared to toxicity reference values, and hazard quotients (HQs) will be calculated. HQs will be added together to determine a hazard index if chemicals act by a similar mechanism of toxicity.

## **4. QUALITY CONTROL PLAN**

### **4.1 MAGNETOMETER SURVEY QUALITY CONTROL**

Sterling will conduct quality checks to ensure all intrusive activities meet standards set in the approved work plan. After each segment has been completed, the UXOSO/QCS will check and verify all work in accordance with WERS DID 004.01 by conducting instrument repeatability, dynamic repeatability, geodetic equipment functionality, and geodetic repeatability tests. The inspection results will be documented and included in the final report. A detailed QC plan for the magnetometer survey is in Appendix E.

#### **4.1.1 Instrument Repeatability**

All UXO personnel will verify instrument function tests daily in the IVS test strip.

#### **4.1.2 Dynamic Repeatability**

The UXOQCS will resurvey at least 2 percent of the total area per lot. The failure criterion for this test is  $\pm 20$  percent of the documented anomaly count. The lot size for this requirement will be the total transect area for each of the seven subareas.

#### **4.1.3 Geodetic Equipment Functionality**

Sterling will conduct a daily geodetic equipment functionality test at a known point for each Archer handheld used. The reacquired point will be accurate within  $\pm 10$  meters.

#### **4.1.4 Geodetic Repeatability**

Sterling will conduct a daily geodetic repeatability test at one transect point per lot with the Archer handheld. Each reoccupied transect point checked must be within  $\pm 10$  meters of the original location.

#### **4.1.5 QC Test Results**

The project geophysicist with support from the site UXOQCS will record the QC test results in the project analog database in accordance with DID WERS-004.01. The daily data submittal will include documentation of the values and test results (pass or fail). The project geophysicist will review all the analog geophysical data generated during the project.

### **4.2 CONFIRMATORY SOIL SAMPLING QUALITY CONTROL REQUIREMENTS**

All original data recorded in field logbooks and on sample labels, chain of custody records, and receipt-for-samples forms will be written in waterproof ink. If an error is made on an accountable document, corrections should be made simply by crossing out the error and entering the correct information. The erroneous information should not be obliterated. Any error discovered on a document should be corrected by the person who made the entry. All corrections must be initialed and dated.

The photographer should review the photographs and compare them with the photographic log to confirm that the log and photographs match.

Although most sample labels are made with water-resistant paper and are filled out using waterproof ink, inclement weather and general field conditions can affect the legibility of sample labels. It is recommended that after sample labels are filled out and affixed to the sample container, the label should be covered with wide clear tape. This will preserve the label and keep it from becoming illegible. In addition to label protection, chain of custody and analysis request forms should be protected when samples are shipped in iced coolers. Typically, these forms should be placed inside a zip lock bag or similar waterproof protection and taped to the inside lid of the secured shipping container with the samples.

#### **4.2.1 Sample Collection, Preservation, and Holding Times**

Procedures for collecting samples will follow EPA protocols. Samples will be collected with properly decontaminated equipment and contained in properly cleaned sample containers. All field sampling equipment will be decontaminated before use and after each sample location. The detailed sample collection procedure is in Section 3.

The laboratory performing the analysis will provide sample containers and preservatives to collect and contain samples for chemical analysis. The bottles must be precleaned and traceable to the laboratory that performed the cleaning, and lot numbers of containers and reagents used for preservatives must be traceable to the laboratory that performed the initial assay. Certificates of cleanliness must be provided by the laboratory and kept in the project file.

All samples for chemical analysis will be placed on ice as soon as possible after collection. Samples will be chilled to 4 +/-2 degrees centigrade and maintained at that temperature through transport and subsequent storage at the analytical laboratory. In no case will samples be retained more than 48 hours on site.

#### **4.2.2 Sample Identification and Chain-of-Custody Procedures**

Sample chain-of-custody procedures require that possession and handling of the sample from the moment of its collection through analysis be documented by written record. The record must clearly reflect the movement of the sample through the chain of custody to ensure the sample has been positively controlled and has not been tampered with in any way. A sample is judged to be in one's custody when one of the following criteria has been met.

- The sample is in one's actual physical possession.
- The sample is in one's clear field of view after being in one's physical possession.
- The sample is in one's physical possession and is then locked up in a secure container, so no one can tamper with it.
- The sample is kept in a secured area that is restricted to authorized personnel only.

##### **4.2.2.1 Sample labels and identification**

All samples will be identified with a label attached directly to the container. Each label will include a unique sample number. Sample label information will be completed using waterproof black ink and will contain at least the following information:

- Company name and site,
- Date and time of sample collection,
- Parameters to be analyzed,

- Preservative (if any), and
- Initials of the person collecting the sample.

#### **4.2.2.2 Chain-of-custody record**

To maintain a record of sample collection, a chain of custody record will be filled out documenting the collection and shipment of samples and receipt by the laboratory. Each time samples are transferred, the signatures of the person relinquishing and receiving the samples as well as the date and time of transfer will be documented.

#### **4.2.2.3 Transfer of custody and shipment**

Before samples are shipped, the chain of custody record will be signed and dated by a member of the field team, who has verified that those samples indicated on the chain of custody (COC) record are indeed being shipped. After packaging has been completed, the samples will be locked in the cooler, and custody seals signed and dated by a member of the field team will be placed over the lid edge.

All samples will be shipped by courier (for example, Federal Express or United Parcel Service) to the analytical laboratory. Upon receipt of samples at the laboratory, the receiver will complete the transfer by dating and signing the chain of custody record. If shipped by commercial courier, the air bill number and shipping data will be transcribed to the chain of custody in the appropriate signature/date block. A copy of the air bill is to be kept with the field copy of the chain of custody form to record specific shipping information.

### **4.2.3 Documentation Procedures**

All documentation must be legible and completed in indelible ink. Corrections must be marked with a single line, dated, and initialed. Serialized documents are not to be destroyed or discarded even if illegible or inaccurate. Voided entries must be maintained in project files. Every line in the logbook should contain text or have notations that the line is intentionally not being used. Text should be continuous with no breaks between topics. Empty lines should have a diagonal line drawn across them and be signed and dated.

Field documentation shall consist of a master site logbook, one or more job- or area-specific field logbooks, field forms, and sample logs/labels. This format of documentation allows for detailed recording of information in various field logbooks and forms referenced in the site logbook.

Site and field logbooks provide a daily handwritten record of all field activities at an investigation site. All logbooks must be permanently bound and have a hard cover. Field logbooks must be waterproof. Logbooks must be ruled or ruled and gridded with sequentially numbered pages. The site logbook is a master record of all site activities, and entries are usually made at the end of each workday. Field logbooks are detailed daily records that are kept in real time and are assigned to specific activities, positions, or areas within the site. Separate logbooks shall be used for each sampling and field (drilling) team.

The PM will ensure that a project central file is established and maintained and that project documents are retained and controlled appropriately.

#### 4.2.4 Quality Control for Field Measurements

Most data will be developed in the analytical laboratory from the samples collected; however, field measurements for health and safety monitoring and sample collection locations may be performed and recorded in the field. The primary QA objectives of field activities where measurements will be taken are to verify that QC checks are performed, verify that measurements are obtained to the degree of accuracy consistent with their intended use, and provide documentation of adherence to the measurement procedures.

Field measurement instruments will be calibrated according to manufacturers' specifications before and after each field use or as otherwise required. Where necessary, instruments will be calibrated each day during field use, and calibration information will be documented on calibration log sheets or in logbooks. Information to be recorded includes date, operator, and calibration standards (concentration, manufacturer, lot number, and expiration date). Field measurements are considered valid provided that

- Calibration records for field measurement equipment are properly maintained,
- Training records exist that document field personnel are familiar with standard procedures for taking measurements, and
- Verification exists that calculations and observations are accurately recorded and transcribed.

### 4.3 DATA QUALITY

This section describes the chemical DQOs, analytical methods and measurements, QA/ QC protocols necessary to achieve the DQOs, and data assessment procedures to evaluate and identify any data limitations.

#### 4.3.1 Project Laboratory

The project laboratory for this project is Empirical Laboratories.

#### 4.3.2 Data Quality Objectives

The DQOs for this project are to satisfy the requirements of the EPA RSLs for antimony, copper, and lead for soil samples. The analytical requirements for this project are listed in Table 3-2. The laboratory will use the most up-to-date version of SW-846, "Standard Test Methods for Evaluating Solid Wastes." The project QC objectives (precision, accuracy, representativeness, comparability, and completeness) are discussed below:

- **Precision:** Precision is defined as the reproducibility, or degree of agreement, among duplicated (collocated) sample measurements of the same quantity. The closer the numerical values of the measurements come to each other, the more precise the measurement is. Analytical precision is expressed as a percentage of the difference between results of duplicate samples for a given analyte. For organic parameters, precision is measured by the relative percent difference (RPD) between the matrix spike (MS) and the matrix spike duplicate (MSD). For inorganic parameters, precision is measured by the RPD between the original sample and the duplicate or the MS and MSD (if required by the analytical method performed). Required precision is 90 percent.
- **Accuracy:** Accuracy is defined as the degree of difference between measured or calculated values and the true value. The closer the numerical value of the measurement comes to the true value, or actual concentration, the more accurate the measurement. Analytical accuracy is expressed as the percent recovery of a compound or element that has been added to the

environmental sample at a known concentration before analysis. Required accuracy is 90 percent.

- **Representativeness:** Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Representativeness is a qualitative parameter dependent on the proper design of the sampling program and proper laboratory protocol. Representativeness will be ensured by using proper sampling techniques and analytical procedures. Representativeness is ensured in the laboratory by proper sample preservation and storage, preparation and analysis of samples within required holding times, and analysis of method and instrument blanks. Field QC samples — including trip blanks, source water check samples, and equipment rinseates — will be collected and analyzed to evaluate the possibility of cross-contamination during sample collection and shipping. Results of field duplicate samples also will be evaluated for assessing representativeness.
- **Comparability:** Comparability is a qualitative parameter that expresses the confidence with which one data set can be compared with another, and is limited to the other parameters because only when precision and accuracy are known can data be compared with confidence. The sampling and analytical procedures described in this work plan that will be used to obtain analytical data are expected to provide comparable data. Comparability will be further ensured by the analysis of EPA standard reference materials, establishing that analytical procedures are generating valid data, and reporting results in standard concentration units.
- **Completeness:** Completeness is defined as the amount of valid (usable) data obtained compared to the planned amount and is expressed as a percentage of measurements judged to be valid. Completeness is usually measured following data validation. Data qualified as a result of validation can be considered valid data; rejected data are not valid. The completeness goal is to generate a sufficient amount of valid data based on project needs. Required completeness is 90 percent.

The required laboratory detection limits for each analyte are listed in Table 4-1. The laboratory will provide definitive level data. Level III validation will be performed on all chemical data following the logic identified in *The CLP National Functional Guidelines for Organic Data Review* (June 2008) by DataChek of Cary, North Carolina.

**Table 4-1 Required Laboratory Detection Limits**

Analyte	Detection Limit	Units
Antimony	1.00	mg/kg dry
Copper	.800	mg/kg dry
Lead	.300	mg/kg dry

mg/kg = milligrams per kilogram

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## **5. ENVIRONMENTAL AND CULTURAL RESOURCES PROTECTION PLAN**

### **5.1 INTRODUCTION**

This environmental and cultural resources protection plan establishes procedures for avoiding, minimizing, and mitigating potential impacts to environmental and cultural resources near the Small Arms Range during field activities. This section describes the resources that may be found within the Small Arms Range and describes procedures and methods to protect and/or mitigate them:

- Threatened and endangered species;
- Trees and shrubs that may be impacted; and
- Cultural and archaeological resources.

### **5.2 ENVIRONMENTAL AND CULTURAL BACKGROUND**

#### **5.2.1 Flora and Fauna**

The vegetation at the Small Arms Range consists of a mature forest with significant amounts of undergrowth. Birds, mammals, and reptiles are found throughout Fort Stewart.

#### **5.2.2 Endangered, Threatened, or Special Concern Species**

Protected species are defined as those listed by the U.S. Fish and Wildlife Service (USFWS) as endangered or threatened under the Endangered Species Act; listed by Georgia as rare, unusual, endangered, or threatened; designated as a special species of concern by the Georgia Natural Heritage Program; or proposed for listing by Georgia or USFWS. Fort Stewart has designated habitat management units as detailed in the Integrated National Resources Management Plan to protect sensitive species. No designated habitat management units are within the Small Arms Range being investigated. These Federal species listed or proposed for listing are found at Fort Stewart:

- Red-cockaded woodpecker,
- Eastern indigo snake,
- Frosted flatwoods salamander,
- Wood stork,
- Bald eagle, and
- Shortnose sturgeon.

In addition, the gopher tortoise is listed by state of Georgia (ERT, November 2012).

#### **5.2.3 Cultural and Archaeological Resources**

Considering the geological history and use of the site, the probability of recovering prehistoric artifacts in the former Small Arms Range site is low; however, the identification of small sites or isolated finds is possible. Significant cultural resource investigations or surveys have been undertaken at Fort Stewart. Based on this, the likelihood for archaeological remains to be found at a particular location can be estimated. Surveys were completed or in progress at the former Small Arms Range location as of August 2001 (ERT, November 2012), and no information released on the former Small Arms Range indicates that these are culturally significant areas. If prehistoric artifacts are discovered, the SUXOS or SSHO will contact the SES PM, who will then contact the USACE PM and MMDC technical lead and Fort Stewart DPW personnel by e-mail and phone to notify them of the find and determine the next steps.

### **5.3 MITIGATION PROCEDURES**

Investigation activities at the Small Arms Range have been designed to avoid impacts to sensitive resources. For this reason, extensive mitigation is not anticipated. However, the following general mitigation procedures and engineering controls will be used during field activities.

#### **5.3.1 Tree, Shrub, and Landscape Protection and Restoration**

Disturbance to the vegetation will be avoided during field activities to the extent possible by cutting only those plants that must be cut to implement this work plan. Environmental impacts will be minimized by limiting the width and spacing of geophysical transects and the extent of vegetation cutting within transects. Only vegetation between 6 inches and 6 feet above ground surface will be cut, and trees larger than 3 inches at chest height will be preserved. Transects will not exceed 3 feet wide. Transect and grid location for the Small Arms Range are in Figure 3-4.

#### **5.3.2 Access Routes**

Access routes for magnetic surveys and environmental sampling at the Small Arms Range will be established in a manner that will minimize vegetation impacts and prevent erosion and run-off. Impacts will be prevented by walking along openings through vegetation, minimizing the amount of vegetation cut, using these cut areas for access as much as possible, and ensuring any excavated soil is covered during precipitation events.

#### **5.3.3 Control of Water Run-On and Run-Off**

Project activities will be performed in a manner that will prevent the discharge of pollutants into adjacent surface water and groundwater within and outside the investigation area. The use of controls — such as siltation migration or berms, dikes, enclosures, and barriers to minimize water run-on/run-off — will be based on heavy precipitation events (usually more than 1 inch of rain in a 24-hour period) and observed conditions, such as areas of visual erosion and sediment trails that are associated with project investigation activities.

#### **5.3.4 Erosion and Sediment Control**

Because the intrusive investigations by DPT will be relatively small, the need for erosion and sediment control measures is not anticipated during field activities. If additional erosion and sediment control measures are needed based on field conditions, such as visual sediment trails from the DPT areas, the SUXOS will direct the construction of adequate controls to minimize any environmental impacts, such as fabric silt fencing or hay placed along the downslope boundary of the intrusive investigation sites to control erosion and minimize surface water run-off damage.

#### **5.3.5 Spill Control and Prevention**

Small quantities of fuel will be stored in OSHA-approved safety containers. IDW containers will be stored on pallets covered with plastic sheeting, and the fuel will also be stored on plastic sheeting. These containers will be checked daily to ensure their integrity. If a leak of fuel or other fluids (more than 2 gallons of liquid), such as hydraulic or transmission fluid, occurs in the field from equipment or vehicles, the following procedures will be implemented:

- Promptly berm the area with dirt to prevent the fuel or fluid from spreading along the ground surface.
- Apply oil-absorbing material, such as sawdust or kitty litter, to the spill. A supply of this material adequate to address the puncture of a full, 25-gallon fuel tank will be always available on site as part of the team's "possibilities" kit.
- Report the spill to the SUXOS and follow the instructions for cleanup. It is anticipated that this will involve digging up and drumming contaminated soil followed by its disposal.

### **5.3.6 Storage Areas**

Storage will be required for IDW and gasoline, if needed, for this project. SES will use OSHA-approved safety cans for gasoline and Department of Transportation Type H drums for IDW. The storage area will have spill kits close at hand and will be within the fence line of each MRS at areas determined to be acceptable through coordination with Installation personnel. Every IDW drum will be stored on pallets covered with plastic sheeting. Gasoline, if needed for the project, will be stored per appropriate regulations — which include EM 385-1-1, OSHA 1910.106, and Georgia Standard Fire Code — and will not be stored near any sources of heat, spark, open flame, or other ignition sources.

### **5.3.7 Burning Activities**

Open fires will not be permitted during this project. Smoking will be restricted to designated smoking areas, which will be coordinated with Fort Stewart personnel prior to field mobilization. Smoking regulations are detailed in the APP, which is available in Appendix F.

## **5.4 PROCEDURES FOR POST-ACTIVITY CLEAN-UP**

Each piece of field equipment brought to Fort Stewart and all drummed IDW will be removed upon completion of field activities. Detailed handling, storage, and disposal procedures for IDW are included in Section 3.7.

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## **6. PROPERTY MANAGEMENT PLAN**

This property management plan was prepared in general accordance with DID MMRP-09-008, which provides requirements for a property management plan for firm fixed price tasks. The field schedule for the project will be relatively short term, and SES does not expect to use any Government-furnished property or equipment. Therefore, certain specific elements of the DID do not apply.

This property management plan provides detailed information on the types, quantities, and sources of equipment and materials that will be required to perform field and office operations at Fort Stewart. Field operations include every activity to be performed to complete the fieldwork. Office operations include every task performed in support of project management requirements to implement the fieldwork consistent with the requirements of the SOW.

The types of equipment recommended, selected, and proposed to complete the project have been tested and proven in the industry and are reliable to use in performing the various activities associated with this project. The quantities proposed are those needed to perform the work efficiently and cost-effectively while maintaining the project schedule.

### **6.1 FIELD EQUIPMENT**

#### **6.1.1 Geophysical Equipment**

The geophysical equipment needed for the fieldwork are Schonstedt GA-52Cx magnetometer and the Archer XF 101 GPS receiver. Detailed descriptions of each piece of equipment and its use are in Section 3.1.

#### **6.1.2 Transportation**

Various types of transportation equipment will be required during field operations. Vehicles required for on-road service during the project may include standard automobiles, four-wheel drive vehicles, and vans.

#### **6.1.3 Safety Gear**

The appropriate PPE for each job assignment is in the site-specific safety and health plan, which is an attachment to the APP and is in Appendix F. Personnel assigned to activities outside the exclusion zone will wear Level D PPE consisting of standard work clothes with long pants, steel-toe safety boots, and hard hats (if overhead hazard is present). Personnel working away from active field investigations will not be required to wear hard hats.

#### **6.1.4 Other Equipment**

No equipment or disposal of scrap is planned for this project.

Site employees will be able to communicate with others using handheld two-way radios or cellular phones. The majority of the office equipment to be used on this project is in the SES satellite office in Richmond Hill, Georgia. Most equipment (for example, Computer Aided Design and Drafting or GIS workstations, computers, printers, plotters, etc.) is owned by SES, and the charges to the project will be as proposed for the task order.

### 6.1.5 Consumable Supplies

The consumable supplies to be used on this project will be in accordance with the SOW. Consumable supplies include, but are not limited to, field notebooks, spray paint, pin flags, flagging tape, and soil sampling supplies.

### 6.2 VENDORS AND ASSOCIATED COSTS

SES owns much of the field equipment to be used to perform the fieldwork. However, some equipment will be obtained from vendors with proven records of furnishing well-maintained, reliable, and updated equipment that can be used to successfully complete the field and office operations. General estimates on the types, quantities, and sources of equipment proposed for the project are summarized in Table 6-1.

**Table 6-1 List of Equipment**

Office/Field Operations	Equipment Type (or Equivalent)	No. of Units	Anticipated Source	Status
Communication during fieldwork	Motorola HT-1000 radios	4	Sterling	Own
Communication during fieldwork	Cellular phone	5	SES and Sterling	Own
Processing and interpreting field data	Field computer	2	SES and Sterling	Own
Geoprobe	6622 CPT	1	Major Drilling	Own
Geophysical instrument	Schonstedt magnetic locator (GA-52Cx)	4	Sterling	Own
Transportation of personnel and field equipment	Passenger cars	6	SES and vendor	Own and rent
Sanitation	Portable toilets	2	Vendor	Rent
Geophysical survey supplies	Engineers tapes, traffic cones	4 sets	Sterling	Own
PPE	Hard hats, Tyvek, gloves, eye protection	10 sets	Vendor	Purchase
Office processing of data and development of maps	GIS workstation	2	SES and Sterling	Own
Office processing of data and development of maps	GPS	3	SES	Rent to purchase
Photo documentation of fieldwork	Camera	1	SES	Own
Geophysical survey supplies	Archer XF-101 GPS	2	Sterling	Own
Soil sampling	PID	2	SES	Own

GIS = Geographic Information System  
 PID = photoionization detector  
 SES = SpecPro Environmental Services

GPS = Global Positioning System  
 PPE = personal protective equipment

### **6.3 PROCUREMENT PROCEDURES**

Equipment will be procured or purchased for each aspect of project activities during this field effort. An evaluation will be performed whether to rent or purchase needed equipment. When possible, SES will price equipment through three different commercial vendors and select the most economical option. It may be the case that renting equipment and supplies is more economical than purchasing equipment. In certain cases involving special maintenance and calibration requirements for an instrument, a sole-source vendor may be used.

### **6.4 LEASED OR RENTED VEHICLES**

Vehicles used for this project will be SES owned or rented from a rental vehicle agency.

### **6.5 CONSUMABLE SUPPLIES AND PERSONAL PROPERTY**

Consumables and personal property include home office supplies and equipment such as letterhead, pen/pencils, standard personal computers, office furnishings, etc. Field office supplies are direct charged to the project.

### **6.6 PROPERTY STORAGE PLAN**

Equipment will be stored at the SES Richmond Hill office. No Government furnished property will be used for this project.

### **6.7 PROPERTY TRACKING**

Although this is a firm fixed price contract, SES will maintain an inventory list for the nonconsumable items purchased for the project. When applicable, the serial number, model or manufacturer, date purchased, present location of item, cost, current status (functional, need of repair, needs batteries, etc.), and a description of the item will be included on the inventory list.

### **6.8 LOSS NOTIFICATION**

No Government furnished equipment will be used for this project.

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## 7. REFERENCES

ARCADIS/ Malcolm Pirnie, Inc., September 2011. *Phase 2 Confirmatory Sampling Report, Fort Stewart, Georgia.*

Earth Resources Technology, Inc. (ERT, Inc.), November 2012. *Final Revised MMRP RCRA Facility Investigation Work Plan for Anti-Aircraft Range 90-mm – 2 MRS (FTSW-002-R-01) and Hero Road Trench Area MRS (FTSW-008—R-01) Fort Stewart Hinesville, Georgia.*

ERT, Inc., August 2014. *Final Revised MMRP RCRA Facility Investigation Report for the Anti-Aircraft Range 90-mm – 2 MRS (FTW-002-R-01) and the Hero Road Trench Area MRS (FTSW-008-R-01), Fort Stewart, GA.*

Environmental Protection Agency, January 2000. *Data Quality Objectives Process for Hazardous Waste Site Investigations (QA/G-4HW).*

USACE Savannah District, October 2008. *Draft Report for Soil Sampling at Small Arms Range Berm Area in Fort Stewart, Georgia.*

SES, November 2012 (Revision 1). *Final Preliminary Investigation/ TCRA for the Small Arms Range Berm Area of MMRP Site FTSW-006-R-01 Fort Stewart, Georgia.*

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**Appendix A**  
**Scope of Work**

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W912HN-10-D-0001

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

**SUMMARY OF CHANGES**

SECTION SF 30 - BLOCK 14 CONTINUATION PAGE

The following have been added by full text:

**MODIFICATION  
TO  
SCOPE OF WORK  
FOR  
  
SITE INVESTIGATION  
SMALL ARMS RANGE BERM AREA  
  
FORT STEWART, GEORGIA**

W912HN-10-D-0001, TASK ORDER 0025

(Shaded Text indicates modified portion of the base Scope of Work)

**MODIFICATION**  
**TO**  
**SCOPE OF WORK**

**SITE INVESTIGATION**  
**SMALL ARMS RANGE BERM AREA**  
**FORT STEWART, GEORGIA**

**1.0 INTRODUCTION**

**1.1 Site Description**

Fort Stewart (then known as Camp Stewart) was established in June 1940 as an anti-aircraft artillery training center. Between January and September 1945, the installation operated as a prisoner-of-war camp. The installation was deactivated in September 1945. In 1950, Fort Stewart was reactivated to train anti-aircraft artillery units for the Korean Conflict and was expanded to include armor training in 1953. Fort Stewart was designated a permanent Army installation in 1956. The installation became a flight training center in 1966. Aviation training at the Fort Stewart facilities was phased out in 1973. In January 1974, the 1st Battalion, 75th Infantry was activated. Fort Stewart then became a training and maneuver area providing tank, field artillery, helicopter gunnery, and small arms training for regular Army and National Guard units. The 24th Infantry Division was permanently stationed at Fort Stewart in 1975 and reflagged the 3d Infantry Division in May 1996.

**1.2 Current Regulatory Status**

The Small Arms Range Berm Area is located near 15<sup>th</sup> street approximately 300 yards from the rear of Building 1805. The United States Army Corps of Engineers (USACE) Construction Division is currently constructing several buildings around the area referred to as the small arms range.

In August 2010 Malcolm Pirnie conducted a Phase 2 Confirmatory Sampling (CS) at the small arms range and several other sites. Two unexpected munitions debris items were found during a visual survey of the small arms range area. Malcolm Pirnie recommended that an RCRA Facility Investigation/Corrective Measures Study be done based on munitions debris finds and historical EOD responses in the area.

Ft. Stewart wants to conduct a Preliminary Site Investigation (SI) / Interim Removal Action (IRA) at the small arms range Berm Area. The scope of the project Ft. Stewart wants to conduct is outlined below.

The base contract that addresses the remaining 190 acres not impacted by MILCON construction, issued on 13 Sept 2011, initiated effort for drafting a work plan only. The remaining tasks were awarded the following quarter. Prior to final approval of the work plan, site conditions changed as a result of encroaching military construction. This modification to the

scope of work (MOD) reflects the changes in the effort needed to complete the work with new site conditions. Due to changes in site conditions this MOD reflects a phased approach to completing a RCRA Facility Investigation (RFI).

### 1.3 Contaminants of Concern

The site has been previously used as a small arms firing range. Therefore, the contaminants of concern (COCs) for this site are antimony, copper, and lead.

### 1.4 Project Objectives

The project objectives are as follows:

- To provide further delineation of the contaminants of concern at the site so that an accurate assessment can be made using the U.S. EPA Regional Residential Soil Screening Levels for Region IV and the appropriate method for assessment and evaluation of subsurface soil constituents leaching potential to groundwater.
- To provide RCRA Facility Investigation (RFI) report and a human health and ecological risk assessment for the media of soil.

### 1.5 Authority

- 10 USC Chapter 160 - Defense Environmental Restoration program
- 42 USC 9601 et. Seq.; 49 CFR 264, Title II, Subpart C, Section 3004 - Resource Conservation and Recovery Act
- CERCLA/SARA, Sections 120, 104 (b) and (e), 113k, and 211, paragraph 2705.
- Georgia Department of Natural Resources, Environmental Protection Division, Chapter 391-3-19, *Hazardous Site Response*, as amended.

### 1.6 References

The list of references below includes some documents that are applicable to this scope of work but is not limited to these documents alone.

- Draft Report for Soil Sampling at Small Arms Range Berm Area, Fort Stewart, GA; USACE Savannah District, October 2008;
- EM 200-1-3, Requirements for the Preparation of Sampling and Analysis Plans, 01-Feb-2001, <http://140.194.76.129/publications/eng-manuals/>

- EM 385-1-1, Safety and Health Requirements Manual, 15 September 2008 with revisions;
- EM 1110-1-4000, Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic and Radioactive Waste Sites, 1 Nov 98;  
<http://140.194.76.129/publications/eng-manuals/>
- ER 385-1-92, Safety and Occupational Health Requirements for Hazardous, Toxic and Radioactive Waste (HTRW) Activities, 1 May 2007.
- ER 1110-1-263, Chemical Data Quality Management for HTRW, 30 April 1998;  
<http://www.usace.army.mil/usace-docs/eng-regs/er1110-1-263/toc.htm>
- Georgia Department of Natural Resources, Hazardous Site Response Act Guidance, 2008.
- Phase 2 Confirmatory Sampling Report, Fort Stewart, GA. Malcolm Pirnie INC, December 2010.

## **2.0 DESCRIPTION OF SERVICES**

### **2.1 Statement of Contractor Services and Responsibilities**

#### **2.1.1 Services**

The contractor shall provide the services necessary to plan and execute the required tasks of this Scope of Work (MOD) within the approved schedules and contract period. The work shall be completed in accordance with the MOD and all applicable federal, state, and local laws and regulations, and meet all project objectives. The scope consists of the following major tasks:

Task 1 WP / APP / SSHP

Task 2-OPTION 1-Magnetometer Survey

Task 3-OPTION 2-Confirmatory Sampling

Task 4-OPTION 3-Interim Removal Action

Task 5-OPTION 4-Site Investigation Reporting

#### **2.1.2 Responsibilities**

The contractor shall perform and assume all responsibility for the accuracy and completeness of the work and services for the described project in accordance with established criteria, standards, and instructions. Should the contractor receive any directions or instructions which are beyond

the scope of work, the contractor shall not proceed with the work but shall notify the Contracting Officer (KO) in writing, describing the changes and the impact on the effort within 10 calendar days.

### **2.1.3 Professional Judgment**

The Contractor shall continuously review the Scope of Work (MOD), and all work during the progress of the delivery order, for potential changes that would be in the best interest of the Government. If changes are needed, the Contractor shall contact the Project or Technical Manager to discuss the needs or recommendations and follow-up with a Confirmation Notice within three workdays. The negotiated MOD is not to be viewed as a final, inflexible work order. The Contractor shall use professional judgment to make suggestions to improve the quality of the work, reduce any unnecessary work (and associated costs), and improve the final product (workplan, design, report, etc.). The Contractor shall also ensure that the USACE and the USACE's customers (Base, Installation, etc.) meet all reporting requirements under the regulations.

### **2.1.4 Applicable Regulations**

The contractor shall obtain and apply all applicable USACE, federal, State of Georgia, and local regulations and guidelines. The contractor shall comply with any state requirements for the registration of engineers, geologists, surveyors, drillers and any other applicable disciplines. If any of the USACE requirements conflict with any regulations or guidance documents from regulatory agencies, the USACE TM shall be notified and the regulatory agency requirements shall be followed.

### **2.1.5 Release of Information**

The contractor shall not publicize, nor release in any manner, information or data with regard to projects on which they may be working or negotiating with this office; nor discuss prior to public release by this office, a project, any future project/program, or any planning with anyone not directly concerned with the project. Any inquiries regarding these matters shall be referred to the Contracting Officer (KO).

The above restrictions are not intended to interfere with notification of Federal, State and local agencies as may be required by applicable laws and regulations regarding releases of hazardous materials and substances and other such materials covered therein. To this end, the contractor is obliged to be familiar with applicable Federal, State, and local laws, regulations and procedures regarding such reporting. Such notifications should also be made when there is a reasonable likelihood of harm to persons on or around the project area resulting from a release of potentially dangerous material. Where time permits, the contractor shall coordinate such notifications with the CO.

## **2.2 Task 1 - APP / SSHP / WP**

Prior to field activities, the Contractor shall prepare and submit Final, and Revised Final versions of a Site Investigation (SI) Workplan. The SI Workplan shall detail the work to be performed by the contractor to satisfy the MOD requirements for the project. All copies (Final, and Revised Final) shall be certified by a Professional Geologist, Engineer, or other disciplines, as applicable; all copies of the Site Safety and Health Plan shall be certified by a certified industrial hygienist (CIH) or certified safety professional (CSP). The SI Workplan shall include the following subplans or updates to the following subplans, as appropriate, in the order listed below:

- Project Management Plan (PMP)
- Site Investigation Work Plan (WP)
- Data Management Plan (DMP)
- Accident Prevention Plan (APP) / Site Safety & Health Plan (SSHP)
- Sample and Analysis Plan (SAP)

The Work Plan will address the specific work that is described in sections 2.3 – 2.6 (Tasks 2 – 5) of this MOD and will be submitted in accordance with section 2.6.3 of this MOD. The Workplan and sub-plans shall be prepared in accordance with plans and management requirements of Section 3.0 and the technical requirements described in Section 4.0. The draft and final versions of the SI Workplan shall be submitted for review and comment. Comments shall be provided to the A/E for discussion and incorporation in succeeding document versions.

The Work Plan shall also include a SAP prepared in accordance with *Requirements for the Preparation of Sampling and Analysis Plans* EM 200-1-3. For details on how to prepare an APP see Appendix A (or attached) of the *Safety and Health Requirements Manual*, EM 385-1-1. The SSHP for the project shall also be written in accordance with EM 385-1-1.

The SSHP shall be developed for USACE review and acceptance. The SSHP shall incorporate any other subplans required by the APP as well as a UXO Safety Plan. The APP shall reference the applicable sections of the SSHP. The document will contain or discuss, as a minimum, the following items related to this MOD.

- Field Work
- Accident Prevention Plan
- Health and Safety Plan
- Work Plan
- Implementation Schedule

### **2.3 Task 2 – OPTION 1 - Magnetometer Survey**

Perform a geophysical survey to identify the extent of possible small arms munitions and associated debris. This investigation will be a primary task as part of an environmental and safety evaluation investigation prior to land development, excavation, or construction at the approximate 190-acre wooded site. The initial phase of investigation is to characterize the site to extent of potential environment and safety risk. An electromagnetic induction (EMI) investigation is best suited for this investigation because the available electromagnetic instrumentation has the capability of detecting surface, as well as near surface (5 foot depth) metallic debris. A line spacing (transect profiles) of 20 feet will provide the requisite 50% coverage based on anticipated target size and the ability of the electromagnetic instrumentation to transmit and receive reliable reflected signal from targets 5 feet either side of the instrument travel path. Data maps and anomaly selection tables will present the results of the initial investigation.

The placement of detected features onto existing electronic maps will require locating the survey grid relative to the site coordinates; this will require conducting a Wide Area Augmentation System (WAAS) enabled GPS survey to relate the grid coordinates to your existing electronic map coordinate systems.

During the field effort a UXO specialist will be required to be onsite. If explosive or chemical agent contamination or unexploded ordnance is discovered at any time during operations at any site, the contractor shall immediately stop operations in the affected areas, mark the location, and notify the USACE PM.

#### 2.4 Task 3 – OPTION 2 - Confirmatory Sampling

- Collect 2 soil samples per location (surface and subsurface) at no more than 200 locations or no more than 400 total confirmatory soil samples (**reduced from 500 samples previously awarded**) with appropriate Quality Assurance/Quality Control (QA/QC). A surface soil sample will be obtained from 0 to two feet below ground surface and a subsurface soil sample will be obtained from two to four feet below ground surface at each location.
- All samples are to be analyzed for lead, copper and antimony and submitted with validation report.
- Develop site-specific Soil Screening Levels (SSL) derived from acceptable analytical test method such as Synthetic Precipitation Leaching Procedure (SPLP) to evaluate the potential for constituents detected in subsurface soil to leach to groundwater and incorporate the results of that evaluation into the report. Obtain 1 sample for the SPLP analysis at six locations within the 200 locations above. These samples are to be obtained immediately above the soil/groundwater interface. At each of the six locations, obtain geotechnical samples to use in the evaluation.
- During the field effort a UXO specialist will be required to be onsite. If explosive or chemical agent contamination or unexploded ordnance is discovered at any time

during operations at any site, the contractor shall immediately stop operations in the affected areas, mark the location, and notify the USACE PM.

The contractor shall conduct legally defensible sampling, analysis, and data validation. The laboratory used for this project must have current NELAC certification and any applicable State of Georgia licensing or certification requirements shall also be met. The contractor shall submit a Data Quality Objectives Table that includes each contaminant of potential concern and compares the applicable regulatory limits to the contractor's analytical laboratory's published reporting limits for those contaminants. The contractor shall provide a copy of all analytical data in electronic data files in United States Environmental Protection Agency's Staged Electronic Data Deliverable (SEDD), Stage 2b format, to the USACE TM within two weeks after the contractor receives the data from the laboratory.

This work shall also include the temporary storage, characterization, management, and disposal of Investigation Derived Wastes (IDW). The Contractor shall discuss in the Workplan the temporary storage, characterization, management, and disposal of all IDW. The IDW shall include drill cuttings, development water, purge water, decontamination water, and expendable supplies (plastic sheeting, gloves, Tyveks, etc.). The Contractor shall determine the lowest cost methods for IDW characterization and disposal and propose the methods in the Workplan. All IDW shall be stored in properly labeled DOT drums or approved containers and placed on pallets near their source or stored in a nearby area designated by the Facility and approved by the USACE TM. The drums shall be appropriately labeled with weather resistant labels and shall contain pertinent information such as the project name, point of contact, and contact phone number, and a brief content description. Upon approval by regulatory agencies and notification by the USACE PM, the Contractor shall return to the project site and dispose of all IDW by the approved method.

#### 2.4.1 Site Visits

The contractor shall notify the USACE Project Manager at least 10 days prior to any site visits. Notification by phone is sufficient.

#### 2.5 Task 4 – OPTION 3 - Waste Removal

Due to the change in site conditions and the need for site characterization, the decision to implement a remedy for material associated with the four berms will be based on investigation data and risk assessment. This task is modified to only characterize the potential for contamination associated with the four berms.

The four berms range from an estimated 560 feet to 670 feet in length and are 6 ft wide and 2 ft high. One of the berms contains concrete barriers behind the wall of soil.

- Characterize each berm with sufficient number of sample locations along the length and width

- Collect 2 soil samples per location (surface and subsurface) not to exceed 144 total soil samples in addition to appropriate Quality Assurance/Quality Control (QA/QC).
- All samples are to be analyzed for lead, copper and antimony and submitted with validation report.
- During the field effort a UXO specialist will be required to be onsite. If explosive or chemical agent contamination or unexploded ordnance is discovered at any time during operations at any site, the contractor shall immediately stop operations in the affected areas, mark the location, and notify the USACE PM.

## **2.6 Task 5 – OPTION 4 - Interim Removal Action Report**

Due to the change in site conditions and the need for site characterization, the effort for interim removal awarded previously is modified to provide site characterization only and as a result modifying the reporting requirements as described below.

The A/E shall collect and analyze all data under Task 2, 3, & 4. A **RCRA Facility Investigation (RFI) report** shall be prepared for this site. At a minimum, the report shall contain detailed documentation and evaluation of all the work that has been completed. The RFI report shall include Human Health and Ecological Risk Assessment for surface and subsurface soil. All copies (Draft, Final and Revised Final) shall be certified by a Professional Geologist, Engineer. The report shall be submitted in accordance with the standards described in **Section 2.6.1.**

### **2.6.1 Electronic Deliverables**

All documents are to be delivered in the Adobe PDF format 1.4 (compatible with Acrobat 5.0) with searchable text using the original image. Files printed from scanned documents shall be as legible as the originals. Care shall be taken to optimize the scanning settings to ensure to avoid excessive PDF file size. All scanned documents shall be assembled into the fewest number of individual files as appropriate and grouped according to property/project task. The PDF file generation settings need to be submitted in writing and approved by the Government.

#### **2.6.1. PDF Standards**

The contractor shall prepare all documents according to the following specifications.

##### **2.6.1.1.1 Adobe PDF Version**

The PDF file shall be in PDF Version 1.4, or later which is compatible with Acrobat 5.0.

##### **2.6.1.1.2. PDF Image + Searchable Text Conversion**

PDF Image + Searchable Text Conversion contain a bitmapped image of the original, and a hidden layer of searchable text. The conversion process shall involve scanning the hardcopy

original, performing OCR (Optical Character Recognition) to capture the text of the document, and distilling the two layers into a PDF searchable image file. The PDF searchable image files will be as legible as the original. Indexing: The Contractor shall ensure that the PDF/Searchable Image files shall be able to be indexed for full-text retrieval by any search engine capable of indexing PDF files.

#### **2.6.1.1.3. Bookmarks**

The contractor shall bookmark all section headings, subheadings, appendices, maps/drawings, and table of contents according to the document table of contents to provide quick access to specific areas of the PDF document in order to have retrieval of chapters, sections, appendices, and illustrations one click away.

#### **2.6.1.1.4. Document Title**

The PDF file will be titled according to the following standard: DERP Property Number or Project Number (as appropriate) - Project Name - Document Name - Document Date. For example, the Archive Search Report Findings for Olathe Naval Air Station (DERP Project Number B07KS002904) would be named “B07KS002904 – Olathe Naval Air Station – Archive Search Report Findings – July 1995”.

#### **2.6.1.2 Document Security**

Each PDF file will have the following document security settings applied. The Master Password will be “DERP PIRS”.

- Security Method: Adobe Standard Security
- Encryption Level: 128-bit RC4 (Acrobat 4.0)
- User Password: No.
- Master Password: Yes.
- Printing: Fully Allowed.
- Changing the Document: Not Allowed.
- Copying Content or Extraction: Allowed
- Authoring Comments and Form Fields: Not Allowed.
- Form Field Filling or Signing: Not Allowed.
- Content Accessibility Enabled: Allowed.
- Document Assembly: Not Allowed.

#### **2.6.1.3 Document Options**

- Fast Web Viewing. The PDF file will be saved to optimize the file for Fast Web Viewing.

- Background PDF Downloading. The PDF will be created to permit background PDF downloading.

#### 2.6.1.3.1 Document Open Options

- Initial View: Bookmarks and Page.
- Page Number: 1
- Magnification: Fit in Window
- Window Options: Resize Window to initial page, and Display Title

#### 2.6.1.3.2 Scanning Standards.

The Contractor shall scan the all pages according the following:

Document Type	Color Type	Scanning Resolution (dpi)
Black & White Text	Binary	300
Black & White drawing/map	Binary	150
Grayscale photo/drawing/map	Black & White Photo 16 Shades of grey	150
Color Photo/drawing/map	Color Photo 256 colors	150

#### 2.6.1.4.1 Image Orientation

All pages will be at the correct orientation, i.e. text will be readable without rotating the pages.

#### 2.6.1.4.2 De-skewing

If necessary, pages will be de-skewed to ensure correct page orientation; for those pages skewed due to scanning problems.

#### 2.6.1.5 Delivery and Media Format.

A copy of all files, and all project related submission documents developed under this contract shall be delivered to the Government on electronic digital media with each progress submission. All submittals shall be provided in their native electronic digital format and shall be provided on read-only memory (DVD or CD). The electronic digital media shall be in the format that can be read and processed by the Government's target Intel based computer system. Each DVD shall have an index file created in Microsoft Excel placed in its root directory named "index.xls" that shall contain as a minimum a list of the filenames, their directory location on the DVD, and a brief description of their content. The files shall be copied to the delivery media using standard DOS copy commands, or other methodology approved in writing by the Government, in an orderly directory structure approved by the Government. At a minimum, each directory shall

contain the DERP property number (and project number if available). The external label for each electronic digital media shall contain, as a minimum, the following information:

- The Contract Number (and Delivery Order Number if applicable) and date.
- The format and version of operating system software.
- The sequence number of the digital media.

Each DVD or CD shall be delivered in a jewel case with a paper index of DVD or CD content. The contractor will also provide assistance to the USACE loading the electronic digital media on a centralized USACE server or at individual district servers.

### **3.0 PLANS AND MANAGEMENT**

#### **3.1 Project Management**

The contractor shall provide the details of his/her project management within the Project Management section of the workplan. Information on specific elements of project management and related functions is provided below.

##### **3.1.1 Project Manager**

The contractor shall assign a principal or key employee to serve as the contractor's Project Manager (PM). The contractor's PM shall oversee the coordination and execution of the entire project and shall be capable of administering all instructions from the USACE and obtaining answers to all questions related to the project during the course of the Task Order period.

##### **3.1.2 Project Team**

The contractor shall assemble a team composed of personnel experienced in appropriate disciplines to accomplish the specified work. A brief resume of key members of the project team, both contractor and subcontractor personnel, shall be furnished in the Project Management Plan.

##### **3.1.3 Coordination and Points of Contact**

During the execution of the work under this contract Task Order, the contractor shall keep in close liaison with the Corps PM, who will coordinate the work with the Fort Stewart Directorate of Public Works (DPW). The project points of contact (POCs) will be:

USACE, Savannah:

Ana Vergara	Project Manager	(912) 652-5835
Zsolt Haverland	Technical Manager	(912) 652-5815

Fort Stewart DPW:

Algeana L. Stevenson

Ft. Stewart IRP Manager

(912) 210-2950

### **3.1.4 Review of Progress and Technical Adequacy**

At appropriate times, representatives of the Contracting Officer may review the progress and technical adequacy of the work. Such review will not relieve the contractor from performing all contract Task Order requirements.

### **3.1.5 Project Records**

At the completion of the project, the contractor shall provide to the USACE PM a complete set of project records including all correspondence, memorandums, trip reports, confirmation notices, test results, submittals, photographs, and any other records or documents generated as a result of the project. *The project records shall be submitted in both hard copies and in electronic file format.*

### **3.2 Schedule and Progress Reports**

The contractor shall include with his proposal a tentative schedule for the completion of all work as outlined in this Scope of Work. Within 10 days of receipt of the notice to proceed, the contractor shall prepare a progress chart showing the project schedule for completion of the work. The schedule shall be prepared in reproducible form and submitted for approval. The actual progress of the work shall be updated and submitted by the 5th day of each month and may be included with the request for payment. Progress charts must be revised to reflect modifications and other approved changes in scheduling. Along with the progress chart, a monthly progress report in letter form shall be provided to the USACE PM. The letter shall outline the progress during the past month and the projected work effort for the next month. All progress reports and schedules shall be submitted via electronic mail. Progress reports shall include exposure man-hours.

### **3.3 Submittals**

#### **3.3.1 General Requirements**

The contractor shall submit the documents listed in section 3.3.2, including Draft, Final and Revised Final copies of the Workplan and the Reports to the addresses shown in Section 3.3.3. All other documents shall be submitted to the Savannah District only. All submittals for review shall contain a cover letter stating the project title, contract and Task Order numbers, phone numbers for POCs of contractor and USACE, and the dates by which the comments are to be received at USACE. The contractor shall coordinate the cover letters with the USACE. Submittals to regulatory reviewers shall be shipped by registered mail or other method where a signed receipt indicating appropriate delivery is obtained.

#### **3.3.2 Confirmation/Notices**

The contractor shall provide a record within 5 days of occurrence of all discussions, verbal directions, and telephone conversations participated in by the contractor or his representative on

matters relative to this contract Task Order. These records, entitled "Confirmation Notices" shall be numbered sequentially and shall fully identify participating personnel, subject(s) discussed, and any conclusions reached.

**3.3.3 Submittal and Document Schedule**

<u>DOCUMENT</u>	<u>SUBMITTAL DATE</u> (Days after NTP)
* Progress Chart	10
* Final RFI Work Plan	40
Final RFI Work Plan Review	95
* Revised Final RFI Work Plan	115
Field Work Begins	170
* Draft RFI/Risk Assessment Report	285
Draft RFI/Risk Assessment Report Review	330
* Final RFI/Risk Assessment Report	350
Final RFI/Risk Assessment Report Review	395
* Revised Final RFI/Risk Assessment Report	415
* Monthly Progress Reports	5th of each month
* Minutes of Meetings/Conferences	5 days after meeting

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\* Denotes contractor submittals

**3.3.4 Document Distribution**

<u>OVERNIGHT MAILING ADDRESS</u>	<u>COPIES OF REPORTS</u>		
	DRAFT	FINAL	REV. FINAL
U.S. Army Corps of Engineers ATTN: CESAS-PM-H (Ana del Vergara, PG) 100 W. Oglethorpe Ave. Savannah, GA 31401-0889	2	2	2
Department of the Army HQ, 3D Infantry Division (Mechanized) & Fort Stewart Directorate of Public Works, Attn: Algeana L. Stevenson 1550 Frank Cochran Drive Ft. Stewart, GA 31314-4927	2	2	2
<b>TOTAL</b>	<b>4</b>	<b>4</b>	<b>*4</b>

\* Note: A CD version shall accompany each Revised Final submittal.

## **4.0 TECHNICAL REQUIREMENTS**

### **4.1 Project Management**

The contractor shall prepare a Project Management Plan (PMP) as a subplan to the workplan that shall include a discussion of the technical approach and schedules associated with this project. The PMP shall also include a description of personnel, including subcontractor personnel, required to complete this project.

### **4.2 Data Management**

The contractor shall prepare a Data Management Plan (DMP) as subplan to the workplan. The DMP shall fully describe the methods, techniques, and procedures that the contractor will use to ensure that all data produced during the project will be accurately gathered, recorded, maintained, and reported. Data shall include all information from surveys, drilling, and testing. All field and laboratory data shall be submitted as part of the Investigation Report.

Data presented in the report shall be in the following forms: listed, sorted, tabulated, graphed, or charted, or any combination of the above. Figures and charts shall be used to clearly highlight relationships of data on a site or significant contamination in relation to regulatory requirements (e.g., ACLs, MCLs etc.). Reduced data presented in the report shall be of sufficient quantity and quality to ensure the accurate use of common statistical methods.

### **4.3 Health, Safety, and Emergency Response**

#### **4.3.1 General**

The Contractor shall be fully responsible for the administration of health and safety requirements for the project. The Contractor Accident Prevention Plan (APP) and Site-Specific Safety and Health Plan (SSHP) shall be completed in accordance with all local, State, and Federal regulations. The APP and SSHP shall be prepared in accordance with the requirements of EM 385-1-1, "Safety and Health Requirements Manual" 15 September 2008 with revisions, and ER 385-1-92 Safety and Occupational Health Requirements for Hazardous, Toxic and Radioactive Waste (HTRW) Activities, 1 May 2007. The APP shall identically follow the outline and numbering system presented in EM 385-1-1. All subplans required by the APP shall be incorporated into the SSHP with the APP referencing their location. The SSHP shall also address UXO safety by incorporating a plan or section devoted to this subject.

The Contractor shall utilize the services of a Certified Industrial Hygienist (CIH) or Certified Safety Professional (CSP) experienced in hazardous waste site operations to oversee the

development and implementation of the health and safety documents required by this section. Other professionals may also be needed, such as UXO/OE safety specialists, to ensure that all hazards are addressed. The CIH/CSP shall review and sign all drafts, final, and revised final submittals of the SSHP. If the information made available is insufficient to allow the Contractor to develop these documents, a description of all additional information required shall be prepared and submitted to the USACE PM.

The workplan and the SSHP shall be submitted for review and comment. Comments shall be provided to the contractor for discussion and incorporation in the succeeding version(s) of the document. The contractor shall ensure all necessary certifications and documentation is attached to each document version and is valid, and shall annotate all comments, including location of any changes. Work shall not begin until the SSHP is accepted. Worker certifications must be submitted no later than 2 weeks prior to initial fieldwork.

Due to the possibility that USACE personnel may be visiting the site, the Contractor shall be prepared to provide personal protective equipment (PPE), with the exception of APRs and steel-toed boots. A maximum of 3 sets of PPE shall be present on site for USACE use.

#### **4.3.2 Regulatory Requirements**

All site investigation activities and health and safety documents required by this MOD shall comply with and reflect the following regulations and appropriate guidance publications, at a minimum:

- a. Federal Acquisition Regulation, FAR Clause 52.236-13: Accident Prevention.
- b. U.S. Army Corps of Engineers, Safety and Health Requirements Manual, EM 385-1-1, 15 September 2008; with revisions.
- c. U.S. Army Corps of Engineers Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities, ER 385-1-92, 1 May 2007.
- d. Occupational Safety and Health Administration (OSHA) Construction Industry Standards, 29 CFR 1926, General Industry Standards, 29 CFR 1910, especially 29 CFR 1910.120 - Hazardous Waste Site Operations and Emergency Response.
- e. NIOSH/OSHA/USCG/EPA, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," October 1985.
- f. Other applicable Federal, State, and local safety and health requirements.

#### **4.3.3 Unexploded Ordnance (UXO)**

If explosive or chemical agent contamination or unexploded ordnance is discovered at any time during operations at any site, the contractor shall immediately stop operations in the affected areas, mark the location, and notify the USACE PM. The USACE PM will make arrangements for the evaluation and proper disposal of the device. It is anticipated that, in the unlikely event that such a condition arises, it will be overcome with only a slight delay to the contractor. It is

the express intention of the USACE that the contractor is not to drill, excavate, or otherwise disturb the subsurface in areas where ordnance, agent, or explosives may reasonably be suspected. The SSHP shall address awareness, avoidance, reporting, and other procedures for unexpected UXO safety.

#### 4.3.4 Examples of Guidance Available

The following are examples of available guidance that can be used:

- TLVs - Threshold Limit Values and Biological Exposure Indices (current edition), ACGIH (American Conference of Governmental Industrial Hygienists).
- OSHA, 29 CFR 1910, in general, and specifically Sections .20 and .21 (Health and Safety Plan); Section .120 (Hazardous Waste Operations and Emergency Response); Section .134 (Respiratory Protection); and Section .1200 (Hazard Communication Standard).
- U.S. Army Corps of Engineers Safety Manual, EM 385-1-1, 15 September 2008; with revisions.
- U.S. Army Corps of Engineers Safety and Occupational Health Document Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities, ER 385-1-92, 1 May 2007.

#### 5.0 PERIOD OF PERFORMANCE

As a result of this modification, the task order completion date is hereby extended from 30 September 2013 to 27 September 2014.

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**Appendix B**  
**Points of Contact**

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**Appendix C**  
**Contractor Forms**

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**DAILY INSPECTION AND WEEKLY AUDIT LOG  
FOR OE OPERATIONS**

<b>DATE:</b> _____		<b>TIME:</b> _____		<b>LOG NO.:</b> _____	
<b>CONTRACT NO.:</b> _____			<b>TASK ORDER NO.:</b> _____		
<b>SITE NAME AND LOCATION:</b> _____					
<b>WEATHER CONDITIONS:</b> _____ _____					
<b>I. AREAS INSPECTED:</b> (List by grid number, team or task) _____ _____					
<b>II. INSPECTION RESULTS</b>					
Item Description		Pass	Item Description		Pass
1. Personal Protection (PPE) per SSHP		Y / N	9. UXO/OE Detection Equipment		Y / N
2. Work Practices Follow SSHP/WP		Y / N	10. UXO/OE Detection Equipment Calibration		Y / N
3. Site Control/Decon per SSHP		Y / N	11. MSDSs and Container Labeling per SSHP		Y / N
4. First Aid Kit(s)/Eyewash Station(s)		Y / N	12. On- and Off-Site Communications		Y / N
5. Fire Extinguisher(s)		Y / N	13. Site House Keeping		Y / N
6. Flammable Storage Areas		Y / N	14. Explosives / Ordnance Storage Areas		Y / N
7. Safety and Health Monitoring Equipment Use		Y / N	15. Other: (list)		Y / N
8. Monitoring Equipment Calibration		Y / N	16. Other: (list)		Y / N
<b>III. SUMMARY OF DEFICIENCIES NOTED:</b> (If required) _____ _____					
<b>IV. CORRECTIVE ACTIONS RECOMMENDED:</b> (If required) _____ _____					
<b>V. REINSPECTION RESULTS:</b> (If required) _____ _____					
<b>VI. SIGNATURES:</b>			I acknowledge that I have been briefed on the results of this inspection and will take corrective actions (if necessary)		
Site Safety and Health Officer			Sr. UXO Supervisor / Project Manager		
_____			_____		

Note: Safety Inspections are to be conducted each day and documented on this form. This form will also be used to document the Weekly Safety Audit conducted at the end of each workweek. The weekly audit will not only indicate the present status of the site/site operations, but will also be used to note the current status of deficiencies noted during daily inspections. Any daily inspection forms where deficiencies have been noted, and the weekly audit will be faxed to the Sterling Occupational Safety and Health Manager.

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## VEHICLE INSPECTION CHECKLIST

(To be used weekly for all vehicles **EXCEPT** explosive carriers, which must be inspected prior to each explosives transport)

Site Name / Location: \_\_\_\_\_

SUXOS: \_\_\_\_\_ Inspector: \_\_\_\_\_ Vehicle: \_\_\_\_\_  
(MAKE AND LICENSE PLATE #)

Date Inspected: \_\_\_\_\_ Mileage: \_\_\_\_\_ Owner: \_\_\_\_\_  
(RENTAL, EODT, GFE, CONTRACT)

	Pass	Fail		Pass	Fail
<b>1. DOCUMENTATION:</b>			<b>2. BRAKES:</b>		
Registration	[ ]	[ ]	Hand/Emergency	[ ]	[ ]
Insurance	[ ]	[ ]	Service	[ ]	[ ]
Emergency Route Map and Phone Numbers	[ ]	[ ]			
<b>3. TIRES:</b>			<b>4. BELTS:</b>		
Pressure	[ ]	[ ]	Proper tension	[ ]	[ ]
Condition	[ ]	[ ]	Condition	[ ]	[ ]
<b>5. EQUIPMENT:</b>			<b>6. LIGHTS:</b>		
Fire extinguishers*	[ ]	[ ]	Headlights (high & low)	[ ]	[ ]
First Aid/CPR/Burn	[ ]	[ ]	Brake Lights	[ ]	[ ]
Eyewash kits	[ ]	[ ]	Parking	[ ]	[ ]
Emergency Breakdown Kit	[ ]	[ ]	Back-up	[ ]	[ ]
Spare Tire	[ ]	[ ]	Turn Signals	[ ]	[ ]
Tire Changing Equipment	[ ]	[ ]	Emergency Flashers	[ ]	[ ]
Tie downs*	[ ]	[ ]			
Chocks*	[ ]	[ ]			
Placards*	[ ]	[ ]			
<b>7. FLUID LEVELS:</b>			<b>8. GENERAL:</b>		
Oil	[ ]	[ ]	Windshield Wipers	[ ]	[ ]
Coolant	[ ]	[ ]	Windshield/Windows	[ ]	[ ]
Brake	[ ]	[ ]	Seat Belts	[ ]	[ ]
Steering	[ ]	[ ]	Steering	[ ]	[ ]
Transmission	[ ]	[ ]	Horn	[ ]	[ ]
Windshield Wiper	[ ]	[ ]	Gas Cap	[ ]	[ ]
Fluid Leaks	[ ]	[ ]	Mirrors	[ ]	[ ]
			Cleanliness	[ ]	[ ]
			Exhaust System*	[ ]	[ ]

(Note: Items marked with \* are required for explosive carriers and must be inspected prior to each use)

Description of deficiencies: \_\_\_\_\_

Deficiencies corrected by: \_\_\_\_\_ Date: \_\_\_\_\_

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## INSTRUMENT TEST REPORT – DAILY

<b>Project Name:</b>	<b>Project No:</b>	<b>Location:</b>	<b>Date:</b>

Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

### I. Test Plot Information

**Location:**

Item Number	Inert Item/Surrogate Description	Depth (inches)	Inclination Angle(Degrees)	Comments
1				
2				
3				
4				
5				

### II. Instrument Information

Instrument Type / Manufacturer	Instrument Property Number	Test Plot Items Instrument Tested on (List Item Numbers)	Setting On Instrument Tested (As per WP)	Test Results, <input checked="" type="checkbox"/> indicates good for operation	Personnel Testing Equipment	Comments
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		

### III. Problems Encountered / Corrective Actions Taken.

Explain in space below:

### IV. Supervisor

<b>Name and Signature:</b>	<b>Title/Company:</b>	<b>Date:</b>

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**<SITE> DAILY REPORT**

<b>CONTRACT NUMBER</b>		<b>TITLE AND LOCATION</b>		<b>DAY/DATE</b>	<b>REPORT NUMBER</b>
X###XX-##-X-####-###		<Location, e.g., Ft. Hunter Liggett> <Title, e.g., MPMG Surface Clearance>		MM/DD/YYYY	1 Page 1
<b>CONTRACTOR:</b> SOI			<b>NAME OF SUXOS</b>		
<b>WEATHER:</b> <e.g., clear>				<b>TEMPERATURE</b> Low: 0 High: 0	
<b>WEATHER EFFECTS:</b> <e.g., None>					
<b>PRIME CONTRACTOR/SUBCONTRACTOR WORKFORCE</b>				<b>SUMMARY OF WORK PERFORMED</b>	
<b>NAME</b>	<b>POSITION</b>	<b>HOURS</b>	<b>EMPLOYER</b>		
	<e.g., Project Manager>	0.0	SOI		
	<e.g., SUXOS>	0.0	SOI	<e.g., MEC Clearance>	
	<e.g., FOA>	0.0	SOI	<e.g., Administrative>	
	<e.g., UXOSO/QCS>	0.0	SOI	<e.g., MEC Clearance>	
	<e.g., UXOQCS>	0.0	SOI	<e.g., MEC Clearance>	
<b>&lt;e.g., Survey Sub&gt;</b>	<e.g., Surveyor>	0.0	<e.g., Pacific>	<e.g., Survey>	
	<e.g., Assistant>	0.0	<e.g., Pacific>	<e.g., Survey>	
	<e.g., Assistant>	0.0	<e.g., Pacific>	<e.g., Survey>	
<b>&lt;e.g., Survey&gt;</b>	<e.g., Surveyor>	0.0	SOI	<e.g., Survey>	
	<e.g., Tech II>	0.0	SOI	<e.g., Escort>	
	<e.g., Tech II>	0.0	SOI	<e.g., Escort>	
<b>&lt; e.g., Team 1&gt;</b>					
	<e.g., Tech III>	0.0	SOI	<e.g., MEC Clearance>	
	<e.g., Tech II>	0.0	SOI	<e.g., MEC Clearance>	
	<e.g., Tech I>	0.0	SOI	<e.g., MEC Clearance>	
	<e.g., Tech I>	0.0	SOI	<e.g., MEC Clearance>	
	<e.g., Tech I>	0.0	SOI	<e.g., MEC Clearance>	
<b>&lt; e.g., Team 2&gt;</b>					
	<e.g., Tech III>	0.0	SOI	<e.g., MEC Clearance>	
	<e.g., Tech II>	0.0	SOI	<e.g., MEC Clearance>	
	<e.g., Tech II>	0.0	SOI	<e.g., MEC Clearance>	
	<e.g., Tech I>	0.0	SOI	<e.g., MEC Clearance>	
	<e.g., Tech I>	0.0	SOI	<e.g., MEC Clearance>	
	<e.g., Tech I>	0.0	SOI	<e.g., MEC Clearance>	
<b>* TOTAL WORK HOURS ON JOB SITE THIS DATE</b>		0.0		<b>WERE THERE ANY LOST TIME ACCIDENTS THIS DATE?</b> <input type="checkbox"/> YES <input type="checkbox"/> NO  IF "YES", ATTACH SUMMARY OF INCIDENT OR OSHA REPORT	
<b>* CUMULATIVE TOTAL OF WORK HOURS FROM PREVIOUS REPORT</b>		0.0			
<b>* TOTAL WORK HOURS FROM START OF PROJECT</b>		0.0			

<b>&lt;SITE&gt; DAILY REPORT</b>			
CONTRACT NUMBER	TITLE AND LOCATION	DAY/DATE	REPORT NUMBER
X###XX-##-X-####-###	<Site e.g., Ft. Hunter Liggett> <Location, e.g., MPMG Surface Clearance>	MM/DD/YYYY	Page 1 2
* <b>Number of Points Surveyed today:</b>			
* <b>The following Grids passed SOI QC:</b>			
* <b>The following Grids failed an SOI QC Inspection:</b>			
<b>LOCATION AND DESCRIPTION OF DEFICIENCIES</b>			
<i>(Materials, Equipment, Safety, and/or Workmanship)</i>			
*			
*			
<b>DEFICIENCIES CORRECTED</b>			
*	Report No.	Compliance Notice No.	
* <b>SAFETY TOPICS COVERED:</b>			
* <e.g., Ordnance safety, heavy equipment>			
*			
*			
<b>REMARKS:</b> (Include directions received from client's representative, visitors, compliance notices received; pertinent information)			
* Team 1 total Anomaly Count	FHL	0	
* Team 2 total Anomaly Count today:	FHL	0	
*			
*			
*			
* <b>TOTAL Anomalies TODAY:</b> 0			
<b>Comments:</b>			
*			
*			
*			
*			



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## DAILY QUALITY CONTROL REPORT

Project Name:		Report No:	
Project No:	Location:	Date:	
<input type="checkbox"/> Sunday	<input type="checkbox"/> Monday	<input type="checkbox"/> Tuesday	<input type="checkbox"/> Wednesday <input type="checkbox"/> Thursday <input type="checkbox"/> Friday <input type="checkbox"/> Saturday
Weather/Precipitation:		High Temperature:	Wind:
		Low Temperature:	Humidity
<b>I. Personnel Present</b> (Reference/attach Site Managers daily report, if applicable.)			
Name	Position	Company	
<b>II. Work Performed</b> (Annotate the field work performed during the Reporting Period.)			
<b>III. Quality Control Activities</b> (Reference/attach inspection/surveillance reports.)			
<b>IV. Problems Encountered / Corrective Actions Taken</b>			
<b>V. Directions Given / Received</b>			
<b>VI. Special Notes / Lessons Learned</b>			
<b>VII. Visitors</b>			
<b>VIII. Certification</b> (I certify that the above information is correct and complete.)			
Name and Signature:	Title/Company:	Date:	

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SPECRO ENVIRONMENTAL SERVICES LLC
DRILL RIG CHECKLIST

Site Name:
Equipment Type (Model and Manufacturer):
Serial Number: Owner of Rig:
Inspection Performed by: (Driller's Signature) (Date)

Checklist Reviewed and Emergency Shutdown Observed by: (Signature) (Date)

1.0 GENERAL

1.1 Check all safety devices that are part of drill rig and can be verified (\* see note). Are all devices intact and operating as designed? Yes No

Emergency Interrupt System

- A. Kill Switch 1 Yes No N/A
B. Kill Switch 2 Yes No N/A
C. Kill Switch 3 Yes No N/A
D. Kill Switch 4 Yes No N/A
E. Kill Switch 5 Yes No N/A
F. Other Yes No N/A
G. Other Yes No N/A
H. Other Yes No N/A

\* Note: All safety devices not otherwise listed in this checklist should be identified for each drill rig at the beginning of each project and subsequently checked at each inspection. Testing of all safety devices must be observed by health and safety personnel. List only safety devices that can be checked without disassembly or without rendering the device ineffective. This checklist does not cover U.S. Department of Transportation requirements.

- 1.2 Is the proper type and capacity of fire extinguisher(s) present properly charged, and inspected? Yes  No  N/A
- 1.3 Is rig properly grounded? Yes  No  N/A
- 1.4 Are rig and mast a safe distance from electrical lines? Yes  No  N/A
- 1.5 Can mast be raised without encountering overhead obstruction? Yes  No  N/A
- 1.6 Have spill prevention materials been placed under rig (i.e. plastic sheeting)? Yes  No  N/A
- 1.7 Is a spill kit present? Yes  No  N/A
- 1.8 Is the safe operating zone/exclusion zone posted (minimum radius at least equal to height of raised drill mast)? Yes  No  N/A
- 1.9 Do all modifications made to the drill rig permit it to operate in a safe manner and allow the drill to operate within the manufacturer's specifications? Yes  No  N/A
- 1.10 Are moving parts (excluding cathead) properly guarded? Yes  No  N/A
- 1.11 Are all exhaust pipes, which could come into contact with personnel during normal operations properly guarded? Yes  No  N/A
- 1.12 Are tank(s) and lines free of leakage? Yes  No  N/A
- 1.13 Have all normal or manufacturer-recommended maintenance activities been performed at the appropriate frequency? Yes  No  N/A
- 1.14 Are walking and standing surfaces, steps, rungs, etc. free of substances (excess grease, oil, or mud) that could create a hazard? Yes  No  N/A

## 2.0 CONTROL MECHANISMS

Are all control mechanisms and gauges on the drill rig functional and free of grease, oil and ice (checked while running)? Yes  No  N/A

### 3.0 HYDRAULICS AND PNEUMATICS

Note: The mast should be lowered during the completion of this section to allow inspection of portions of the lifting mechanisms normally out of reach during operation.

- 3.1 Do all hydraulic reservoirs have proper fluid levels? Yes  No  N/A
- 3.2 Are hydraulic and/or pneumatic systems in good condition and functioning correctly (checked while running)? Yes  No  N/A

### 4.0 LIFTING MECHANISMS

Note: The mast should be lowered during the completion of this section to allow inspection of portions of the lifting mechanisms normally out of reach during operation.

- 4.1 Have all wires, ropes, cables, and lines that are kinked, worn, corroded, cracked, bent, crushed, frayed, stretched, birdcaged, or otherwise damaged been replaced and the defective equipment removed from the site? Yes  No  N/A
- 4.2 Have all wires, ropes, cables, and lines been wrapped around winch drums without excessive pinching or binding? Yes  No  N/A
- 4.3 Are all pulleys undamaged & functional? Yes  No  N/A
- 4.4 Are all clips, clamps, clevises, hooks or other hardware used to rig wires, ropes, cables, or lines undamaged and attached properly? Yes  No  N/A
- 4.5 Do all eyes formed in wires, ropes, cables, or lines attached to the rig use a thimble to retain the shape of the eye? Yes  No  N/A
- 4.6 Do all hooks have functioning safety gates/latches? Yes  No  N/A

### 5.0 NONCONFORMING ITEMS

- 5.1 When did the last operation checklist inspection take place for this drill rig at this site?  
Date: \_\_\_\_\_

5.2 Have any nonconforming items been carried over from the last inspection? List any items and dates of original nonconformance.

A. \_\_\_\_\_

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

B. \_\_\_\_\_

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

C. \_\_\_\_\_

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

D. \_\_\_\_\_

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

Any nonconforming items must be documented in the following remarks section and reported to the Site Superintendent and/or the SSHO for the project prior to operating the drill rig. Reference all remarks to the item numbers noted above.

Remarks:

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## IDW Sample Worksheet

**SAMPLE LOCATION:** \_\_\_\_\_ (site/well #)

**SAMPLE DATE:** \_\_\_\_\_ **TIME:** \_\_\_\_\_

**SAMPLE MATRIX:**    Purge Water    Decon Water    Development Water

DPT Soil Cuttings    Other: \_\_\_\_\_

**DRUM//TANK// NUMBER:**

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**LIST ANALYTICAL SUITE**

**CONTAINER**

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**SAMPLER:** \_\_\_\_\_

**SAMPLE NUMBER:** \_\_\_\_\_

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### Weekly Job Site Inspection Checklist

**Project Name:** \_\_\_\_\_

**Inspection Date:** \_\_\_\_\_

**Project Supervisor:** \_\_\_\_\_

DESCRIPTION	YES	N/A	NO	IF NO, WHY?
<b>1.0 Project Administration: 1926, Subpart C</b>				
1.1 OSHA and other required posters/sign posted				
1.2 Do all employees meet the required training level?				
1.3 Was a pre-job safety meeting held?				
1.4 Are toolbox meetings conducted and documented?				
<b>2.0 Housekeeping: 1926, Subpart C</b>				
2.1 General orderliness of the site acceptable?				
2.2 Passageways and walkways clear?				
2.3 Containers with lids provided for trash?				
<b>3.0 Medical Services and First Aid: 19256, Subpart D</b>				
3.1 One employee on site with current CPR/First Aid?				
3.2 First Aid Kit provided and properly stocked?				
3.3 Emergency communication numbers available?				
<b>4.0 Sanitation, 1926, Subpart D</b>				
4.1 Adequate supply of drinking water provided?				
<b>5.0 Hazard Communication</b>				
5.1 Is a hazardous material inventory available?				
5.2 Are MSDSs available for all hazardous materials on site?				
5.3 Are all containers properly labeled?				
5.4 Have all employees been trained?				
<b>6.0 Personal Protective Equipment: 1926, Subpart E</b>				
6.1 Are approved hard hats worn by all personnel?				
6.2 In eye and face protection provided and used as needed?				
6.3 Are full body harnesses with dual shock absorbing lanyards provided?				
6.4 Are employees tied of 100% of the time if over six feet?				
6.5 Are employees wearing gloves when required?				
6.6 Are employees dressed in appropriate work clothing?				
6.7 Are employees wearing proper boots?				
6.8 Is all equipment inspected regularly and maintained in a safe and sanitary condition?				

DESCRIPTION	YES	N/A	NO	IF NO, WHY?
<b>7.0 Fire Protection and Prevention: 1926, Subpart F</b>				
7.1 Is the necessary fire fighting equipment provided?				
7.2 Are No Smoking signs posted within 50 feet of flammable liquids?				
7.3 Are combustible or flammable materials stored, dispensed, and used properly?				
<b>8.0 Signs and Signals</b>				
8.1 Are warning signs properly posted and visible?				
8.2 Is the construction area properly posted?				
<b>9.0 Handling and Storage: 1926, Subpart H</b>				
9.1 Is material stacked, racked, blocked, or otherwise secured to prevent falling or collapse?				
9.2 Are correct lifting methods used?				
9.3 Is all rigging equipment properly used and inspected?				
9.4 Is the Crane Operator certified and trained?				
<b>10.0 Tools – Hand and Power: 1926, Subpart I</b>				
10.1 Proper tools being used for the job?				
10.2 Proper inspection and maintenance of tools?				
10.3 Tools and cords in good condition & free of defects?				
10.4 All mechanical safeguards in place?				
10.5 Ground fault protection being utilized?				
<b>11.0 Electrical: 1926, Subpart K</b>				
11.1 Adequate wiring, well-insulated, no frayed cords?				
11.2 Are extension wires 3-prong and designed for rough usage?				
<b>12.0 Others</b>				
12.1 Are environmentally sensitive areas, equipment, or storage clearly identified and controlled?				

Supervisor Signature: \_\_\_\_\_

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



**Material Handling Equipment, Daily Inspection Checklist**

*(This checklist must be completed daily by the driver before operating the equipment.)*

Equipment No. \_\_\_\_\_ Week of \_\_\_\_\_

ASSIGNED OPERATORS

ALTERNATE OPERATORS

Hour Meter/ Odometer Reading

\_\_\_\_\_

\_\_\_\_\_

Start of Week \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

End of Week \_\_\_\_\_

	SUNDAY		MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY	
	OK	Needs Attn.	OK	Needs Attn.	OK	Needs Attn.	OK	Needs Attn.	OK	Needs Attn.	OK	Needs Attn.	OK	Needs Attn.
<b>Battery Compartment</b>														
cleanliness														
water levels														
connections														
<b>Battery Indicator</b>														
inspect state of charge														
<b>Tire Check</b>														
damaged wheels														
damaged or missing lugs														
condition of tires														
<b>Brakes</b>														
pedal travel														
parking brake holds equipment in place														
<b>Safety Devices</b>														
check horn														
check backup alarm														
lights and reflectors														
<b>Check for new Damage</b>														
Explain in remarks section														
<b>Operators compartment</b>														
check operator controls														
check seat belts														
windshield wipers														
defrosters														
fire extinguisher														
overhead guard in place & secure														
<b>Leaks</b>														
Check under vehicle for puddles														
<b>Steering</b>														
Check operation of steering mechanism														
<b>General Operation</b>														
inspect for unusual operation														
<b>Mast and Forks</b>														
fork pins														
mast operation														
are forks level														

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### Boring Log

Boring/Well:		Installation:		Site:	
Project No.			Client/Project:		
Contractor:			Drilling Contractor		
Driller:			Borehole Diameter(s):		
Start Date:		Time:	End Date:		Time:
Drilling Meth/Rig Type:			Coordinates: N		E
Logged By		E-Log?:	From:	To	Prot. Level

Depth	Sample	Sample No.	Off-site Lab	On-site Lab	OVA Reading (ppm)	Headspace (ppm)	Recov (ft/lft)	Lithologic Description	USCS	Blows/6 in	Stratigraphic Log	Well Construction Data	Water Depth & Remarks	GS Elev
0														
5														
10														
15														
20														
25														
30														
35														

U = Thin Wall Tube                      R = Rock Coring                      On-Site G/C (Make/Model) \_\_\_\_\_  
 S = Split Spoon (tube)                  O = Other                                  G/C Operator: \_\_\_\_\_  
 C = Cuttings                                  OVA Instrument (Make/Model) \_\_\_\_\_

Notes: \_\_\_\_\_

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# Subsurface Log



Project Name: \_\_\_\_\_ Date: \_\_\_\_\_  
 Location: \_\_\_\_\_ Excavation: \_\_\_\_\_  
 Method: \_\_\_\_\_ Job Number: \_\_\_\_\_  
 Form Completed by: \_\_\_\_\_

Depth (Ft)	Sample Location	Moisture %	Dry Density (PCF)	Compaction (%)	Grain Size Percent				USCS	Symbol	Type	Description
					Gravel	Sand	Silt	Clay				
5												
10												
15												
20												
25												
30												

Comments: \_\_\_\_\_

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## EMPIRICAL LABORATORIES, LLC - CHAIN OF CUSTODY RECORD

SHIP TO: 621 Mainstream Drive, Suite 270 ♦ Nashville, TN 37228 ♦ 615-345-1115 ♦ (fax) 615-846-5426

<b>Send Results to:</b>		<b>Send Invoice to:</b>				<b>Analysis Requirements:</b>												<b>Lab Use Only:</b>														
Name _____		Name _____																VOA Headspace	Y	N	NA											
Company _____		Company _____																Field Filtered	Y	N	NA											
Address _____		Address _____																Correct Containers	Y	N	NA											
City _____		City _____																Discrepancies	Y	N	NA											
State, Zip _____		State, Zip _____																Cust. Seals Intact	Y	N	NA											
Phone _____		Phone _____																Containers Intact	Y	N	NA											
Fax _____		Fax _____																Airbill #: _____														
E-mail _____		E-mail _____																CAR #: _____														
<b>Project No./Name:</b>		<b>Sampler's (Signature):</b>																														
<i>Lab Use Only</i> Lab #	Date/Time Sampled	Sample Description	Sample Matrix															Comments	No. of Bottles	<i>Lab Use Only</i> Containers/Pres.												
Sample Kit Prep'd by: (Signature)		Date/Time	Received By: (Signature)				<b>REMARKS:</b>												<b>Details:</b>													
Relinquished by: (Signature)		Date/Time	Received By: (Signature)																Page _____ of _____													
Relinquished by: (Signature)		Date/Time	Received By: (Signature)																Cooler No. ____ of ____													
Received for Laboratory by: (Signature)		Date/Time	Temperature																Date Shipped _____													
																			Shipped By _____													
																			Turnaround _____													

C-35

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

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**Appendix E**  
**Materials from Sterling Operations**

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## CHAPTER 4

### QUALITY CONTROL PLAN

#### 4.1 INTRODUCTION

This Quality Control Plan (QCP), as a component of the Quality Program (QP), documents the approach and procedures to be used to ensure quality throughout the execution of project tasks for the Site Inspection. All QC activities will be performed and documented in accordance with International Organization for Standardization (ISO) 9001:2008 based standards, all applicable professional and technical standards, and the USAESCH requirements. This QCP applies to all work performed by Sterling and its subcontractors. Specific geophysical data collection QC criteria for analog data collection is presented in Table 4-1.

#### 4.2 QUALITY CONTROL OBJECTIVES

The QC procedures described in this section will be used to conduct site investigation fieldwork. The procedures were designed to manage, control, and document performance of work efforts. This QCP presents the following objectives:

- Identify quality management structure and responsibilities;
- Ensure effectiveness of work performed via audits/surveillances;
- Ensure data correctness through testing and calibrating of equipment;
- Ensure correctness of site records through inspection and maintenance; and
- Determine compliance with this plan, and site safety, environmental, and operational plans.

#### 4.3 QUALITY MANAGEMENT STRUCTURE

The following section describes the structure of the quality management team for Sterling's operations. Personnel were selected based on previous experience and their familiarity with the Sterling QA/QC system.

##### 4.3.1 Quality Control Manager

Mr. Don Welch is the Sterling Quality Control Manager (QCM), and has the ultimate responsibility for the Sterling QP. The QCM's responsibilities include:

- Preparing all QC policies and procedures;
- Establishing guidelines to assist in the development of program-, project-, site-, and task-specific QC policies and procedures;
- Reporting regularly to the President of Sterling on the adequacy, status, and effectiveness of the QP;

- Conducting periodic field audits of the programs, projects, and sites, and submitting a report of findings to the President with courtesy copies to the SUXOS and Sterling’s PM; and,
- Training the site UXOQCS in the performance of their duties.

#### **4.3.2 UXOQCS**

The UXOQCS will have the responsibility and authority to enforce the Sterling and site-specific QCP and procedures. His responsibilities include:

- Coordinating with the USAESCH OESS to ensure that QC objectives appropriate to the project are set and that all personnel are aware of these objectives;
- Coordinating with the Sterling QCM to ensure that QC procedures are being followed and are appropriate for achieving data validity sufficient to meet QC objectives;
- Conducting periodic QC surveillances of all site activities and recording them in the QC Surveillance Report and QC Surveillance Log;
- Reporting noncompliance with QC criteria to the SUXOS, Sterling’s QCM and PM and documenting these nonconformances on the QC Nonconformance Report (NCR) and the QC Inspection Log;
- Coordinating with the responsible parties to initiate the proper corrective actions to be taken in the event of a QC deviation and documenting these actions on the NCR and Log; and,
- Ensuring that Lessons Learned are documented on the QC Surveillance Report and forwarded to the Sterling QCM for analysis.

#### **4.4 QUALITY CONTROL PROCEDURES**

These QC procedures will be applied to the Site Inspection field activities and analog geophysical data collection. Following these QC procedures will ensure employee qualifications, compliance with plans, testing of equipment, maintenance, accuracy and timeliness of reports and records. Specific geophysical data collection QC criteria for analog data collection are presented in Table 4-1.

This section also details data QC criteria for this project. In the event of a QC failure, a root-cause analysis will be undertaken to identify the reason for the failure, to identify how much data has been affected, and whether corrective actions can be taken to correct, mitigate, or eliminate the cause of the failure. The following Table 4-1 presents QC requirements for analog data collection.

**TABLE 4-1: QC REQUIREMENTS FOR ANALOG DATA COLLECTION**

<b>Requirement</b>	<b>Limited Applicability (Specific to Collection Method/Use)</b>	<b>Performance Standard</b>	<b>Frequency</b>	<b>Consequence of Failure</b>
Repeatability (instrument functionality)	All	All items in test strip detected	Min 1 daily, per operator per instrument	Remedial training and removal from mapping for 1 day. Or replacement of faulty equipment.
Geodetic Equipment Functionality	All	Position offset of known/temporary control point within 10m.	Daily when equipment is being used	Redo affected work
Geodetic Repeatability	Grid corners/transect points without anomaly reacquisition	Measured locations are reoccupied with 10m.	1 per lot	Redo affected work
Dynamic Repeatability	Each completed transect	+/- 20% of the documented anomaly count	2% of the total area per lot. The lot size for this requirement will be the total transect area per each of the 7 subareas	Redo affected work

#### **4.4.1 Employee Qualifications**

Prior to the employee’s initial assignment or any change in duties/assignment, the UXOQCS will physically review the employee’s licenses, training records, and certificates to ensure that the employee is qualified. The SUXOS, or his designee, will maintain personnel files on each employee. These records will include copies of licenses, training records, and certificates of qualifications that support the employee’s placement and position.

#### **4.4.2 Training**

Employee training is an integral part of producing quality products. Sterling conducts site-specific employee training prior to the start of operations and supplements this initial training, as necessary, throughout the remainder of the project. Site specific training is conducted by the UXOSO/UXOQCS and the SUXOS, and records of training will be maintained on the SharePoint portal. At a minimum, Sterling personnel will receive the following types of training:

- **OSHA:** Current certification in accordance with 29 CFR 1910-120(e)(f).
- **Safety:** Review project safety documentation, with specific emphasis on the hazards known to exist on site.
- **Equipment Operator’s Training:** Tailored to the experience level of the operator and objectives of the project.
- **Daily Safety Training:** Tailgate briefings outlining the day’s activities, unique hazards, and safety precautions, as well as other operational issues related to the project.

- **Weekly Safety Meetings:** On the first workday of each week, a topic will be selected and elaborated on at the tailgate briefings.
- **Visitor Training:** All site visitors shall receive general and site-specific training as a portion of their in-briefing.

#### **4.4.3 Equipment Function Check and Tests**

Investigation equipment utilized on site will be checked for operational reliability and functioning in accordance with the manufacturer's specifications. The UXOQCS will ensure that all equipment is functioning properly before use.

All equipment used at the site will be dedicated solely to the project until the project is completed. The UXOQCS are specifically responsible for ensuring that equipment is checked by the SUXOS, or his designee, prior to being placed into operation. Records of these checks will be documented on the QC Surveillance Report and logged on the QC Surveillance Log. If equipment field checks indicate that any piece of equipment is not operating correctly and field repair cannot be made, the equipment will be tagged by the SUXOS, or his designee, and removed from service. Sterling's Munitions Response Equipment Manager will be notified and a request for replacement equipment will be placed immediately. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service.

#### **4.4.4 Equipment Maintenance Program**

- **Preventive Maintenance:** The assigned operator of each piece of equipment will perform scheduled and, when necessary, unscheduled maintenance to ensure that the equipment is maintained in a satisfactory operating condition. Preventive maintenance consists of before-, during-, and after-maintenance checks.
- **Routine Repair and Adjustment:** Routine repair and adjustment is based on the manufacturer's schedule for adjustment, calibration, or replacement.
- **Emergency Repair:** Emergency repair includes any unscheduled repair. This type of repair will be conducted using manufacturer-required replacement parts to ensure the continued integrity of the equipment.
- **Included Equipment:** Equipment included in the maintenance program will be checked as follows:  
(NOTE: equipment not specifically mentioned will be checked before use for case integrity, sufficient battery voltage, and general operation)
  - **Radios/Cellular Phones:** Before-operation checks shall include verification of a complete battery charge and a communications

check to ensure that the unit is operating properly. During-operation checks shall include checks to ensure that the battery charge remains adequate and a communications check. After-operation maintenance shall include a communications check, cleaning, turning off the equipment, and placing it in a battery charger.

- **Vehicles:** Before-operation checks shall include an operator general inspection of the entire unit to include fluid levels, safety equipment operation, and tire condition. During-operation checks shall include frequent checks of the dials and gauges and a tire check at breaks. After-operation checks shall include topping off of any fluids that are low, a general cleaning, and a recheck of all safety-related equipment.
- **Investigation Equipment:** Before-operation checks shall include function checks in accordance with manufacturer's guidance and, if applicable, a battery charge check. During-operation checks will include frequent inspections to ensure that the unit is operating properly and the battery charge is sufficient. After-operation checks shall include a general cleaning, turning off the unit, and placing into a battery charger, if applicable.

#### **4.4.5 Logs and Records**

For all site work, field personnel will use logbooks with numbered pages. The field logbooks will be used to record the daily activities of the field team, provide sketch maps and locations of UXO and other pertinent items, and note any observations that might affect the quality of data. Specific forms and records to be used on site will be provided to the field team on CD. The field logbooks and site records are utilized to record the following:

- **Daily Journal:** The SUXOS will maintain the daily journal. This journal will provide a summary of all operations conducted, to include information on weather conditions, problem areas, Work Plan modifications, injuries, start/stop times, tailgate safety briefs, equipment discrepancies, UXO/MEC located, training conducted, visitors, and any additional items deemed appropriate.
- **Field Logbooks:** The UXOT3s will maintain field logbooks. These logbooks will be maintained in a neat and legible manner and will provide a historic record of site activities. These logbooks will include the respective team's daily activities, to include start/stop times.
- **MEC Accountability Log:** The UXO supervisors will prepare individual records for each work area at the site. The records will consist of a series of

sheets that will be used to record data on MEC items encountered. Each MEC item will be given a unique identifying number to differentiate it from all others. These sheets will be consolidated into one log organized by day.

- **Safety Logbook:** The UXOSO will maintain the safety logbook. The log will be used to record all safety matters associated with the specific project, such as safety briefings/meetings, including items covered and attendees, safety training, safety audits, near-misses/accidents/incidents, cause and corrective action taken, weather conditions, and any other matters encompassing safety.
- **Training Records:** The SUXOS or other designee will maintain training records for all site personnel. These records will contain training certificates, licenses, and other qualifying data for an individual's position.
- **QC Logs:** The UXOQCS will maintain the QC log. The results of all surveillance, inspection, and NCR activities will be recorded on the appropriate report and logged in the appropriate log, as required by the QC SOPs. These reports and logs will be kept on site and copies sent to the Sterling QCM for analysis.
- **Visitors Logbook:** The UXOSO will maintain the visitor logbook. All personnel that are not directly involved in the project site activities are identified in this log by name, company, date, time in/out, and a contact phone number. Safety briefings and training for visiting personnel will also be recorded in this log.
- **Photographic Log:** The UXOSO will maintain a photographic log. This log will be used to record all photographs taken to document work and/or site conditions. Photographs will be marked with a unique identifying number relating back to the photographic log and will be maintained on file until the end of the project.
- **Site Maps:** The SUXOS will maintain a current working map of the operating areas throughout execution of this project. These maps will be used to document UXO finds, task progression, and other pertinent activities and locations.
- **Document Control Log:** The UXOSO or UXOQCS or designee will maintain the document control log, which will include numbers and the name of the responsible party for all logs and any other documents of importance.

Logbooks and records will be inspected by the UXOQCS on a weekly basis. These inspections will focus on the completeness, accuracy, and legibility of the entries and records. Results of these inspections will be documented on the QC Surveillance Report, logged on the QC Surveillance Log, and forwarded to the SUXOS and Sterling QCM. The log keeper's immediate supervisor will review and initial in the logbook his concurrence with the logbook entries on a daily basis.

#### **4.5 QA/QC AUDITS AND SURVEILLANCE**

As part of the Sterling QP for work performed, Sterling will conduct internal audits and surveillances. These audits ensure that all procedures and protocols are being followed, and that the resulting data is accurate and defensible. Field surveillances will concentrate on all aspects of field activities, procedures and documentation. Checks of resulting data for completeness and accuracy within established QC limits for the analog geophysical data collection will be performed

##### **4.5.1 QC Surveillances**

The UXOQCS will conduct team/function surveillance activities. The surveillance activities will ensure that all work conducted at the project site is being carried out in accordance with this Work Plan. Functions to be inspected include project documentation and team performance. These surveillances will be documented on the Sterling QC Surveillance Report and logged on the Sterling Surveillance Log. These surveillance activities are designed to capture lessons learned and promote continual process improvement. Documentation of surveillance activities will be kept on site by the UXOQCS and copies will be posted on the SharePoint portal for Sterling QCM review. These procedures are in compliance with Sterling's ISO 9001:2000 Quality System.

##### **4.5.2 Scheduled Audits**

This is a very short duration field effort. However, audits of various project functions will be accomplished by the UXOQCS or QCM when possible. These functions include, but are not limited to, site documentation, scheduled reports, MEC accountability, man-hours, and costing data.

#### **4.6 NONCONFORMANCE/CORRECTIVE ACTION**

Any noncompliance/nonconformance to contractual requirements must be documented and reported. Noncompliance/nonconformance includes:

- Delivery of items or services by Sterling that do not meet the contractual requirements;
- Errors made in following work instructions or improper work instructions;
- Unforeseeable or unplanned circumstances that result in items or services that do not meet quality/contractual/technical requirements;
- Technical modifications to the project by individuals that do not have the responsibility and authority; and,

- Errors in craftsmanship and trade skills.

Immediately upon discovery of a noncompliance/nonconformance item, the UXOQCS will stop the nonconforming action and then take the following actions:

- Initiate a NCR Report in accordance with the Sterling procedures;
- Assign a responsible individual and a corrective action due date;
- Issue the NCR to the responsible individual and coordinate any corrective actions; and,
- Ensure that any corrective actions are appropriate to the nonconformance.

Immediately upon receipt of a NCR Report, the SUXOS will take the following actions:

- Identify the impact that the nonconformance may have on other project activities;
- Identify and implement the actions required to bring the project/activity back into compliance;
- Conduct a root cause analysis to determine the cause of the nonconformance or non-compliance and develop procedures to preclude recurrence; these procedures will be presented to the UXOQCS for concurrence prior to implementation;
- Identify and implement preventative action to ensure no reoccurrence of non-conformance; and,
- Capture all lessons learned and forward to Sterling's Program Manager and QCM for evaluation and incorporation into companywide continuous improvement initiatives.

#### **4.7 PROJECT RECORDS**

Project records will be maintained on the SharePoint portal.



**STANDARD OPERATING PROCEDURE 120-I  
MUNITIONS AND EXPLOSIVE OF CONCERN RESPONSE ACTIONS OPERATIONS  
for ANOMALY AVOIDANCE**

**Approval Page**

**This Standard Operating Procedure (SOP) has been reviewed by the EODT Environmental Safety and Health Manager and is found to be within EODT's Corporate Environmental Safety and Health Program directives. Implementation of the procedures contained within this document is required during all EODT site operations. These procedures become effective on 25 April 2012. Deviation from these procedures requires prior approval of the EODT Corporate Safety Manager.**

***Approval on file***

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Prepared by:  
Henry M. Kight  
Corporate Safety Manager  
EOD Technology, Inc.

***Approval on file***

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Michael Findley, PhD, CIH, CSP  
EODT Environmental Safety and Health Manager  
EOD Technology, Inc.

## **1.0 PURPOSE**

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to anomaly avoidance operations on sites contaminated or suspected to be contaminated with munitions and explosive of concern (MEC).

## **2.0 SCOPE**

This SOP applies to all site personnel, including subcontractors, involved in operations on a site with MEC contamination or suspected MEC contamination. This SOP is not intended to contain all requirements needed to ensure compliance. Consult the documents listed in Section 3.0 of this SOP for additional compliance issues.

## **3.0 REGULATORY REFERENCES**

The following Occupational Safety and Health Administration (OSHA) standards and U.S. Army Corps of Engineers (USACE) requirements 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 with other SOP's and regulatory references may be needed:

1. 29 CFR 1910 Occupational Safety and Health Standards (applicable sections)
2. Department of the Army Pamphlet (DAPAM) 385-10, Army Safety Program
3. Department of Defense Explosive Safety Board (DDESB) Technical Paper (TP) 18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel
4. USACE, Engineer Regulation (ER) 385-1-95, Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations
5. USACE, Engineer Regulation (ER) 1110-1-8153, Ordnance and Explosives Response
6. USACE, Engineer Pamphlet (EP) 75-1-2, Munitions and Explosives of Concern (MEC) Support During Hazardous, Toxic and Radioactive Waste (HTRW) and Construction Activities
7. USACE, Engineer Pamphlet (EP) 385-1-95a, Basic Safety Concepts and Basic Considerations for MEC Response Action operations (Attachment 1 of this SOP).
8. USACE, Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual.



## **4.0 RESPONSIBILITIES**

### **4.1 PROJECT MANAGER**

The Project Manager (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 UNEXPLODED ORDNANCE SUPERVISOR**

The Senior Unexploded Ordnance (UXO) Supervisor (SUXOS) will ensure that this SOP is implemented for all sites where MEC contamination is suspected or present. The SUXOS will also ensure that relevant sections of this SOP are discussed in the tailgate and daily safety briefings, and that information related to its daily implementation is documented in the Site Operational Log.

### **4.3 TEAM LEADER**

The Team Leader (TL), a UXO Technician III, will be responsible for the field implementation of this SOP and for implementing the safety and health requirements outlined in Section 5.0 of this SOP. In the absence of a SUXOS, the TL will be responsible for implementing the SUXOS's responsibilities outlined in Paragraph 4.2.

### **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 and 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 subcontractors, involved in anomaly avoidance operations on sites with MEC contamination or suspected MEC contamination will be familiar with the potential safety and health hazards associated with MEC operations, and with the work practices and control techniques used to reduce or eliminate these hazards.

### **5.1 TRAINING**

All UXO personnel and other personnel assigned work at an MEC/MC site, including subcontracted personnel, will receive training on the site-specific hazards associated with their project site. They will also receive any supplemental training needed to support specific types of MEC/MC operations, as necessary, based on the nature and

hazards related to the work. For MEC/MC avoidance activities, this supplemental training may include a discussion of procedures for operation of specialized equipment and any special instructions for work with drill rigs or heavy equipment.

## **5.2 DAILY BRIEFING**

At the beginning of each work day, the UXO Lead will hold a daily briefing for the project. At a minimum, this briefing will include the following:

- Review of emergency procedures
- Review of ordnance safety
- Review of communications procedures and equipment
- Review of any site-specific hazards (physical or biological) and the measures that will be used to mitigate those hazards
- A description of any known utilities in work areas
- Procedures for coordination of MEC/MC avoidance work with personnel performing non-UXO activities.

Other issues will be discussed during the briefing as necessary to support safe and efficient operations. The UXO Lead will document the daily briefing in his/her log book and will obtain the signatures of those attending the briefing either in the log book or on a daily briefing attendance sheet. Construction personnel performing activities that require MEC/MC avoidance are required to attend the daily briefings.

## **5.3 TAIL-GATE BRIEFING**

The daily briefing may serve as the tail-gate briefing if the content covers those additional issues normally reserved for discussion during the tail-gate briefing. If the daily briefing is combined with the tail-gate meeting it will include:

- Review of task assignments for the day
- Review of instrument function test procedures/requirements
- Review of task-specific hazards
- Review of any other task or location specific information needed to safely complete the assigned daily work

## **5.4 EQUIPMENT FUNCTION TESTING**

All equipment used by the UXO personnel will be verified to be working properly prior to use each day. The functionality of metal detectors and other handheld locators will be verified and documented by the UXO Lead. This will be accomplished by passing the instrument detection heads over one or more selected metallic item on the ground

surface. If any detection equipment requires repair, is new equipment, or is spare equipment, it must be inspected and confirmed to be operational by the UXO Lead. The UXO Lead will inspect the remaining equipment to be used each day to ensure that the required tools and equipment are available and in proper working order.

## **5.6 GENERAL REQUIREMENTS**

The following sections contain the specific procedures that will be used to conduct MEC/MC avoidance.

1. MEC/MC avoidance activities will not be conducted until the required training (both general and site-specific) and proper equipment checks have been completed.
2. Avoidance activities may be conducted at any given location on site by a UXO Team. The UXO Team will consist of a minimum of two personnel one of whom will be a qualified UXO Technician III. The UXO Team may include additional UXO qualified personnel, geophysicists, sampling personnel or other essential personnel.
3. The UXO Lead will be notified immediately of all MEC finds.
4. UXO personnel must remain on site at all times when non-UXO personnel are conducting intrusive operations or activities sited in known or suspected ordnance use areas.
5. UXO personnel will not conduct disposal operations for MEC discovered during avoidance operations until a proper Work Plan and Health and Safety Plans are approved and the proper number of staff, having the required training and qualifications, are present on site.

### **5.6.3 AVOIDANCE FOR DRILLING**

For drilling work the following activities are required:

UXO technicians equipped with down-hole metal detectors will observe all drilling activities and perform monitoring at the specified intervals. These individuals are charged with identification of MEC/MC items that may be disturbed during the planned activities. In addition to the basic requirements outlined in previous sections, the following procedures are specific to MEC avoidance for drilling operations:

1. Work sites (including drilling locations) and access lanes will initially be cleared (if required) using a geophysical instrument capable of detecting MEC to a depth of at least two feet.
2. Once the initial survey has been conducted, incremental drilling may be initiated at the planned well locations. During this process,

all non-essential personnel will withdraw to a distance at least equal to the fragmentation distance of the most probable munition (MPM) for the work site.

3. A geophysical instrument capable of down-hole monitoring will be used to evaluate the borehole after each specified increment of depth has been augured.
4. As long as no anomalies are detected the borehole will be advanced in the approved increments until the terminal point is reached.
5. It is not necessary for UXO personnel to observe well installation.
6. If an anomaly is detected at any point during the installation of boreholes, the borehole in question will be back filled and an alternate drilling location will be selected.

In order to safeguard UXO personnel and others working on site from non-ordnance related hazards, the following requirements will apply to all drilling operations, unless otherwise approved:

1. Only trained and qualified personnel will be allowed to operate the drilling equipment. The drill rig will be operated in accordance with the manufacturer's guidelines and maintenance manual.
2. Exposed gears and pulleys on the equipment will be guarded.
3. Personnel will be instructed to stay clear of moving parts and rigging lines on the drill rig.
4. The drill bit (auger) will be withdrawn from the boring and secured. The drill rig may have to be moved before UXO personnel move in to evaluate the boring with downhole geophysical equipment.
5. Workers will not assume that the drill rig operator is aware of their exact location. Workers will make eye contact and use hand signals to communicate with the rig operator before approaching the area where the equipment is being operated.
6. When an operator must maneuver equipment in tight quarters, the presence of a second person (spotter) is required to ensure adequate clearance. Hand signals for communication between the operator and spotter will be established. The operator and spotter will always be in visual contact.
7. Equipment must have an audible alarm that sounds when the equipment is moving in reverse.

8. During maintenance operations, the maintenance worker will shut down the equipment and retain the key. The operator will ensure that all mechanical components, particularly those that are hydraulically driven, are de-energized or brought to their lowest energy state (i.e., the operator will ensure that stored energy has been dissipated and that the components have been mechanically locked in place).

## **5.7 ANOMALIES/ITEMS OTHER THAN MEC/MC**

Material other than munitions may be located during the MEC/MC avoidance operations, including metal debris, underground utilities, chemicals, and other hazards. This section provides general guidelines for dealing with some of these anomalies.

### **5.7.1 Metal Debris**

Metal debris located during MEC/MC avoidance will be inspected to ensure that it is not munitions-related. It will then be either left in place or placed in a 55-gallon drum or other suitable container with like items for future disposal or recycling.

### **5.7.2 Underground Utilities**

The detectors used during MEC/MC avoidance operations may provide data indicating that a utility line is potentially present. If there are any indications that a near-surface utility line is present (such as a signal from the locator or discovery of a marking tape), the UXO Lead will be notified immediately. This is particularly important if intrusive construction work is planned.

### **5.7.3 Chemicals**

Locating industrial-type chemicals is a remote possibility during MEC/MC avoidance operations. If any evidence of chemical contamination is detected (stained soil, chemical odors, powders, or other substances resembling chemicals), all activities will cease, and the UXO Lead will make the required notifications. Work will not continue until the MR Safety Manager has determined that it is safe to do so.

### **5.7.4 Other Hazards**

If sealed drums or other suspect materials or conditions that would indicate a potential health or safety hazard are encountered during the investigation, all activities will cease, and the specific notification procedures will be implemented. Work will not continue until the MR Safety Manager has determined that it is safe to do so.



## **5.8 DOCUMENTATION**

The results of MEC/MC avoidance will be recorded in the project log book(s) by the technicians performing this activity. If MEC is found, the appropriate data will be recorded on the MEC Accountability Form. A photograph should be taken of each piece of MEC recovered to document the item. At the end of the day the UXO technicians will ensure that field notes are complete and will submit those notes to the UXO Lead. The UXO Lead will review the notes for accuracy and completeness before submitting copies to the PM for review and inclusion in the project files.

## **5.9 SAFETY HAZARDS AND OPERATIONAL CONTROL TECHNIQUES**

### **5.9.1 MEC Hazards**

Due to the nature of their design and components, MEC presents unique hazards that may cause catastrophic affects involving personal injury or death and property damage. MEC hazards include explosion, fire, burns, over pressurization, excessive noise, and fragmentation.

### **5.9.2 General Precautions for MEC**

If MEC is present and may be located during site activities, only UXO qualified personnel shall be allowed to perform MEC related operations. These personnel will follow the procedures and requirements of this SOP, the applicable references listed in paragraph 3.0 and other ordnance safety procedures found in the Work Plan (WP) when performing anomaly avoidance operations. UXO qualified personnel will also follow all applicable site-specific MEC SOP's presented in the site-specific WP.

### **5.9.3 Requirements for UXO Qualified Personnel**

In order to ensure the safety and health of all site personnel during anomaly avoidance operations a UXO team consisting of a minimum of two personnel, one of whom will be a UXO Technician III. This individual will be the UXO Team Leader. The UXO team must be on site during anomaly avoidance operations. The UXO team may include additional UXO qualified personnel, geophysicists, sampling personnel or other essential personnel. If other UXO Teams are on site readily available and reliable communications will be established in case of emergency.

### **5.9.4 Requirements for Non UXO Qualified Personnel**

In order to ensure the safety and health of site personnel, non UXO qualified personnel will be prohibited from conducting tasks or operations in MEC contaminated areas until authorized by a UXO qualified person. This requirement applies to both general site

personnel and site visitors. Furthermore, the safe work practices and procedures listed below will be, if applicable, followed by, all non UXO qualified personnel on site:

1. Non UXO qualified personnel shall receive site specific MEC recognition training prior to participation in site activities.
2. No non MEC or MEC operations shall be allowed within a teams safe separation distance (200').
3. No non MEC operations will be conducted until such time as the area is first surveyed by UXO qualified personnel. Non MEC operations may be conducted once the area has been surveyed and anomalies marked.
4. Non UXO personnel may enter the work zone with proper escorts and authorization as essential personnel by the SUXOS, UXOSO or TL, whomever is the senior UXO Technician on site.
5. Non UXO qualified personnel shall be escorted in known, or potentially MEC contaminated areas at all times by UXO qualified personnel.
6. Once an area has been surveyed and anomalies marked, the boundaries of the work area will be identified through the use of flagging, and only then may non-UXO qualified personnel perform duties in the area unescorted.
7. At no time shall non UXO qualified personnel leave the cleared area unescorted.
8. Non UXO qualified personnel shall not touch or disturb any object which could potentially be MEC or MEC related, and shall immediately notify the nearest UXO qualified person of the presence of the object.

### **5.10 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS**

The following safety measures and personal protective equipment (PPE) shall be used in preventing or reducing exposure to the hazards associated with anomaly avoidance operations. These requirements will be implemented, unless superseded by site-specific requirements in the SSHP.

1. Hard hats are required only when working around heavy equipment or when an overhead or head impact hazard exists.
2. Composite safety toed boots are required. .
3. Safety glasses will be worn.
4. Leather work gloves.

### **6.0 ATTACHMENTS**

All required documents can be found on the EODT Employee Portal.

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**STANDARD OPERATING PROCEDURE 122**  
**MOTOR VEHICLE OPERATION**

**Approval Page**

**This Standard Operating Procedure (SOP) has been reviewed by the EODT Corporate Safety and Health Manager and is found to be within OSHA and Center for Disease Control (CDC) health directives. Implementation of the procedures contained within this document, is required during all EODT site operations. These procedures become effective on 27 July 2006. Deviation from these procedures requires prior approval of the EODT Corporate Safety and Health Manager.**

***Approval on file***

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Prepared by:  
Henry M. Kight  
Corporate Safety Manager  
EOD Technology, Inc.

***Approval on file***

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Michael Findley, PhD, CIH, CSP  
EODT Environmental Safety and Health Manager  
EOD Technology, Inc.

## **1.0 PURPOSE**

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of on-and off-road motor vehicles.

## **2.0 SCOPE**

This SOP applies to all site personnel, to include contractor and subcontractor personnel, involved in the conduct of operations involving motor vehicle operation. This SOP is not intended to contain all requirements needed to ensure regulatory compliance. Consult the documents listed in Section 3.0 of this SOP for additional compliance issues.

## **3.0 REGULATORY 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 SOP's and regulatory references may be needed:

1. Applicable sections of OSHA Construction Industry Standard 29 CFR, Part 1926.601.
2. Applicable sections of Department of Transportation 49 CFR, Parts 100-199 and 571.
3. USACE EM 385-1-1, Section 18.

## **4.0 RESPONSIBILITIES**

### **4.1 PROJECT MANAGER (PM)**

The Project Manager (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 (SUXOS)**

The Senior UXO Supervisor (SUXOS) will ensure that this SOP is implemented for motor vehicle 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 Operational Log.

### **4.3 UXO SUPERVISOR (UXOT3)**

The UXO Supervisor (UXOT3) shall be responsible for the field implementation of this SOP, and for implementing the safety and health requirements outlined in Section 5.0 of this SOP. In

the absence of a SUXOS, the UXOT3 shall be responsible for implementing the SUXOS's responsibilities, outlined in Paragraph 4.2.

#### **4.4 UXO SAFETY OFFICER (UXOSO)**

The UXO Safety Officer (UXOSO) will be responsible for ensuring that the safety 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 motor vehicle operations shall be familiar with the potential safety 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.

#### **5.1 GENERAL REQUIREMENTS**

"Motor Vehicle" shall mean any vehicle propelled by a self-contained power unit, or equipment designed for use on paved roads. All-purpose utility vehicle (APUV) shall mean any four-wheel, or greater, vehicle propelled by a self-contained power unit, designed for off-road use. Every person regularly or occasionally operating a motor vehicle shall possess, at all times while operating such vehicle, a permit valid for the equipment being operated. No motor vehicle shall be placed in service until it has been inspected and found to be in safe operating condition.

All motor vehicles shall be inspected and maintained IAW this program. Motor vehicles being used shall be checked at the beginning of each day to assure that the all parts, equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use. The parts, equipment, and accessories of concern include service brakes, including trailer brake connections; parking system (hand brake); emergency-stopping system (brakes); tires; horn; steering mechanism; coupling devices; seat belts; operating controls; and safety devices. These requirements also apply to equipment such as lights, reflectors, windshield wipers, defrosters, and fire extinguishers, where such equipment is necessary. Vehicles not meeting safe operating conditions shall be removed from service, repaired or replaced, and re-inspected before being placed back in service.

All motor vehicles operated between sunset and sunrise shall have the following lights:

1. Two (2) headlights, one (1) on each side.

2. At least one (1) red taillight and one (1) red or amber stop light on each side.
3. Directional signal lights, both front and rear.

All motor vehicles, except APUV's, trailers or semi-trailers, having a gross weight of 5,000 pounds or less, shall be equipped with service brakes and manually-operated parking brakes. Service and parking brakes shall be adequate to control the movement of, to stop, and to hold the vehicle under all conditions of service. Service brakes on trailers and semi-trailers shall be controlled from the driver's seat of the prime mover.

Braking systems on every motor vehicle shall be so designed as to be in approximate synchronization on all wheels and develop the required braking effort on the rearmost wheels first, unless the vehicle is equipped with an "Anti-lock Braking System" (ABS). The design shall also provide for application of the brakes by the driver's seat of the prime mover. Exceptions to this are vehicles in tow by an approved tow bar hitch.

Every motor vehicle shall be equipped with the following:

1. A working speedometer.
2. A fuel gauge.
3. An audible warning device.
4. A windshield equipped with an adequately powered windshield wiper.
5. An operable defrosting and defogging device.
6. Adequate rear view mirror, or mirrors.
7. Cabs, cab shields, and other protection to protect the driver from the hazards of falling or shifting materials.
8. Non-slip surfaces on steps.
9. Safety glass in windshields, windows, and doors.
10. No cracked or broken glass.
11. All towing devices that are structurally adequate for the weight drawn, and properly mounted.
12. A power-operated starting device.

All trailers will be equipped as follows:

1. A locking device, or double safety system, shall be provided on every fifth wheel mechanism and tow bar arrangement, which will prevent the accidental separation of towed and towing vehicles.
2. Every trailer shall be coupled with safety chains or cables to the towing vehicle. Such chain or cable shall prevent the separation of the vehicles in the event of failure of the tow bar.

All buses, trucks, and combinations of vehicles with a carrying capacity of 12 tons or greater, when operated on public highways, shall be equipped with emergency equipment required by state laws but not less than those listed below:

1. One (1) red flag, not less than 12 inches square, and three (3) reflective markers, which shall be available for immediate use, in case of emergency stops.
2. Two (2) wheel chocks for each vehicle, or each unit of a combination of vehicles.
3. At least one (1) fire extinguisher rated at 20 BC units, with at least two (2) such rated fire extinguishers being required for flammable cargoes, including UXO/OE.
4. Vehicle exhaust control, so as to present no hazards to the operator, passengers, or other personnel.
5. Records of tests and safety inspections that are maintained at the site and available upon request.
6. All rubber-tired motor vehicles equipped with fenders. Mud flaps may be used in lieu of fenders, whenever motor vehicle equipment is not designed for fenders.

## 5.2 OPERATING RULES

No motor vehicle shall be driven at a speed greater than the posted speed limit, with due regard for weather, traffic, intersections, width, and character of the roadway, type of motor vehicle, and any other existing condition. The operator must, at all times and under all conditions, have the vehicle under such control as to be able to bring it to a complete stop within the assured clear distance ahead. To accomplish this, the operator shall follow the safe operating rules presented below:

1. Headlights shall be switched to low beam when approaching other vehicles.
2. No motor vehicle shall be driven on a downgrade with gears in neutral or with clutch disengaged.

3. Every motor vehicle, upon approaching an unguarded railroad crossing or drawbridge, shall be driven at such a speed as to permit stopping before reaching the nearest track or the edge of the draw and shall proceed only if the course is clear.
4. No motor vehicle shall be stopped, parked, or left standing on any road, or adjacent thereto, or in any area in such a manner, as to endanger the vehicle, other vehicles, equipment, or personnel using or passing that road or area.
5. No motor vehicle shall be left unattended until the motor has been shut off, the key removed (unless site regulations prohibit), the parking brake set, and the gear engaged in low, reverse, or park.
6. If stopped on a hill or grade, front wheels shall be turned or hooked into the curb or the wheels securely chocked.
7. Personnel shall not be permitted to get between a towed and towing vehicle, except when hooking or unhooking.
8. No motor vehicle, or combination of vehicles, hauling unusually heavy loads or equipment shall be moved until the driver has been provided with required permits, the correct weights of the vehicles and load, and a designated route to be followed.
9. When backing or maneuvering, operators will take the applicable precautions and, whenever possible, use a backing guide.
10. Operators of motor vehicles transporting personnel, explosives, or flammable or toxic substances shall stop at railroad crossings or drawbridges, and shall not proceed until the course is determined to be clear. A stop shall be required at a crossing within a business or residential district that is protected by a watch person, traffic officer, or by a traffic signal giving a positive indication to approaching vehicles.
11. When a bus, truck, or truck/trailer combination is disabled or parked on the traveled portion of a highway or the shoulder adjacent thereto, red flags shall be displayed during the daytime and reflector, flares, or electric lights at night. (An exception may be made in residential or business sections or municipalities.)
12. The principles of defensive driving shall be practiced.
13. Seat belts will be installed and worn IAW 49 CFR 571 (DOT).
14. If the windshield wipers are in use due to rain, headlights will be activated.

### **5.3 TRANSPORTATION OF PERSONNEL**

The number of passengers in passenger-type vehicles shall not exceed the number of seats equipped with approved seat belts. Trucks used to transport personnel shall be equipped with a seating arrangement that is securely anchored, a rear gate, a guardrail, and steps or ladders for mounting and dismounting. The beds of trucks which are not equipped with appropriate safety devices, as described in this paragraph, will not be used to transport personnel unless absolutely necessary, and never on a public highway, unless it is an emergency. Additional personnel transportation requirements are listed below:

1. All tools and equipment shall be guarded, stowed, and secured when transported with personnel.
2. No person will be permitted to ride with arms or legs outside of the truck's body, in a standing position on the body, on running boards, or seated on side fenders, cabs, cab shields, rear of truck, or on the load.
3. All motor vehicles transporting personnel during cold or inclement weather shall be enclosed.
4. No explosives, flammable materials (except normal fuel supply), or toxic substances shall be transported in vehicles being used to transport personnel.
5. No motor vehicle transporting personnel shall be moved until the driver has ascertained that all persons are seated, the guardrail and rear gate are in place, and/or doors are closed.
6. Getting on or off any vehicle while it is in motion is prohibited.

### **5.4 FUELING**

All motor vehicles shall be shut off during fueling operations, and no smoking or open flames will be permitted within 50 feet of fueling operations. Care should be taken not to spill fuel, and only that fuel recommended by the manufacturer shall be used. During fueling, when there is a potential for fuel contact with the skin, especially during cold weather, personnel will wear protective gloves, as specified in the SSHP.

### **5.3 LOADING**

Drivers of trucks and similar vehicles shall leave the cab, if the cab of the vehicle being loaded is exposed to danger from suspended or overhead loading operations, unless the cab is adequately protected. No motor vehicle shall be loaded so as to obscure the driver's view ahead or to either side, or to interfere with the safe operation of such vehicle. All motor vehicles carrying loads

which project more than four (4) feet beyond the rear of the vehicle shall carry a red light at or near the end of the projection at night, or when atmospheric conditions restrict visibility. During daylight periods, or other non-restricted conditions, a red flag not less than 12 inches square shall be used. The load shall be distributed, chocked, tied down, or secured.

#### **5.4 ALL-TERRAIN VEHICLES**

During the operation of all-purpose utility vehicles (APUV's), every operator shall possess a valid state driver's license and have completed, as a minimum, an on-site APUV training course prior to operation of the vehicle. The operation of APUV's shall be conducted according to the procedures listed below:

1. The manufacturer's recommended payload shall not be exceeded at any time.
2. Gloves and an approved motorcycle helmet with full-face shield or goggles, or a hard hat and safety glasses, shall be worn at all times while operating an APUV.
3. APUV's are to be used on off-road terrain and gravel roads only. (APUV's shall not be used on paved roads.)
4. APUV's shall be driven during daylight hours only.
5. Only four-wheel, or greater, APUV's shall be used.
6. Passengers are prohibited on APUV's, unless they are designed to carry them.
7. All APUV's shall be equipped with warning signal devices (i.e. horn and backup alarm).

#### **5.5 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS**

Except for the personal protective equipment (PPE) requirements identified previously, no special PPE requirements apply to this SOP.

### **6.0 ATTACHMENTS**

#### **6.1 APPENDIX A - AUDIT CRITERIA**



## **APPENDIX A**

### **AUDIT CRITERIA**

## 1.0 AUDIT CRITERIA

The following items related to vehicle operations will be audited to ensure compliance with this SOP:

1. The Daily Operational Log (Figure 1a and Figure 1b).
2. The Documentation of Training form for the initial site hazard training (Figure 2a, Figure 2b, and Figure 2c).
3. The Documentation of Training form for the Daily Tailgate Safety Briefing (Figure 3a and Figure 3b).
4. The Weekly Vehicle Inspection Checklist - While daily pre-operational inspections of vehicles are required by this SOP, this form shall be completed by the vehicle operator at least weekly, and prior to any transportation of explosives. (Figure 4).

### EODT Senior UXO Supervisor Daily Log

Date	Time	Event

Figure 1a

### EODT Senior UXO Supervisor Daily Log

Notes for Using This Log: This log is intended to be a continuous table that will extend from page to page. The header, footer, and first row of the table will be carried to each new page and a running log of the pages will be kept in the footer. To extend the length of the table (i.e. add additional rows), simply place the cursor in the Event column of the last row and press the “Tab” key. For simplicity of use, make each new entry in a new line within the table. For the first event entry each day, enter the date in the first row under the previous day’s events, enter the time of the event, and then the event description. After that, just enter additional time and event information on successive rows. There is no need to enter a new date with every event recorded within a given date, since the rows in the date column can be merged at the end of the entries for a given date (see example below). To merge the rows in the Date column at the end of the day, place your cursor in the row at the start of the day, click left mouse button, drag down and highlight all rows in the date column down to the last entry for the day. Release the left mouse button and with the cursor over part of the highlighted column, click the right mouse button and select “Merge Cells” in the pop-up menu. Once you have mastered these instructions, or before final submission of this log, delete these instructions and the example table below.

<b>Date</b>	<b>Time</b>	<b>Event</b>
03/22/01	0700	Event 1
	0730	Event 2
	0800	Event 3
	Etc	Event 4
	Etc	Event 5
	Etc	Event 6
	1630	Event 7
03/23/01	0700	Event 1
	0745	Event 2
	01630	Event 3

Figure 1b









### EODT VEHICLE INSPECTION CHECKLIST

(To be used weekly for all vehicles EXCEPT explosive carriers, which must be inspected prior to each explosives transport)

Site Name / Location: \_\_\_\_\_

SUXOS: \_\_\_\_\_ Inspector: \_\_\_\_\_ Vehicle: \_\_\_\_\_  
(MAKE AND LICENSE PLATE #)

Date Inspected: \_\_\_\_\_ Mileage: \_\_\_\_\_ Owner: \_\_\_\_\_  
(RENTAL, EODT, GFE, CONTRACT)

USE  FOR PASS, X FOR DISCREPANCY

1. DOCUMENTATION:	Pass	Fail	2. BRAKES:	Pass	Fail
Registration	[ ]	[ ]	Hand/Emergency	[ ]	[ ]
Insurance	[ ]	[ ]	Service	[ ]	[ ]
Emergency Route Map and Phone Numbers	[ ]	[ ]			
<b>3. TIRES:</b>			<b>4. BELTS:</b>		
Pressure	[ ]	[ ]	Proper tension	[ ]	[ ]
Condition	[ ]	[ ]	Condition	[ ]	[ ]
<b>5. EQUIPMENT:</b>			<b>6. LIGHTS:</b>		
Fire extinguishers*	[ ]	[ ]	Headlights (high & low)	[ ]	[ ]
First Aid/CPR/Burn	[ ]	[ ]	Brake Lights	[ ]	[ ]
Eyewash kits	[ ]	[ ]	Parking	[ ]	[ ]
Emergency Breakdown Kit	[ ]	[ ]	Back-up	[ ]	[ ]
Spare Tire	[ ]	[ ]	Turn Signals	[ ]	[ ]
Tire Changing Equipment	[ ]	[ ]	Emergency Flashers	[ ]	[ ]
Tie downs*	[ ]	[ ]			
Chocks*	[ ]	[ ]			
Placards*	[ ]	[ ]			
<b>7. FLUID LEVELS:</b>			<b>8. GENERAL:</b>		
Oil	[ ]	[ ]	Windshield Wipers	[ ]	[ ]
Coolant	[ ]	[ ]	Windshield/Windows	[ ]	[ ]
Brake	[ ]	[ ]	Seat Belts	[ ]	[ ]
Steering	[ ]	[ ]	Steering	[ ]	[ ]
Transmission	[ ]	[ ]	Horn	[ ]	[ ]
Windshield Wiper	[ ]	[ ]	Gas Cap	[ ]	[ ]
Fluid Leaks	[ ]	[ ]	Mirrors	[ ]	[ ]
			Cleanliness	[ ]	[ ]
			Exhaust System*	[ ]	[ ]

(Note: Items marked with \* are required for explosive carriers and must be inspected prior to each use)

Description of deficiencies: \_\_\_\_\_  
\_\_\_\_\_

Deficiencies corrected by: \_\_\_\_\_ Date: \_\_\_\_\_

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## STANDARD OPERATING PROCEDURE 123 PERSONAL PROTECTIVE EQUIPMENT PROGRAM

### Approval Page

**This Standard Operating Procedure (SOP) has been reviewed by the EODT Corporate Safety and Health Manager and is found to be within OSHA and Center for Disease Control (CDC) health directives. Implementation of the procedures contained within this document, is required during all EODT site operations. These procedures become effective on 27 July 2006. Deviation from these procedures requires prior approval of the EODT Corporate Safety and Health Manager.**

#### ***Approval on file***

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Prepared by:  
Henry M. Kight  
Corporate Safety Manager  
EOD Technology, Inc.

#### ***Approval on file***

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Michael Findley, PhD, CIH, CSP  
EODT Environmental Safety and Health Manager  
EOD Technology, Inc.

## **1.0 PURPOSE**

The purpose of this program is to provide EOD Technology, Inc. (EODT) personnel with general guidelines and procedures for the selection and use of personal protective equipment (PPE). In accordance with (IAW) OSHA standards, EODT will, whenever possible, use engineering controls or other means to control personnel exposures to chemical and physical hazards encountered during operations conducted on hazardous waste and unexploded ordnance (UXO) sites. Whenever engineering controls or other protective measures are not feasible or adequate, this program will be used to select the PPE necessary to ensure the health and safety of site personnel.

## **2.0 SCOPE**

This program will be applicable to EODT projects conducted on hazardous waste or UXO sites where PPE is required and used. The provisions of this program apply to all EODT and subcontractor personnel who perform operations where PPE is required by the Site-Specific Safety and Health Plan (SSHP).

## **3.0 RESPONSIBILITIES**

### **3.1 DIRECTOR OF OPERATIONS (DO)**

The DO is responsible for the overall implementation of the program, and for management of the EODT resources needed for its implementation. The DO is also responsible for the final review and approval of this program.

### **3.2 OCCUPATIONAL SAFETY AND HEALTH MANAGER (OSHM)**

The OSHM is responsible for the continued development and review of this program, and for providing consultation to the Site Safety and Health Officer (SSHO) regarding the PPE to be used for protecting personnel from the chemical and physical hazards found on site. The OSHM is also responsible for the following:

1. Reviewing newly developed or improved PPE, in order to identify products that may afford a higher degree of protection or provide a level of protection not previously available
2. Conducting a task hazard assessment for each task conducted on site, and identifying the chemical and physical hazards from which site personnel will require protection
3. Completing the Certification of Task Hazard Assessment form for each task conducted on site

4. Creating, and incorporating into the SSHP, a Personal Protective Equipment Plan (PPEP) that outlines the PPE to be used for each task conducted on site
5. Periodically inspecting the EODT project sites, in order to ensure that the provisions of this program and the PPEP are being implemented

### **3.3 SITE SAFETY AND HEALTH OFFICER (SSHO)**

The SSHO is responsible for the on-site implementation of this program. To this effect, the SSHO will be responsible for the following:

1. Providing initial training, as specified in Paragraph 5.0 of this program, to inform site personnel of the selection, use, limitations, and maintenance of PPE used on site
2. Issuing PPE IAW the provisions of the SSHP
3. Assisting site personnel with the inspection and maintenance of PPE
4. Consulting with the OSHM to determine the levels and types of PPE to be used for tasks not previously addressed in the SSHP
5. Completing the Certification of Task Hazard Assessment form for any new tasks which were not previously addressed in the SSHP
6. Conducting daily inspections and weekly audits of the site, in order to ensure that site workers are complying with this program and the PPEP

## **4.0 SELECTION OF PPE**

### **4.1 INTRODUCTION**

**4.1.1** Each task outlined in the SOW will be assessed prior to its initiation to determine the risk of personnel exposure to safety and health hazards which may be encountered during its conduct. The hazard assessment will be based on available information pertaining to the historical use of the site, site contaminant characterization data, and the anticipated operational hazards. This information will either be provided by the client or collected by EODT site personnel. The PPE assigned as a result of the hazard assessment represents the minimum PPE to be used during initial site activities. Since hazard/risk assessment is a continuing process, changes in the initial types and levels of PPE will be made IAW information obtained from the actual implementation of site operations and data derived from the site monitoring. As a general rule, the levels of PPE will need to be reassessed if any of the following occur:

1. Commencement of a new work phase, such as the start of drum sampling or work that begins on a different portion of the site

2. Change in job tasks during a work phase
3. Change of season/weather
4. Temperature extremes or individual medical considerations that limit the effectiveness of PPE
5. Encountering of contaminants other than those previously identified
6. Change in ambient levels of contaminants
7. Change in work scope that affects the degree of contact with contaminants

**4.1.2** If work tasks are added or amended after completion and approval of the SSHP, the SSHO will conduct the task hazard assessment and consult with the OSHM. The level and type of PPE to be used will be identified, and the SSHO will complete the Certificate of Task Hazard Assessment form. Any changes in PPE that involve downgrading the level of PPE will be allowed only after review by the OSHM.

## **4.2 SELECTION CRITERIA**

**4.2.1** The OSHM and SSHO will utilize the general chemical resistance information found in Table 1 and Appendix B, the manufacturer's permeation and breakthrough specifications, the requirements outlined in Appendix A, and the anticipated chemical and physical hazards, to select the level and types of PPE to be used for each task.

**4.2.2** During the selection of PPE, the OSHM and SSHO will also take into consideration the following factors:

1. Limitations of the equipment.
2. Work mission duration.
3. Temperature extremes.
4. Material flexibility.
5. Durability/integrity of the equipment.

**4.2.3** Once the specific types of PPE have been selected for each task, the SSHO and OSHM will ensure that the items purchased will properly fit each employee designated to wear PPE.

**4.2.4** Selection of respiratory protection will be conducted IAW the Respiratory Protection Program found in CSHP SOP 125.

**4.2.5** Specific limitations of the PPE selected for site use will be outlined in the PPEP found in each SSHP.

## **5.0 TRAINING**

### **5.1 TRAINING SCHEDULE**

**5.1.1** All EODT, contractor, or subcontractor site personnel will be given initial PPE-specific training that complies with this section. This training will be given by the SSHO or OSHM prior to personnel participating in site operations where PPE is required. This, and all other subsequent PPE training, will include the relevant topics outlined in Paragraph 5.2 of this program.

**5.1.2.** Site personnel will be given additional PPE training whenever any of the following occur:

1. The SSHO has reason to believe that a previously trained employee's knowledge or use of assigned PPE indicates that the employee has not retained the requisite skill or understanding needed to properly use the PPE in question.
2. Changes in the work place render previous training obsolete.
3. Changes in the types of PPE to be used render previous training obsolete.

### **5.2 REQUIRED TRAINING TOPICS**

**5.2.1** EODT will provide all affected site personnel with PPE training that covers the following topics:

1. The decisions and justifications used to select each piece of PPE.
2. The nature of the hazards, and the consequences of not using PPE.
3. What PPE will be required for the conduct of each task.
4. When PPE will be required during the performance of each task.
5. How to properly don, doff, adjust, and wear each piece of PPE.
6. The proper inspection, cleaning, decontaminating, maintenance, and storage of each PPE item used.
7. The limitations of the PPE.

**5.2.2** All personnel receiving PPE training will be required to demonstrate an understanding of the training topics and the ability to correctly use the PPE. This will be accomplished through the SSHO supervising and visually inspecting each individual's ability to properly don and use the PPE during its initial use.

**5.2.3** Upon completion of the training, and after each employee has successfully demonstrated the requisite understanding, the SSHO will complete the Certification of Personal Protective Equipment Training form (see Figure 123-1), which identifies: the employees who attended the

training course and successfully demonstrated the required knowledge, the date(s) of the training and demonstration session(s), and the PPE covered by the training session.

## **6.0 LEVELS OF PPE**

The following paragraphs outline the different levels of PPE that may be used by EODT personnel during the conduct of site activities. The levels described do not identify specific makes, types, or brands of PPE, since that information is site-specific and directly related to the nature and degree of hazards and contaminants which may be encountered at each site. These levels of PPE provide a general guideline, and may be modified to address site-specific hazards and contaminants. Information related to the OSHA mandated requirements for different types of PPE is outlined in Appendix A of this procedure, and may be referenced when selecting specific PPE required for each level, described below.

### **6.1 SPECIAL CONSIDERATIONS**

The following special considerations shall be observed in the selection of PPE for the levels discussed below:

1. Hard hats are not required unless working around heavy equipment, or an overhead hazard exists.
2. Steel toe/shank boots are not required during surface/subsurface location of UXO unless a serious toe hazard exists, in which case a fiber safety toe will be used.
3. Safety glasses, goggles, and face shields will be required only when an eye hazard exists, such as the potential for flying objects, chemical splash, or contact with sharp objects.
4. When required, eye protection will be selected which provide site personnel with the best protection from not only physical hazards, but also ultra-violet radiation.
5. The OSHA standards for PPE selection are vague concerning selection of some types of specific PPE; therefore, EODT will continually evaluate site tasks to identify hazards, and will provide any PPE necessary to ensure the safety and health of site personnel, regardless of the activity they perform.

### **6.2 LEVEL D PPE**

This level of PPE is not allowed in areas of the site where atmospheric hazards are known or expected to exist. Level D should be worn only if the activity in which personnel are engaged does not have the potential for splash, immersion, or any other contact with hazardous substances. Level D involves the use of the following PPE:

1. Work clothes or coveralls (cotton).
2. Leather work gloves (optional unless hand hazards exist).
3. Leather work boots with safety toe.
4. Hard hat (when working around heavy equipment or overhead hazards).
5. Safety glasses (optional unless eye hazards exist).
6. Two-way radio, one per team.

### **6.3 MODIFIED LEVEL D PPE**

Modified Level D affords protection from casual contact with contaminated soils and materials, but should be worn whenever there is a potential for overexposure to airborne hazardous substances. Modified Level D involves the use of the following PPE:

1. Chemical-resistant suit with attached booties.
2. Five-minute escape mask (if the potential for airborne exposure exists).
3. Chemical-resistant boot covers.
4. Gloves – cotton lined inner, latex inner, and chemical-resistant outer.
5. Boots – leather work, with safety toe.
6. Hard hat (when working around heavy equipment or overhead hazards).
7. Eye protection – safety glasses or goggles.
8. Two-way radio, one per team.

### **6.4 LEVEL C PPE**

Level C affords moderate protection from airborne hazards, and should be worn during site activities where the potential exposure to hazardous substances may exceed the OSHA PEL or other published exposure limits. If, however, this level of PPE is used on a known or suspect chemical warfare materiel (CWM) site, this level of protection is not acceptable, since there are no air-purifying respirator cartridges approved for use against CWM. Level C with an air-purifying respirator can only be used for protection against chemicals for which NIOSH/MSHA approved cartridges exist. Level C will involve the use of the following PPE:

1. Chemical-resistant suit with attached booties and hood.
2. Full-face air-purifying respirator with appropriate filters (NIOSH/MSHA approved).
3. Chemical-resistant boot covers.
4. Gloves – cotton liner inner, latex inner, and chemical-resistant outer.

5. Boots – leather work, with safety toe.
6. Hard hat (when working around heavy equipment or overhead hazards).
7. Two-way radio, one per team.

## 6.5 LEVEL B PPE

Level B PPE offers superior protection against the inhalation of airborne contaminants. This is due to the fact that supplied-air or Self Contained Breathing Apparatus (SCBA) respirators are used as the respiratory protection for this level. However, the type of protective suit used with this level of protection is not air-tight, and skin exposure to hazardous vapors is possible. Therefore, this level of protection is not acceptable for use where contact with liquids or vapors which are extremely toxic or corrosive to the skin is anticipated. This level should not be used if the site contains CWM agents, which present a serious safety or health threat via dermal contact. Level B can, however, be used at CWM sites under conditions where: 1) the CWM and other chemical hazards of concern are not acutely skin-toxic; 2) there is no potential for liquid contact, and vapor levels are being continuously monitored; and 3) it is needed to protect site workers from non-CWM hazardous wastes. Level B will involve the use of the following PPE:

1. Chemical-resistant encapsulating or non-encapsulating suit.
2. SCBA or Supplied Air (NIOSH/MSHA approved).
3. Coveralls or scrubs – cotton.
4. Chemical-resistant boot covers.
5. Gloves – cotton lined inner, latex inner, and chemical-resistant outer.
6. Hard hat (when working around heavy equipment or overhead hazards).
7. Boots – leather work, with safety toe.
8. Two-way radio, one per team.

## 6.6 LEVEL A PPE

Level A PPE provides the highest available level of protection against both inhalation and skin contact of extremely hazardous materials. The Level A suit is fully-encapsulating; but unlike the Level B encapsulating suit, the Level A suit is air-tight and must be tested prior to use in order to ensure that hazardous gases and vapors do not leak into the suit. Since the Level A suit is usually worn in areas where highly toxic and corrosive materials are known to exist, it must be constructed of materials capable of resisting degradation and permeation by the chemicals of concern, including CWM agents. Permeation and breakthrough data for the Level A suit to be used must show that it is capable of resisting the chemicals expected to be found at the site. Since the Level A suit affords the greatest level of protection to dermal hazards, it will be worn in all instances where potential for contact with liquid CWM exists, or when the nature and

degree of potential exposure are unknown. Level A will also be worn in the event that site personnel are exposed to and overcome by CWM or other materials, and require rescue. Level A will involve the use of the following PPE:

1. SCBA, Supplied Air, or a combination of both (NIOSH/MSHA approved).
2. Fully-encapsulating chemical protective suit with attached boots and gloves.
3. Coveralls or scrubs – cotton.
4. Gloves – cotton lined inner, latex inner, and chemical-resistant outer.
5. Boots – leather work, with safety toe.
6. Chemical-resistant boot covers (optional).
7. Disposable protective suit worn over fully-encapsulating suit (optional).
8. Hard hat (when working around heavy equipment or overhead hazards).
9. Two-way radio, or an equivalent communication system (worn inside encapsulating suit), one for each team member.

**Note:** Level A suits are to be worn only when the known chemicals/vapors are highly toxic to skin contact, or when the nature and level of exposure is unknown or unmeasurable. Therefore, the structural integrity and air-tightness of the suit and its seams, zippers, and glove seals are extremely important. To ensure air-tightness of the suit, it should be tested IAW the manufacturer's requirements and the requirements found in Appendix A of 29 CFR 1910.120.

## **7.0 PPE DONNING PROCEDURES**

### **7.1 INTRODUCTION**

The purpose of the PPE donning procedures outlined in this section is to ensure that site personnel don the required PPE in a manner that will afford the greatest degree of protection. Failure to adhere to these procedures may result in the clothing and/or PPE being ineffective against potential contamination. The general donning procedures are given as a guide, and may be altered by the SSHO if the improvements are warranted by site operations and approved by the OSHM.

### **7.2 GENERAL REQUIREMENTS**

This paragraph contains general procedures and requirements for donning all levels of PPE. Specific procedures for donning each level of PPE are discussed in the paragraph immediately following the description of the PPE level. The general procedures/requirements are as follows:

1. Prior to donning, gather the PPE required for performing the task specified for the day's operations.
2. Issuance of respiratory equipment will be through the SSHO or his designated representative only.
3. Always inspect protective gloves, boots and boot covers, outer garment, and respiratory protective equipment for proper fit, integrity (i.e. rips, tears, holes), and function.
4. If wearing a level of PPE other than Level A, and a small tear/rip is noticed during initial inspection or while engaged in site activities, it may be repaired using a small piece of tape.
5. If a tear/rip in protective clothing cannot be repaired with a small piece of tape, or if the tear/rip compromises the structural integrity of the clothing, that article of clothing will be replaced, even if this involves leaving the EZ to do so.
6. Whenever protective boots and boot covers or gloves are not part of the outer garment, use duct tape (or an equivalent) to connect the clothing to the gloves at the wrist and to the boots at the leg.
7. When taping boots or gloves to the suit, do not wrap the tape too tightly, as this can cut off circulation and restrict movement. The goal is to simply attach the two, to eliminate a route of entry for chemicals into the suit or gloves.
8. Whenever using tape, always leave a folded tab, placed where it is visible and accessible for ease of removal.
9. If planned site activities will require walking, arm movement, or bending, it is best to place tape over the zipper and over seams at the stress points in the crotch, armpits, and back (where the shoulder seam and hood seam meet).
10. If kneeling will be necessary during site activities, avoid kneeling on any contaminated surfaces, and place tape over the knee areas to reduce the possibility of tearing or wearing out the knees.
11. Consult with the SSHO for any other improvements that would make the suit sturdier and/or improve the comfort of the suit.

### **7.3 DONNING PROCEDURES FOR MODIFIED LEVEL D**

To don Modified Level D, keep in mind the general recommendations above, and put on the PPE utilizing the steps listed below:

1. Put on chemical/splash resistant protective suit (suit should have attached booties).
2. Put chemical-resistant boots on over the booties, and tape the boots to the suit.
3. Make any strengthening modifications to the suit, as deemed necessary by the planned site activities.
4. Assemble and adjust all other PPE (hard hat, safety glasses, splash shield, etc.), and proceed toward the CRZ access point.
5. If ear plugs are to be worn, insert them before putting on inner and outer gloves, or any other PPE that might obstruct the proper insertion of the plugs.
6. Don all other PPE (hard hat, safety glasses, splash shield, etc.), saving the inner and outer gloves for last.
7. Put on inner and outer glove of one hand and have buddy tape that hand, then tape one of the buddy's gloved hands, and so on, until both hands are gloved and taped.
8. Proceed to the EZ access control point to be checked by the EZ access control attendant prior to being cleared for entry.

#### **7.4 DONNING PROCEDURE FOR LEVEL C PPE**

To don Level C, follow the general consideration listed in Paragraph 7.2, then follow the steps listed below:

1. Put on chemical/splash resistant protective suit (suit should have attached booties and hood).
2. Put chemical-resistant boots on over the booties, and tape the boots to the suit.
3. Make any strengthening modifications to the suit, as deemed necessary by the planned site activities.
4. Report to the SSHO, or the designated representative, to check out the proper respirator and cartridge assembly.
5. Assemble and adjust all other PPE (hard hat, safety glasses, splash shield, etc.), and proceed toward the CRZ access point.
6. If ear plugs are to be worn, insert them before putting on inner and outer gloves, respirator, or any other PPE that might obstruct the proper insertion of the plugs.

7. Assemble respirator and cartridges, and inspect the assembly for proper cleanliness and function.
8. Don the respirator, and conduct negative and positive pressure fit tests to ensure that the mask is not leaking.
9. Don all other PPE (hard hat, safety glasses, splash shield, etc.), saving the inner and outer gloves for last.
10. Put on inner and outer glove of one hand and have buddy tape that hand, then tape one of the buddy's gloved hands, and so on, until both hands are gloved and taped.
11. Proceed to the EZ access control point to be checked by the EZ access control attendant prior to being cleared for entry.

### **7.5 DONNING PROCEDURES FOR LEVEL B PPE WITHOUT ENCAPSULATING SUIT**

The donning procedure outlined in this paragraph applies to Level B with a non-encapsulating suit. The donning procedures to be followed for Level B with a fully-encapsulating suit are the same as those outlined for Level A in Paragraph 7.6. To don Level B with a non-encapsulating suit, follow the general considerations listed in Paragraph 7.2, and then follow the steps listed below:

1. Report to the SSHO, or the designated representative, to check out the proper SCBA respirator assembly.
2. Assemble and inspect the SCBA system for cleanliness and function.
3. Make sure that all required PPE have been assembled at the location where it is to be donned, and make any adjustments to the equipment prior to starting the donning process.
4. While sitting, insert one leg after the other into the encapsulating suit, stand, and don the suit (suit should have attached booties and gloves).
5. While sitting again, put chemical-resistant boots on over the booties, and tape the boots to the suit.
6. Put on the air tank/harness assembly, adjust for a comfortable, snug fit, and turn on the air at the tank, after first making sure the regulator valve is closed.
7. If ear plugs are to be worn, insert them now, before putting on the respirator face piece or any other PPE that might obstruct the proper insertion of the plugs.

8. Don the SCBA face piece (do not connect the air line at this time), and conduct negative- and positive-pressure fit tests to ensure that the mask is not leaking.
9. Put on glove liners, inner gloves, and outer gloves, and tape gloves to suit.
10. While connecting SCBA to the face piece, turn on the regulator valve and check air flow and breathing usability of the unit.
11. Once the suit and SCBA are situated and assistant has checked to ensure that the wearer is breathing freely, the assistant will put the hard hat on wearer.
12. Proceed to the EZ access control point to be checked by the EZ access control attendant prior to being cleared for entry.

## **7.6 DONNING PROCEDURE FOR LEVEL A AND FULLY-ENCAPSULATING LEVEL B PPE**

To don Level A or Level B with an encapsulating suit, follow the general considerations listed in Paragraph 7.2, then follow steps listed below:

1. Report to the SSSHO, or the designated representative, to check out the proper SCBA respirator assembly.
2. Assemble and inspect the SCBA system for cleanliness and function.
3. Make sure that all required PPE have been assembled at the location where it is to be donned, and make any adjustments to the equipment prior to starting the donning process.
4. While sitting, insert one leg after the other into the encapsulating suit, stand, and pull it up to the waist (suit should have attached booties and gloves).
5. While sitting again, put chemical-resistant boots on over the booties, and tape the boots to the suit.
6. Put on the air tank/harness assembly, adjust for a comfortable, snug fit, and turn on the air at the tank, after first making sure the regulator valve is closed.
7. If ear plugs are to be worn, insert them now before putting on the respirator face piece or any other PPE that might obstruct the proper insertion of the plugs.
8. Don the SCBA face piece (do not connect the air line at this time), and conduct negative- and positive-pressure fit tests to ensure that the mask is not leaking.

9. Put on glove liners and inner gloves, and then put on hard hat.
10. While connecting SCBA to the face piece, turn on the regulator valve and check air flow and breathing usability of the unit.
11. Insert the arms into the sleeves, being sure hands fit into the gloves properly, and have the assistant “work” the suit over the SCBA, face piece, and hard hat.
12. Once the suit is situated and the assistant checks to ensure that the wearer is breathing freely, the assistant will zip the suit and check all closures and valves.
13. Proceed to the EZ access control point to be checked by the EZ access control attendant prior to being cleared for entry.

## **8.0 INSPECTION PROGRAM**

### **8.1 INSPECTING INCOMING SHIPMENTS OF PPE**

The SSHO, or a designated appointee, will inspect all incoming shipments of PPE received from the EODT home office, the manufacturer, or the distributor. This inspection will include checking the shipment for correctness of size, quantity, material, and quality. Any deficiencies should be noted, and defective material returned to the supplier.

### **8.2 PRE-DONNING INSPECTION**

Prior to donning PPE, site personnel will thoroughly inspect each piece of PPE to determine if it is in proper working order, and to ensure that the item will be capable of protecting the employee from site hazards. As applicable, site personnel will check the following when pre-donning inspections are conducted:

1. Chemical-Resistant Clothing (suits, gloves, boots, etc.)
  - a. Check that clothing is made of proper material.
  - b. Visually check seams, coating, and zippers, and look for tears.
  - c. Check gloves and boots for pin holes.
  - d. Stretch material to check flexibility, and to look for cracks.
2. Eye, Face, and Head PPE
  - a. Ensure that equipment is ANSI-approved.
  - b. Check that hard hats are in good condition, with no cracks or chemical/material buildup visible.
  - c. Check hard hat head band for proper function and completeness.

- d. Ensure that all eye/face/head PPE fits comfortably and securely.
- e. Check safety glasses and face shields for cracks or scratches that could impair vision or compromise structural integrity.
- f. Check safety glasses for side shields.
- 3. Fully-Encapsulating Suits
  - a. Check operation of pressure relief valves and fitting of suit.
  - b. Check face shield for cracks, glazing, or fogging.
  - c. Ensure that suit passes pressure test.
  - d. Visually check seams, coating, and zippers, and look for tears.
  - e. Check gloves and boots for pin holes.
  - f. Stretch material to check flexibility, and to look for cracks.
- 4. Respirators
  - a. Inspect IAW CSHP SOP 125.

### **8.3 PERIODIC INSPECTIONS**

During the work task, buddy teams should periodically inspect each other's PPE for evidence of chemical attack, such as discoloration, swelling, stiffening, or softening. Also check for closure failure, tears, punctures, and seam discontinuities. If defective or deficient PPE is identified, it will be repaired or replaced immediately.

### **9.0 CLEANING AND DECONTAMINATION**

The SSHO will be responsible for ensuring that PPE is in good, clean, working order prior to issuing the PPE the first time. Once issued, site personnel will ensure that re-usable articles of PPE are maintained in a clean, sanitary fashion. For items used inside an EZ, site personnel will follow the requirements of the Site-Specific Decontamination Plan, and ensure that the PPE is properly decontaminated before removing the item from the EZ or CRZ.

### **10.0 MAINTENANCE**

Maintenance of PPE can vary greatly, based upon the complexity of the PPE and the intricacy of the repair involved. The SSHO will become familiar with the manufacturer's recommended maintenance and, when possible, repair defective PPE. If unable or unauthorized to conduct the repair, the SSHO will return the item to the manufacturer for repair, or to procure a replacement.



## **11.0 STORAGE**

PPE will be stored in a location which is protected from the harmful effects of sunlight, damaging chemicals, moisture, extreme temperatures, impact, or crushing. If needed, the SSHO will designate a specified area for the storage of PPE.

## **12.0 ATTACHMENTS**

**12.1 APPENDIX A – SPECIFICATONS FOR INDIVIDUAL TYPES OF PPE**

**12.2 APPENDIX B – PROTECTIVE CLOTHING MATERIAL GUIDE**



**EOD TECHNOLOGY, INC.**  
**CERTIFICATION OF PERSONAL PROTECTIVE EQUIPMENT (PPE) TRAINING**

<b>SITE INFORMATION</b>			
Site Name:			
Location:	Instructor(s):		
Date of Classroom Instruction:	Date of Demonstration:		
<b>PPE TRAINING COURSE ATTENDANTS</b>			
The following personnel have attended the site PPE training course, and demonstrated, through use, an understanding of the donning/doffing procedures, inspection, cleaning, maintenance, storage, limitations, and proper disposal of the PPE listed on this certificate. These personnel are now qualified to use the site- and task-specific PPE, as required by the SSHP.			
Name	Organization	Name	Organization
<b>TYPES AND LEVELS OF PPE ADDRESSED DURING TRAINING</b>			
Trainer's Initials	Personal Protective Equipment Reviewed	Trainer's Initials	Personal Protective Equipment Reviewed
<b>CERTIFICATION</b>			
I, the undersigned, do hereby certify that the above listed personnel have received the requisite training and successfully demonstrated their ability to use the PPE listed above, in accordance with the EODT Personal Protective Equipment Program.			
Name (printed)	Signature:	Date:	

Figure 123-1

**Table 1**  
**Comparative Chemical Resistance**

Key: E-Excellent; G-Good; F-Fair; P-Poor; NR-Non Recommended; \*-Limited Service

CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
A. *Acetaldehyde	E	G	G	E
Acetate	G	F	P	G
Acetic acid	E	E	E	E
*Acetone	G	E	P	E
Acetylene gas	E	E	E	E
Acetylene tetrachloride	F	NR	F	F
Acrylonitrile	G	F	F	G
Amidol	G	E	F	E
Amine hardeners	F	F	G	G
Ammonium hydroxide	E	E	E	E
*Amyl acetate	F	P	P	F
Amyl alcohol	E	E	E	E
Anhydrous ammonia	G	E	E	E
Aniline	G	F	P	F
Aniline hydrochloride	F	G	P	F
Aniline oil	F	G	P	F
Animal fats	E	P	E	G
Animal oils	E	F	E	G
Anodex	G	E		E
Anthracene	F	P	F	P
*Aromatic fuels	P	NR	F	NR
Arsine	E	E	E	E
Asbestos	E	E	E	E
Asphalt	G	F	E	F



CHEMICAL		NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
B.	Banana oil	F	P	P	F
	*Benzaldehyde	F	F	G	G
	*Benzene	P	NR	F	NR
	Benzol	P	NR	F	NR
	Benzyl alcohol	E	E	E	E
	Benzyl benzoate	G	F	G	F
	*Benzyl chloride	F	P	F	G
	Blacosolve	G	P	G	P
	Boron tribromide	G	P	P	P
	Bromine	G	P	P	P
	Bromoterm	G	P	P	P
	Butane	E	F	E	F
	2-Butanone	G	G	F	G
	Butyl acetate	G	F	P	F
	Butyl alcohol	E	E	E	E
	*Butylaldehyde	G	G	E	G
	Butylene	E	G	E	G



CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
C. *Cadmium oxide fume		E	E	E
Calcium hydroxide	E	E	E	E
Carbolic acid	E	E	F	E
Carbon dioxide	E	E	E	E
Carbon disulfide	F	F	F	F
*Carbon tetrachloride	F	P	G	P
Castor oil	F	P	E	F
Celiosolve	F	G	G	G
Celiosolve acetate	G	F	G	G
Chlordane	G	F	G	F
Chlorine	G	F	F	G
Chlorine gas	G	F	F	G
*Chlorobenzene	F	P	P	F
*Chloroacetone	F	F	P	E
Chlorobromomethane	F	P	F	P
*Chloroform	G	P	E	P
Chloronaphthalene	F	P	F	F
Chlorophenylene diamine	G	P	F	F
Chloropicrin	P	P	P	F
*Chlorothene	P	NR	F	NR
Chromic acid	F	P	F	F
Chromotex	G	G	G	G
Citric acid	E	E	E	E
Coal tar pitch volatiles	F	P	F	
Cottonseed oil	G	G	E	F
Cotton dust (raw)	E	E	E	E
Creosole	G	G	F	G
Cresol	G	G	F	G
Cupric nitrate	G	G	E	E
Cyanide	G	G	G	G
Cyclohexane	G	F	G	F
Cyclohexanol	G	F	E	G
*Cyclohexanone	G	E	F	G



CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
D. Decaborane		P	F	F
Degreasing fluids		P	G	P
Diacetone alcohol		E	E	E
Diborane		P	F	F
*Dibetyl ether		G	F	G
*Dibutyl phthalate		P	G	G
Dichloroethane		NR	F	NR
Dichloropropene		P	F	F
Diesel fuel		P	E	P
Diethanolamine		G	E	E
Diethylamine		G	E	G
Diethyltriamine		F	E	G
Diisobutyl ketone		F	P	G
Diisocyanate		P	G	E
Dimethylformamide		F	G	G
Diocetyl phthalate		P	E	F
Dioxane		G	G	G



CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
E. Emulsifying agent	G	F	E	E
Emulthogene	G	F	G	E
Epichlorohydrin	G	P	F	G
Epoxy resins dry	E	E	E	E
*Esters	F	P	P	F
Ethane gas	E	G	E	E
Ethanol	E	E	E	E
Ethers	E	G	G	G
*Ethyl acetate	G	F	F	G
Ethyl alcohol	E	E	E	E
Ethyl bromide			P	
Ethyl ether	E	G	G	E
Ethyl butyl ketone			P	
Ethyl formate	G	F	G	G
Ethylaniline	F	F	P	G
Ethylenediamine	E	G	E	G
Ethylene dichloride	F	P	P	F
Ethylene gas	E	G	E	E
Ethylene glycol	E	E	E	E
Ethylene oxide	G	F	G	
Ethylene trichloride	F	P	G	P
F. Fatty acids	E	P	E	F
Ferrocyanide	F	G	G	E
Fluoric acid	E	G	E	E
Fluorine	G	F	F	G
Fluorine gas	G	F	F	G
Formaldehyde	E	E	E	E
Formic acid	E	E	E	E
Freon 11	G	P	G	F
Freon 12	G	P	G	F
Freon 21	G	P	G	F
Freon 22	G	P	G	F
*Furfural	G	G	G	G



CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
G. Gasoline - leaded	G	P	E	F
Gasoline - unleaded	G	P	E	F
Glycerine	E	E	E	E
Glycerol	E	E	E	E
Glycol	E	E	E	E
Gold fluoride	G	E	E	E
Grain alcohol	E	E	E	E
H. Halogens	G	F	F	G
Hexamethylenetetramine	F	G	F	G
Hexane	F	P	G	P
Hexyl acetate	F	P	P	F
Hydraulic oil				
ester base	E	P	F	G
petroleum base	G	P	E	P
Hydrazine	F	G	G	G
Hydrochloric acid	E	G	G	G
Hydrofluoric acid	E	G	G	G
Hydrogen gas	E	E	E	E
Hydrogen peroxide--30%	G	G	G	G
Hydrofluosilicic acid	F	G	G	G
Hydroquinone	G	G	F	G



CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
I. Inorganic salts	E	E	E	E
Iodine	G	F	G	G
Isooctane	F	P	E	P
Isopropanol	E	E	E	E
Isopropyl alcohol	E	E	E	E
K. Kerosene	E	F	E	F
Ketones	G	E	P	E
L. Lacquer thinners	G	F	P	F
Lactic acid	E	E	E	E
Lauric acid	E	F	E	E
Linoleic acid	E	P	E	F
Linseed oil	E	P	E	F



CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
M. Maleic acid	E	E	E	E
Mercuric chloride	G	E	G	E
Mercury	G	G	G	E
Methane gas	E	E	E	E
Methanol	E	E	E	E
Methyl acetate	G	F	P	G
Methyl alcohol	E	E	E	E
Methylamine	F	F	G	G
Methyl bromide	G	F	F	G
Methyl celiosolve	G	G	G	G
*Methyl chloride	NR	NR	NR	NR
*Methyl ethyl ketone	G	G	NR	E
Methyl formate	G	F	F	G
Methylene bromide	G	G	F	G
Methylene chloride	G	F	F	G
*Methyl isobutyl kelone	F	F	P	E
Methyl methacrylate	G	G	F	E
Mineral oils	E	F	E	F
*Monochlorobenzene	F	P	P	F
Monoethanolamine	E	G	E	E
Morpholine	E	E	G	E
Muriatic acid	E	G	G	E



CHEMICAL		NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
N.	Naphthalene	G	F	G	F
	Naphthas aliphatic	E	F	E	F
	Naphthas, aromatic	G	P	G	P
	*Nitric acid	G	F	F	F
	*Nitric acid, red and white fuming	P	P	P	P
	*Nitrobenzene	F	P	F	F
	*Nitroethane	E	E	E	E
	Nitrogen gas	F	P	F	F
	*Nitromethane	F	P	F	F
	*Nitropropane	G	Q	G	G
	Nitrous oxide				
O.	Octyl alcohol	E	E	E	E
	Oleic acid	E	F	E	G
	Oxalic acid	E	E	E	E
	Oxygen liquid	F	P	NR	F
	Ozone	G	P	P	G



CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
P. Paint thinners	G	F	G	F
Paint and varnish removers	G E	F E	F E	F E
Palmitic acid	E	F	E	E
*Paradichlorobenzene	P	F	F	F
Parathion	F	P	F	F
Pentaborane	F	G	G	G
Pentachlorophenol	E	G	E	G
Pentane	E	F	G	G
Perchloric acid	F	NR	G	NR
Perchloroethylene	E	NR	G	NR
Perklene	E	F	E	NR
Permachlor	G	P	E	
Petroleum distillates (naphtha)	E	F	E	F
Petroleum spirits	E	F	F	G
Phenol	G	P	G	G
Phenylenediamine	G	G	G	G
Phenylhydrazine	E	F	E	G
Phil-sotv	E	G	E	E
Phosphoric acid	G	G	G	E



CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
Pickling solution	E	G	E	G
Picric acid	E	P	E	F
Pine oil	E	P	E	F
Pitch	E	E	E	E
Plating solutions	G	G	G	E
Potassium alum	G	G	G	E
Potassium bromide	G	G	G	E
Potassium chrome alum	F	F	F	E
Potassium dichromate	G	G	G	E
Potassium ferrocyanide	E	E	E	E
Potassium hydroxide	E	G	G	G
Printing inks	E	E	E	E
Propane gas	E	E	E	E
Propanol (iso)	G	F	F	G
Propyl acetate	E	E	E	E
Propyl alcohol	E	E	E	E
Propyl alcohol (iso)	E	F	E	E
Propylene gas	E	F	E	E
Propyne gas	E	E	E	E
Pyrethrum				
R. *Red fuming nitric acid	P	P	P	P
Rhodium fumes and dust	E	E	E	E



CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
S. Silver nitrate	E	G	E	E
Skydrol 500	P	G	P	G
Sodium carbonate metal	G	G	G	E
Sodium hydroxide	E	E	E	E
Sodium sulfite	G	G	E	E
Sodium thiosulfide	G	G	E	E
Solvarsol	E	F	E	F
Solvessos	P	P	G	P
Stearic acid	E	E	E	E
Stoddard solvent	E	F	E	G
Styrene	P	P	F	P
Styrene 100%	P	P	F	P
Sulfuric acid	G	G	G	G



CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
T. Tannic acid	E	E	E	E
Tetrahydroborane	F	P	F	F
Tetraethyl lead	E	F	E	G
Tetrahydroluran	P	F	F	F
*Toluene	F	P	F	NR
Toluene diisocyanate	F	G	F	G
*Toluol	F	P	F	NR
Trichlor	F	P	G	P
*Trichloroethylene	F	F	G	P
*Trichloroethane	P	P	F	P
Tricresyl phosphate	G	F	E	F
Tridecyl alcohol	G	F	E	F
Triethanolamine	E	G	E	G
Trinitrotoluene	G	P	G	F
Trinitrotoluol	G	P	G	F
Triptane	E	P	E	F
Tung oil	E	P	E	F
Turco No. 2996	P	P		F
Turpentine	G	F	E	F



CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
U.    Unsymmetrical Dimethylhydrazine	F	P	F	P
V.    Varnoline gas Vanadium fume and dust Varsol Vegetable oils	E E G E	F E F G	E E G E	F E F G
W.    Wood alcohol Wood preservatives *Woodyouth	E G F	E F P	E G F	E G G
X.    *Xylene *Xyiol *Xylidine	P P E	P P F	F F F	P P F
Z.    Zinc Chloride	E	E	E	E

## **APPENDIX A**

### **SPECIFICATONS FOR INDIVIDUAL TYPES OF PPE**

## **SPECIFICATIONS FOR INDIVIDUAL TYPES OF PPE**

### **1.0 INTRODUCTION**

The following information will be utilized during the task hazard assessment, and when determining which products will be used to fulfill the PPE requirements outlined in this program and the PPEP. This appendix contains the OSHA requirements for eye, face, head, hand, body, and foot protection.

### **2.0 GENERAL REQUIREMENTS**

Whenever process, environmental, chemical, radiological, or mechanical hazards exist on site, EODT will ensure that all affected personnel utilize appropriate PPE. When individual personnel provide their own PPE, EODT will assure its adequacy and compliance, including proper maintenance and sanitation of said equipment.

### **3.0 EYE AND FACE PROTECTION**

Each affected employee shall use appropriate eye or face protection when exposed to hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially harmful light radiation. When eye and face protection is required, the following shall apply:

1. Side shields will, as a minimum, be used when there is a hazard from flying objects.
2. For personnel who wear prescription lenses, the eye protection will either incorporate the prescription in its design, or will be worn over the prescription glasses, without disturbing the position or comfort of the prescription glasses.
3. Eye and face protection will be clearly marked with the manufacturer's name.
4. Eye and face protection will be selected and worn that protects personnel from the type of eye/face hazard encountered during a given operation.
5. If there is a potential for exposure to blood or other infectious fluids, personnel will be required to wear eye and face PPE capable of preventing fluid contact with the eye and face mucous membranes.
6. Eye and face protection devices shall be reasonably comfortable, fit snugly, be durable, be easily cleaned and disinfected, and stored in a clean, sanitary location.

7. Personnel involved in operations emitting hazardous light levels will wear appropriate filtered lenses.
8. Protective eye and face devices will be clearly marked, indicating that they comply with the provisions of ANSI Z87.1-1989.

#### **4.0 HEAD PROTECTION**

Each employee who is exposed to operations involving a potential for injury to the head from falling objects, or other forms of head injury, will wear appropriate head protection. Selection and use of head protection devices will comply with the following;

1. Head protection devices will comply with ANSI Z89.1-1986, and be stamped accordingly.
2. Head protection devices will be maintained and inspected to ensure that they are in working order and that their structural integrity has not been compromised through exposure to chemicals, physical abuse, or improper storage.
3. Head protection devices will be selected IAW the type and degree of head hazard anticipated for site activities.

#### **5.0 FOOT PROTECTION**

Each employee exposed to operations where there is a danger of foot injury due to falling or rolling objects, objects capable of piercing the sole, or other identifiable hazards, will be required to wear appropriate foot protection. Selection and use of foot protection will comply with the following:

1. Foot wear used on site will comply with ANSI Z41-1991.
2. The degree of foot protection will be consistent with the degree of hazard anticipated for each site operation.
3. At a minimum, foot wear will be leather work boots.

#### **6.0 HAND PROTECTION**

Each employee exposed to operations where there is danger of hand injury due to skin absorption or contact with hazardous substances, cuts, lacerations, abrasions, punctures, thermal burns, electrocution, temperature extremes, or pinching will be required to wear appropriate hand protection. Selection and use of hand protection will comply with the following:

1. EODT will select hand protection based upon an evaluation of the performance characteristics of the protection device relative to the task to be performed, conditions present, duration of use, and the known or potential hazards identified.

2. If site personnel have the potential of contact with blood or other infectious materials, they will, as a minimum, wear surgical type latex gloves at the time of potential contact.
3. Chemical resistant gloves which come in contact with known contaminated materials will be discarded after each use.

## **7.0 BODY PROTECTION**

Each employee exposed to operations where injury to the body trunk or limbs could occur will be required to wear appropriate protective devices. Operations typically conducted by EODT personnel that may require use of body/limb protection devices include:

1. Working in hot environments – cooling vest or other temperature-reducing device.
2. Working in cold environments – insulated coveralls, long underwear.
3. Brush/tree clearing with a bladed weed eater – steel toed boots or toe guards, and Kevlar leg chaps.
4. Tree/limb removal with a chain saw – steel-toed boots or toe guards, and Kevlar leg chaps.
5. Lifting heavy objects – lumbar/back support belts, knee support devices.
6. Rendering first aid – body apron.



## **APPENDIX B**

### **PROTECTIVE CLOTHING MATERIAL GUIDE**

## PROTECTIVE CLOTHING MATERIAL GUIDE

- Tyvek®:** Product of Dupont. Spun-bounded non-woven polyethylene fibers. Has reasonable tear, puncture, and abrasion resistance. Provides excellent protection against particulate contaminants, with very limited chemical resistance. Inexpensive and suitable for disposable garments.
- Polyethylene:** Used as a coating on polyolefin material such as Tyvek®, increasing resistance to acids, bases, pesticides, and salts.
- Saranex®:** Made of Saran, a Dow product. Coated on Tyvek®. Very good general-purpose disposable material. Better overall protection than Polyethylene. Resistant to PCB's and chlorinated hydrocarbons.
- Barricade®:** A Dupont material with better general chemical resistance than Saranex®. Barricade is a thick, tightly seamed material that may be suitable for re-use, depending upon contaminant type and level. Provides excellent protection from a large variety of acids, caustics, organic solvents, and salts.
- Responder®:** One of the strongest limited-use materials, with a multi-layer construction. Responder® is one of the few materials with no breakthrough times less than eight hours for the ASTM F1001 test chemicals. It is also the only commercially available material that has been actively tested against CWM.
- Butyl rubber:** Resists degradation by many contaminants except halogenated hydrocarbons and petroleum compounds, a common deficiency of most protective materials. Especially resistant to permeation by toxic vapors and gases. Expensive material used in boots, gloves, splash suits, aprons, and fully-encapsulating suits.
- Natural rubber:** This is also synthetic latex. Resists degradation by alcohols and caustics. Used in boots and gloves.
- Neoprene:** Resists degradation by caustics, acids, and alcohols. Used in boots, gloves, and respirator face pieces and breathing hoses. Commonly available and inexpensive.

## PROTECTIVE CLOTHING MATERIAL GUIDE (cont.)

- Nitrile:** Also referred to as Buna-N, milled Nitrile, Nitrile latex, NBR, acrylonitrile. Resists degradation by petroleum compounds, alcohols, acids, and caustics. Used in boots and gloves. Commonly available and inexpensive.
- PVA™:** Polyvinyl alcohol. Resists degradation and permeation by aromatic and chlorinated hydrocarbons and petroleum compounds. Major drawback is its solubility in water. Used in gloves.
- PVC:** Polyvinyl chloride. Resists degradation by acids and caustics.
- Viton®:** Product of Dupont. Fluoroelastomer similar to Teflon. Excellent resistance to degradation and permeation by aromatic and chlorinated hydrocarbons and petroleum compounds. Very resistant to oxidizers. Extremely expensive material used in gloves and fully-encapsulating suits.
- SilverShield®:** Lightweight, flexible Norfoil™ laminate with excellent chemical resistance. Suggested for vinyl chloride, acetone, ethyl ether, and a large variety of other toxic solvents and caustics. Often used as an over glove for haz-mat situations. Flexible material, but not stretchable, may tear at the seams if overly stressed.
- 4H:** Five layer patented plastic laminate material intended to provide at least four hours of protection form over 280 chemicals and mixtures. Excellent protection against epoxy, organic solvents, acids, bases, paints, degreasers, and adhesives. Flexible material, but not stretchable, may tear at the seams if overly stressed.
- Chloropel®:** Also referred to as CPE or chlorinated polyethylene. ILC Dover product. Used in splash suits and fully-encapsulating suits. No data on permeability. Considered to be a good all-around protective material.
- Nomex®:** Product of Dupont. Aromatic polyamide fiber. Non-combustible and flame resistant up to 220°C, thus providing good thermal protection. Very durable and acid resistant. Used in firefighters' turnout gear and some fully encapsulating suits as a base for the rubber.

**Appendix F**  
**Final Revision 1 Accident Prevention Plan**

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U.S. Army

**Final  
Accident Prevention Plan  
and  
Site-Specific Safety and Health Plan  
for Site Investigation  
at the Small Arms Range Berm Area  
Site Identification No. FTSW-006-R-01  
Fort Stewart, Georgia**



IMA

**February 2014  
(Revision 1)**

**Submitted to:  
U.S. Army Corps of Engineers  
Savannah District  
100 West Oglethorpe Avenue  
Savannah, Georgia 31401-3604**

**Prepared by:  
SpecPro Environmental Services LLC  
1006 Floyd Culler Court  
Oak Ridge, Tennessee 37830  
under  
Contract No. W912HN-10-D-0001  
Delivery Order No. 0025**

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**Final  
Accident Prevention Plan  
for Site Investigation  
at the Small Arms Range Berm Area  
Site Identification No. FTSW-006-R-01  
Fort Stewart, Georgia**

**February 2014  
(Revision 1)**

**Submitted to:  
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# SIGNATURE PAGE

## Accident Prevention Plan Including the Site-Specific Safety and Health Plan for Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia

Contract No. W912HN-10-D-0001  
Delivery Order No. 0025

<b>Prepared By:</b>	 CIH, CSP	2-24-14
	Richard Rathnow, CIH, CSP (plan preparer) Safety and Health Manager SpecPro Environmental Services LLC	Date (865) 481-7837

<b>Plan Approval:</b>		2-24-14
	Jim Madaj, Senior Program Manager (company officer) SpecPro Environmental Services LLC	Date (865) 481-7837

<b>Plan Concurrence:</b>		2-24-14
	Doug Hawn, Project Manager SpecPro Environmental Services LLC	Date (865) 481-7837

**ACCIDENT PREVENTION PLAN  
for Site Investigation Small Arms Range Berm Area  
Fort Stewart, Georgia**

**PURPOSE AND SCOPE**

This accident prevention plan (APP) will serve, in essence, as a safety and health policy and program document for this project. This plan will address the job-specific hazards associated with this project and also any unusual or unique aspects of the project. The plan defines SES's system for predicting, identifying, evaluating, and prescribing controls for the hazards that will be posed by this work. The site safety and health officer (SSHO) will perform daily safety inspections to verify that the controls in this plan are appropriate and sufficient and will revise these controls as necessary to ensure that the work is performed safely. Revisions to the APP will be documented, and the SpecPro Environmental Services LLC safety and health manager will approve those revisions that result in decreasing or eliminating a hazard control before they are implemented.

SES subcontractors as applicable will be informed of the requirements of this plan and will be provided with copies of, or unrestricted access to, copies of this plan. SES and its subcontractors will be required to comply with this APP after it has been approved. This plan does not relieve subcontractors of the regulatory requirement to provide a safe workplace, and SES subcontractors will be required to supplement this plan as necessary to ensure that their employees perform their specific tasks safely.

This document is designed to satisfy the requirements of EM 385-1-1, *Safety and Health Requirements Manual* [U.S. Army Corps of Engineers (USACE), September 2008 (updated July 2012)]; relevant Occupational Safety and Health Administration (OSHA) regulations; and the *SpecPro Environmental Services LLC Safety and Health Program Manual* (SES, June 2009).

**1. SIGNATURE SHEET**

The signature page is included on page 1 of this document.

**2. BACKGROUND INFORMATION**

**2.a. Contractor:** SpecPro Environmental Services LLC (SES).

**2.b. Contract Number:** W912HN-10-D-0001, Delivery Order No. 0025.

**2.c. Project Name:** Site Investigation at the Small Arms Range Berm Area Site Identification No. FTSW-006-R-01, Fort Stewart, Georgia.

**2.d. Project Description:** Fort Stewart is in portions of Long, Evans, Tattnall, Bryan, and Liberty counties, Georgia, approximately 40 miles southwest of Savannah, Georgia. The nearest city is Hinesville, approximately 1½ miles to the south. The Small Arms Range Berm Area is near 15<sup>th</sup> Street, approximately 300 feet from the rear of Building 1805. Refer to Figure 2-1 for the site location. This range consists of approximately 287 acres used for small arms training during the 1940s and 1950s. SES will investigate approximately 190 acres of the site. According to historical documents, small arms of .50 calibers or less were used on the range.

SES will conduct a site investigation focused on sampling for antimony, copper, and lead. Tasks to be performed include

- Conducting the magnetometer-assisted visual survey outlined in ARCADIS/ Malcolm Pirnie's September 2011 *Phase 2 Confirmatory Sampling Report, Fort Stewart, Georgia*, to determine if munitions of explosive concern (MEC) are present on the site;
- Collecting a maximum of 400 soil samples from 200 direct push technology (DPT) soil borings at depths of 0 to 6 inches and 2 to 4 feet;
- Collecting soil samples from four berm areas to characterize them for potential removal or disposal;
- Having samples analyzed for lead, copper, and antimony;
- Conducting appropriate quality assurance (QA)/quality control (QC) sampling to provide legally defensible sampling, analysis, and data validation;
- Taking six soil samples for Synthetic Precipitation Leaching Procedure and using the analytical results to develop site-specific soil screening levels; and
- Providing further delineation of the COCs at the site, so an accurate assessment can be made using the Environmental Protection Agency (EPA) Regional Residential Soil Screening Levels for Region 4 and the appropriate method selected for assessing and evaluating subsurface soil constituents leaching potential to groundwater.

### 3. STATEMENT OF SAFETY AND HEALTH POLICY

SES's commitment to excellence in the areas of health and safety performance is consistent with the company's goal of being acknowledged as an industry leader. As such, SES is committed to the following principles.

- **Zero incidents:** SES has adopted a "zero incidents" safety culture approach to project safety. The term *Focus Zero* represents this desired safety culture. The key ingredient to establishing a *Focus Zero* culture is leadership. Demonstrated leadership in support of safety and health from the chief executive officer, program management, and operations is essential to the success of achieving this culture. To project a strong outward safety and health culture, SES believes that a strong internal culture must be established and supported. *Focus Zero* means that every employee must take responsibility to achieve
  - Zero Incidents (injuries and illnesses, property damage, and serious near misses),
  - Zero Adverse Impacts (environmental stewardship), and
  - Zero Errors and Omissions (first-time quality).

*Focus Zero* reflects the philosophy of continual improvement. When an incident occurs, it is evaluated, system corrections are made, and the process starts over, focusing on the ultimate drive toward zero.

The *Focus Zero* safety culture emphasis is to be communicated, encouraged, and adopted for subcontractor workers on each and every SES project as well.

- **Decision-making:** SES makes health and safety concerns an integral part of corporate decision-making. All strategic and operational decision-making takes into account health and safety implications.
- **Compliance:** SES complies with all applicable health and safety laws and regulations. Health and safety programs have been established and are maintained. Audits are conducted to assess compliance with laws and regulations as well as these principles.
- **Communication with employees:** SES promotes among its employees an individual and collective sense of responsibility to protect health and safety through daily safety briefings,

monthly safety coordination meetings, and periodic distribution of relevant safety and lessons learned bulletins.

- **Subcontractor selection:** SES preferentially selects subcontractors with excellent safety programs that demonstrate a commitment to these principles of worker safety and health.
- **Measurement of performance:** SES maintains metrics to measure current and future health and safety performance in meeting these principles.
- **Risk management:** SES integrates risk management principles into all areas of project delivery through hazard identification and analysis, identification of control measures, determination of associated risk by assessing the likelihood of failure of the control measures and the potential consequences of injury or damage, and reviewing the principles of control to ensure that the risk of performing any task is either eliminated or reduced to a tolerable level.
- **Responsibility:** All SES employees are empowered to take the necessary means to protect their personal safety as well as that of their co-workers. SES employees are responsible for complying with safety requirements as well as bringing safety concerns to the attention of management.
- **Safety Goals:** SES's project safety goal is to complete the project and all associated activities with no recordable accidents or illnesses and no first aid incidents. The SES Human Resources Department maintains all accident records.

SES believes that all work-related accidents are preventable. The safety of our workers holds the same priority as production and client satisfaction.

Company management, field supervisors, and employees plan safety into each work task to prevent occupational injuries and illnesses. The ultimate success of SES's safety program depends on the full cooperation and participation of each employee.

SES management extends its full commitment to health and safety excellence to protect our most valued asset: our employees.

#### **4. RESPONSIBILITIES AND LINES OF AUTHORITY**

**4.a. SES's Responsibility for Safety:** SES is ultimately responsible for the implementation of its health and safety program during the performance of this project work. In accordance with the OSHA General Duty Clause, SES is committed to providing each of its employees with a place of employment free from recognized hazards that are causing or are likely to cause death or serious physical harm to them. SES and its subcontractors will comply with EM 385-1-1, *Safety and Health Requirements Manual*; OSHA regulations; and referenced standards. In turn, each employee is expected to and shall be required to comply with SES rules as well as occupational safety and health standards based on the OSHA regulations.

SES has established the policies and procedures set forth in its program to

- Provide a safe and healthful work environment for all SES employees and subcontractors;
- Prevent or minimize occupational injuries and illnesses;
- Eliminate damage to equipment and property; and
- Comply with all applicable Federal, state, local, and consensus safety and health standards.

SES's General Safety Program provides steps to protect the safety and health of our employees. This program is intended to provide safety-related tools and guidance for all employees as well as provide essential elements of regulatory and internal requirements.

This program includes general safety procedures and requirements, as well as specific written programs to address actual or potential workplace hazards. It may be necessary during certain circumstances to consult appropriate OSHA regulations for more specific information.

The corporate *Safety and Health Program Manual* (S&H Manual) is one tool necessary to achieve SES’s health and safety program objectives. The manual, however, cannot ensure a safe and healthful work environment by itself. *The responsibility of conducting work in a manner that ensures our well-being and that of co-workers, clients, and the general public rests with management at all levels as well as each individual employee. Managers and site supervisory personnel will be held accountable for the successful implementation of program and project safety and health requirements and results for projects under their direction. Project management and supervision personnel’s annual review includes an evaluation of their administration, implementation, and compliance with the corporate Safety and Health (S&H) Program. This evaluation and their dedication to the advancement of the safety culture are factored into any annual merit increase they may receive.*

**4.b. Personnel Responsible for Safety:** This section presents the lines of authority, responsibilities, and communication procedures related to site safety and health and emergency response. It includes key SES and subcontractor personnel. All fieldwork will be under the supervision of the SES field manager. The SES field manager will oversee normal and emergency work and will perform any required emergency notification. Table 4-1 identifies the individuals who will fill key roles for the project field activities.

The key personnel assigned to the field activity positions presented in Table 4-1 represent those individuals who are expected to participate in the project. Project personnel will be finalized after the dates of fieldwork have been approved. If personnel other than those presented in Table 4-1 are assigned to the project, SES will submit an amendment to this APP providing the names of these individuals for acceptance by the USACE Savannah District Government Designated Authority (GDA) prior to mobilization.

The USACE Savannah District GDA for this project is Ana Vergara, contracting officer’s representative (COR) and project manager, (912) 652-5835. The technical manager is Zsolt Haverland, (912) 652-5815.

**Table 4-1 Staff Organization**

<b>Position</b>	<b>Name</b>	<b>Telephone</b>
Senior Program Manager	Jim Madaj	(865) 481-7837
Safety and Health Manager	Rich Rathnow, CIH, CSP	(865) 481-7837
Project Manager (SES)	Doug Hawn	(865) 481-7837
Project Manager (Sterling Operations)	Jay Ferguson	(865) 300-2712
Field Manager	Chris Napoleon	(865) 360-9910
SSHO*	LeAnn McNeal	(912) 660-4782
Alternate SSHO	Chris Napoleon	(865) 360-9910

CIH = Certified Industrial Hygienist  
 SSHO = Site Safety and Health Officer

CSP = Certified Safety Professional

***\*No work shall be performed unless a designated competent person is present on the job site.***

#### **4.b.1 SES Senior Program Manager**

SES Senior Program Manager Jim Madaj is the primary interface with the client and has ultimate responsibility for the project. The senior program manager provides progress reports and addresses client questions and concerns. In addition, he is responsible for ensuring conformance with the SES S&H program and USACE policies and procedures. Specific responsibilities of the senior program manager include the following:

- Coordinating with USACE personnel,
- Ensuring that project managers satisfy SES and USACE health and safety requirements,
- Ensuring that project staff implement project APPs, and
- Ensuring that projects have the resources necessary to operate safely.

#### **4.b.2 SES Safety and Health Manager**

SES Safety and Health Manager Rich Rathnow, CIH, CSP, oversees the SES S&H program. This includes establishing health and safety policies and procedures, supporting project and office activities, and verifying safe work practices and conditions. The SES safety and health manager is certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene and has more than 20 years of hazardous waste experience. The specific responsibilities of the safety and health manager include the following:

- Coordinating with USACE health and safety personnel,
- Reviewing and approving APPs,
- Approving downgrades in personal protective equipment (PPE) or protective procedures, and
- Collaborating with project personnel through routine communication and audit of selected projects.

#### **4.b.3 SES Project Manager**

SES Project Manager Doug Hawn is responsible for overall project execution. The responsibilities of the project manager include the following:

- Coordinating with USACE personnel (including reporting accidents and incidents to the USACE Savannah District project manager immediately and submitting written reports within five working days),
- Ensuring implementation of the project APP,
- Maintaining auditable project documentation of all required records,
- Ensuring that a qualified SSHO is designated, and
- Maintaining a current copy of the project APP.

#### **4.b.4 SES Field Manager**

Chris Napoleon, SES field manager, is in charge of all SES and subcontractor field activities associated with this project. All SES and subcontractor personnel performing fieldwork on this project must report to the field manager.

The SES field manager is responsible for site accessibility, safety, and quality assurance. The field manager is responsible for enforcing the field requirements of this APP. Specific responsibilities of the field manager are

- Enforcing compliance with the project APP;
- Coordinating on-site operations, including subcontractor activities;

- Ensuring that subcontractors follow the requirements of this APP;
- Coordinating and controlling any emergency response actions;
- Ensuring that at least two people currently certified in first aid/cardiopulmonary resuscitation (CPR) and bloodborne pathogens are on site during site operations;
- Performing a daily safety inspection and documenting the inspection on the daily safety inspection form (or ensuring that this inspection is performed); and
- Maintaining current copies of the project APP; EM 385-1-1, *Safety and Health Requirements Manual* [USACE, September 2008 (updated July 2012)]; and the SES S&H Manual (SES, June 2009) on site.

#### **4.b.5 Site Safety and Health Officer**

SES SSHO LeAnn McNeal will serve as the appointed competent person as required by EM 385-1-1, September 2008 (updated July 2012), Section 01.A.17. The SSHO will be on site during all fieldwork activities. The SSHO is responsible for making safety and health decisions, for specific safety and health activities, and for verifying the effectiveness of the safety and health program. The SSHO's qualifications include at a minimum, completion of the OSHA 30 Hour Construction Safety course, five years of experience with similar projects, knowledge and understanding of the project APP, 24 hours of ongoing continued education every four years, and the ability to use required monitoring equipment. The SSHO has primary responsibility for the following:

- Implementing and verifying compliance with this APP and reporting to the project manager and safety and health manager any deviations from anticipated conditions;
- Conducting and documenting daily safety inspections;
- Stopping work or upgrading protective measures (including protective clothing) with the approval of the safety and health manager if uncontrolled safety and health hazards are encountered (Indications of uncontrolled safety and health hazards include monitoring instrument readings higher than established action limits, encountering liquids other than water, and soil staining suggestive of unexpectedly high concentrations of nonvolatile contaminants.);
- Authorizing resumption of work after adverse conditions have been corrected;
- Completing the safety and health debriefing based on SES S&H Manual Section 8.0, "Tool Box Safety Meetings";
- Documenting deficiencies listed in the daily inspections and identifying responsible parties, procedures, and timetables for correction;
- Ensuring that site personnel have access to this plan and are aware of its provisions;
- Conducting a site-specific pre-entry safety and health briefing covering potential chemical and physical hazards, safe work practices, and emergency procedures;
- Maintaining on-site auditable documentation of
  - Material safety data sheets/ (MSDSs)/ safety data sheets (SDSs) for applicable materials used at the site;
  - Training for site workers and visitors;
  - Calibration/maintenance of field instruments, such as photoionization detectors, flame ionization detectors, or combustible gas indicators;
  - Environmental and personal exposure monitoring results as applicable; and
  - Notification of accidents/incidents.
- Confirming that all on-site personnel have received the training listed in Section 6 of this APP; and
- Issuing respirators as necessary and ensuring that all respirator users have received medical clearance.

**4.c. Competent Person:** SES SSHO LeAnn McNeal will serve as the designated competent person as required by EM 385-1-1, September 2008 (updated July 2012), Section 01.A.17 and 29 CFR 1926.20(b)(2). Her resume is in Attachment 5.

Ms. McNeal has completed the OSHA 30 Hour Construction Industry Outreach Training as required by the USACE and has the experience and training to fulfill this role for this project. In addition to her training and experience, she has the authority to manage, implement, and enforce the APP and SES S&H program, including any corrective actions for any construction hazards or safety concerns that arise during this project work. This includes the authority to remove personnel from the project site as deemed necessary for flagrant violation of safety policy or endangering themselves and/or others. The competent person/ SSHO assignment letter is in Attachment 5, and a copy of Ms. McNeal's OSHA 30 Hour certification is in Attachment 3.

**4.d. No work shall be performed unless a designated and qualified competent person is present on the job site.**

**4.e. Requirements for Pre-Task Safety and Health Analysis:** A pre-task specific safety and health analysis is required for this project. An activity hazard analysis (AHA) has been performed as required for all major phases of work prior to the task being started at the project site. A pre-task safety and health analysis has been performed as required for the following features of work:

- Conducting a magnetometer survey based on the area established by the Malcolm Pirnie Phase 2 Confirmatory Sampling Report;
- Collecting soil samples for antimony, copper, and lead;
- Sampling four separate berms for waste characterization;
- Providing further delineation of the COCs at the site; and
- Properly storing and disposing of investigative-derived waste (IDW).

For all phases of the task hazard analysis, the corporate safety and health manager considered the various methods for mitigating the hazards. Employees will be trained on this hierarchy of controls during their safety training and reminded of them throughout the project.

- Elimination of the hazards (use remote sampling methodology to avoid going into a confined space),
- Substitution (reduce exposure to vapors by using a Geoprobe instead of test pitting),
- Engineering controls (ventilate a confined space to improve air quality),
- Warnings (establish exclusion zones to keep untrained people away from hazardous waste work),
- Administrative controls (implement a work-rest schedule to reduce chance of heat stress), and
- Use of PPE (use respirators when action levels are exceeded).

The SSHO identifies, analyzes, and reviews hazards and hazard control measures with the field crew in the daily pre-task safety meetings prior to work being performed.

Site tasks present some possible physical hazards, which include operating and working around heavy equipment, exposure to moving equipment from the drill rig, manual material handling injuries during sampling and disposing of IDW, exposure to MEC and related energy, vehicle accidents, minimal contaminant exposure, and inclement weather. Precautionary measures will be communicated to site workers relating to any potential for such items. Procedures related to determining if MEC is present on the site and the respective hazard control measures can be found as an attachment to this APP.

If additional tasks or significant hazards are encountered during the work, work will stop and this document will be modified by addendum or field change order to include the additional information.

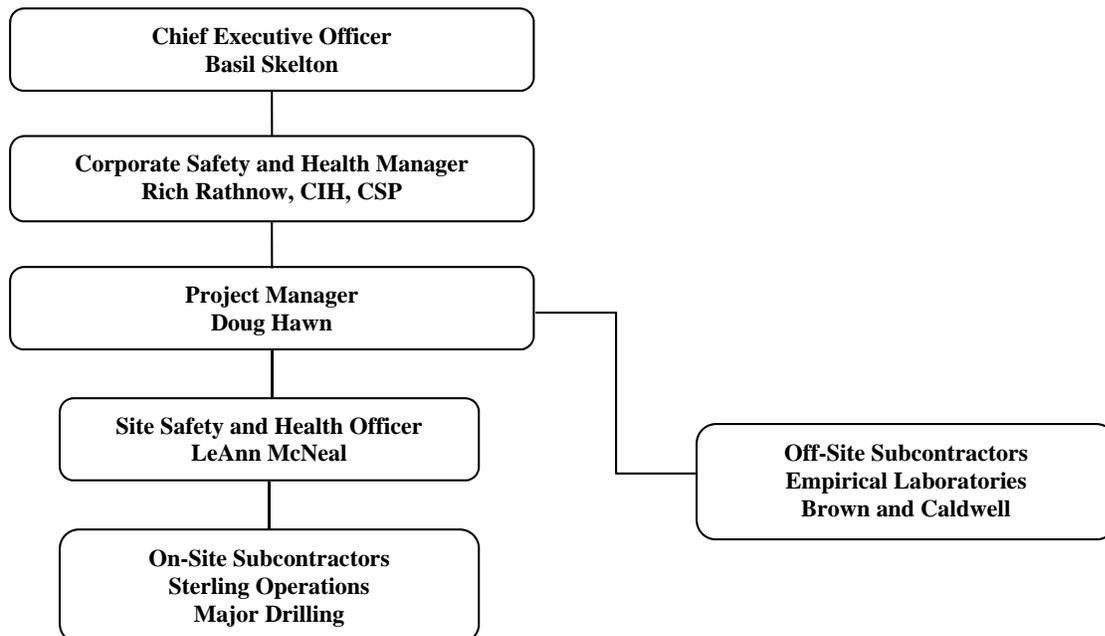
#### 4.e.1 Activity Hazard Analysis

An AHA must be developed before any phase of work is initiated in the field. An AHA defines the activity being performed, the hazards posed, and control measures required to perform the work safely. Workers are briefed on the AHA before doing the work, and their input is solicited prior to, during, and after the performance of work to further identify the hazards posed and control measures required. The AHA shall identify the work tasks required to perform each activity, along with potential safety and health hazards and recommended control measures for each hazard. In addition, a listing of the equipment to be used to perform the activity, inspection requirements, and training requirements for the safe operation of the equipment listed must be identified. AHAs have been prepared for this project and are included as an attachment to this APP.

#### Subcontractor AHAs

SES subcontractors are required to provide AHAs specific to their scope of work on the project for acceptance by SES. Each subcontractor shall submit AHAs for its field activities as defined in the work plan/ scope of work, along with the project-specific safety plan/procedures. Additions or changes in field activities, equipment, tools, or material used to perform work or hazards not addressed in existing AHAs require either a new AHA to be prepared or an existing AHA to be revised.

**4.f. Lines of Authority:** The SES corporate safety and health manager administers the health and safety program. Figure 4-1 is an organizational chart identifying the line of authority for corporate health and safety structure.



**Figure 4-1 Project Safety Program Line of Authority**

*As deemed necessary, the SSHO/supervisor has the authority to correct flagrant violations of safety policy and to remove personnel from the project site if they flagrantly violate safety policy or endanger themselves or others. The disciplinary process will then be implemented according to SES policy.*

The CEO has the overall responsibility and overall authority for all aspects of the corporate S&H program and its implementation.

The corporate safety and health manager reports directly to the CEO and has the authority delegated by the CEO for all actions necessary to effectively implement the corporate S&H program on all projects.

The project manager has the responsibility to implement the S&H program at the project level and has the authority to make decisions and take actions relating to the effective implementation of the program in coordination with the corporate safety and health manager.

The project supervisor is delegated the responsibility and authority for implementation of the safety program by the project manager. The project supervisor may also hold the SSHO responsibility on some projects depending on project scope and size. If the project supervisor does not serve as the SSHO, then the two work together closely and ensure that project safety is carried out in accordance with all regulatory requirements and in accordance with the APP. This individual has the authority to make day-to-day decisions about the implementation of the S&H program on the project.

The SSHO has the authority to correct any and all health and safety hazards and unsafe conditions on the project site. The SSHO in the role of competent person has the authority to stop aspects of the project work as warranted if he/she deems a condition at the work site is a hazard to site workers, the client, or the public. The SSHO in the role of competent person also has the authority to remove personnel from the project for flagrant violations of safety policy or for reckless behavior that endangers themselves or others. The SSHO works in cooperation and close communication with the corporate safety and health manager.

**4.g. Policies and Procedures for Noncompliance:** Noncompliance with safety and health requirements will be corrected immediately as designated by on-site supervisory personnel. Documentation will be made in the logbook. The site manager or SSHO will report serious, noncompliant personnel to the immediate supervisor. The supervisor shall counsel the employee.

SES complies with all Federal, state, and local safety and health regulations. SES also has instituted internal requirements to help reduce the potential for accidents or illnesses. All employees are expected to follow safe work practices, to take responsibility for their own safety, and to respect the safety of others. SES's safety management approach attempts to motivate employees to work safely rather than punishing them for unsafe behaviors, but there may be instances where disciplinary action is necessary.

Any personnel not abiding by regulatory or internal safety rules or policies will be subject to progressive discipline. The general approach to progressive discipline includes the following steps.

- First offense – documented verbal warning,
- Second offense – written warning,
- Third offense – three days suspension without pay, and
- Fourth offense – termination.

The supervisor will document disciplinary actions, and a notice will be placed in the individual's personnel record.

Depending on the nature, severity, or frequency of safety violations, and at SES’s sole discretion, individual or multiple steps in this progressive discipline approach may be bypassed with potential actions up to or including termination on the first offense.

Supervisory Accountability for Safety

The responsibility of conducting work in a manner that ensures our well-being and that of co-workers, clients, and the general public rests with management at all levels as well as each individual employee. Managers and site supervisory personnel will be held accountable for the successful implementation of program and project safety and health requirements and results for projects under their direction. *Project management and supervision personnel’s annual review includes an evaluation of their administration, implementation, and compliance with the corporate S&H program. This evaluation and their dedication to the advancement of the safety culture are factored into any annual merit raises they may receive.*

**5. SUBCONTRACTORS AND SUPPLIERS**

**5.a. Identification of Subcontractors:** Major Drilling Environmental LLC and Sterling Operations will be the on-site subcontractors. Contact information is available in Table 5-1.

**Table 5-1 Subcontractor Contacts**

<b>Subcontractor</b>	<b>Role</b>	<b>Contact</b>	<b>Phone Number</b>
Major Drilling Environmental LLC	Drilling	Ricky Davis	(256) 852-7000
Sterling Operations	UXO support	Jay T. Ferguson	(865) 988-6063 ext. 6048

ext. = extension

UXO = unexploded ordnance

**5.b. Safety Responsibilities of Subcontractors:** *SES as the prime contractor is responsible for ensuring that all subcontractors follow the requirements of this APP and the subcontractors’ submitted safety and health plans and AHAs.* The subcontractor field manager will oversee the field activities of the subcontractor employees. He/she is responsible for enforcing the field requirements of this APP and has the following responsibilities:

- Ensuring that subcontract personnel follow the requirements of the APP and any other applicable safety and health requirements,
- Verifying that this APP adequately addresses the hazards and controls of the subcontracted work,
- Ensuring the safe operation of subcontractor equipment,
- Coordinating the on-site operations of subcontract personnel, and
- Maintaining any required documentation specific to subcontract operations.

SES subcontractors will be informed of the requirements of this plan and will be provided with copies of, or unrestricted access to, copies of this plan. SES subcontractors will be required to review, understand, and sign off acknowledging and accepting the duty to comply with the requirements of this plan. This plan does not relieve subcontractors of the regulatory requirement to provide a safe workplace, and SES subcontractors will be required to supplement the requirements of this plan, as necessary, to ensure that their employees perform their specific tasks safely.

## 6. TRAINING

**6.a. New Hire Safety and Occupational Health Training:** SES employees will be provided with safety and health orientation training by a qualified person before the start of work. All workers will receive continuous safety and health training to enable them to perform their work safely. All trainings, meetings, and indoctrinations will be documented in writing, including the date of the training, the worker's name, content of training, and name of trainer.

Indoctrination and training will be based upon the SES S&H program and will include but not be limited to

- Requirements and responsibilities for accident prevention and maintenance of safe and healthful work environments;
- General safety and health policies and procedures and pertinent provisions of this plan;
- Employee and supervisor responsibilities for reporting all accidents;
- Provisions for medical facilities and emergency response and procedures for obtaining medical treatment or emergency assistance;
- Procedures for reporting and correcting unsafe conditions or practices;
- Job hazards and the means to control/eliminate those hazards, including applicable AHAs; and
- Specific training as required by USACE EM 385-1-1.

Personnel who participate in field activities associated with this project or who enter areas controlled by SES are subject to the training requirements in Table 6-1. Field activities include all tasks specified in Section 2.d. of this plan as well as any unspecified tasks that take place within the work area. Activities such as driving or walking on paved roads, performing paperwork or attending meetings inside routinely occupied buildings, and performing paperwork or similar activities inside office trailers are not subject to these training requirements. Casual visitors who access only the office or staging areas of the support zone are not subject to these training requirements; however, they **MUST** be briefed by a qualified person on the hazards to be expected on site and the safety and health controls required.

**6.b. Mandatory Safety Training:** Table 6-1 lists training requirements for this project, and Table 6-2 lists training requirements by project activity.

**Table 6-1 Training Requirements**

<b>Training</b>	<b>Worker<sup>a</sup></b>	<b>Worker<sup>b</sup></b>	<b>SSHO</b>	<b>Site Visitor<sup>c</sup></b>
40-Hour HAZWOPER	N	Y	Y	N
HAZWOPER Annual Refresher (8 hours)	N	Y	Y	N
HAZWOPER Supervisor (8 hours)	N	N	Y	N
30 Hour OSHA Construction Safety Training	N	N	Y	N
GHS Hazard Communication	N	Y	Y	N
Hearing Conservation	N/Y	Y	Y	N
Respiratory Protection	N	2 workers	Y	N
Pre-Entry Briefing	Y	Y	Y	Y
Project Safety Orientation	Y	Y	Y	N
PPE	N	Y	Y	N
First Aid/CPR	2 workers	2 workers	Y	N
Bloodborne Pathogens	2 workers	2 workers	Y	N
UXO Worker Related Training	N	Y <sup>d</sup>	Y <sup>d</sup>	N

Note: For the purposes of this table, the SSHO is considered a site worker.

<sup>a</sup>Workers performing nonintrusive tasks under conditions that present no possibility of exposure to hazardous waste or chemicals. This includes surveyors and USACE personnel who enter the site after closure. If workers are exposed to noise levels above 85 dBA, they must be enrolled in a hearing conservation program.

<sup>b</sup>Workers performing tasks inside SES-controlled areas under conditions that pose a potential risk of exposure to hazardous waste or chemicals. This includes all SES personnel and subcontractors performing work as part of the project, vendors, and similar personnel.

<sup>c</sup>Vendors and similar personnel

<sup>d</sup>Sterling workers and SUXO

CPR = cardiopulmonary resuscitation

HAZWOPER = hazardous waste operations and emergency response

OSHA = Occupational Safety and Health Administration    PPE = personal protective equipment

SSHO = site safety and health officer

**Table 6-2 Training Requirements by Role and Project Activity**

<b>Project Activity or Role</b>	<b>Training/Certification/Qualifications</b>
Using machinery and mechanized equipment	Designated and qualified personnel
Using a forklift	Certified, trained, and authorized; reevaluation every three years
Vehicle operation	Valid license for vehicle being operated
Using personal protective equipment	Trained in PPE use according to job description, including donning and doffing, limitations of use, and correct fit.
Using respiratory protection	Training and annual retraining, fit test, physician's written opinion on medical qualification for use.
SUXOT	DDESB TP-18 qualified, USN or DOD EOD school, ER 385-1-92 trained, trained on work plan
UXOT1, UXOT2, UXOT3	DDESB TP-18 qualified, USN or DOD EOD school ER 385-1-92 trained, trained on work plan
UXOSO/UXOQCS	DDESB TP-18 qualified, USN or DOD EOD school ER 385-1-92 trained, trained on work plan

PPE = personal protective equipment

UXOQCS = unexploded ordnance quality control specialist

UXOT1 = unexploded ordnance technician I

UXOT3 = unexploded ordnance technician III

SUXOT = senior unexploded ordnance technician

UXOSO = UXO safety officer

UXOT2 = unexploded ordnance technician II

**6.c. Procedures for Periodic Safety and Health Training for Supervisors and Employees:** The following sections present brief summaries of training requirements and retraining intervals as applicable.

**6.c.1 Off-Site Training**

The 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) course is required for general site workers engaged in hazardous, toxic, and radioactive waste activities that expose or potentially expose them to hazardous substances. Three days of relevant field experience are required in conjunction with this training. The eight-hour HAZWOPER refresher is required annually to maintain currency in the above course.

HAZWOPER supervisor training is required for personnel who directly supervise hazardous waste site workers. This is an eight-hour course that must be taken once. The 40-hour course is a prerequisite for this training. As per 29 *Code of Federal Regulations* (CFR) 1910.120(e)(4), the HAZWOPER supervisor course covers the following topics:

- Site safety and health officer responsibilities;
- Site safety and health plan elements and implementation;
- Direct reading instruments, their operation, use, and limitations;
- Equipment calibration;
- PPE uses and limitations and respirator selection;
- Safety briefings and effective site safety communications; and
- Site safety and health plan management.

Competent Person/SSHO Construction Safety Training

EM 385-1-1 [September 2008 (updated July 2012)] requires 30 Hour OSHA Construction Safety Training with 24 hours of ongoing continued education every four years for an individual to serve as the site

construction safety competent person and as the SSHO with 24 hours of ongoing continued education every four years. The training requires the following content:

- Occupational Safety and Health Act/General Duty Clause;
- 29 CFR 1904, “Record Keeping”;
- Subpart C: “General Safety and Health Provisions, Competent Person”;
- Subpart D: “Occupational Health and Environmental Controls, Citations and Safety Programs”;
- Subpart E: “PPE, Types and Requirements for Use”;
- Subpart F: “Understanding Fire Protection in the Workplace”;
- Subpart K: “Electrical”;
- Subpart M: “Fall Protection”; and
- Rigging, welding and cutting, scaffolding, excavations, concrete and masonry, demolition, health hazards in construction, materials handling, storage and disposal, hand and power tools, motor vehicles, mechanized equipment, marine operations, steel erection, stairways and ladders, confined spaces, or any others that are applicable to the work being performed.

Hazard communication is required for all site workers. This training is designed to inform personnel of the characteristics of chemicals with which they will be working, the hazards presented by those chemicals, and methods of protection from exposure to the chemicals. This initial generalized training is supplemented by training for each project for site-specific chemicals.

Hearing conservation is required annually for all employees enrolled in a hearing conservation program as mandated by 29 CFR 1910.95. This includes all employees exposed to occupational noise in excess of 85 dBA as a time-weighted average.

Respiratory protection is required for all workers who wear respirators. This training requirement is met by taking the 40-hour HAZWOPER course initially and then updated annually.

### UXO Personnel Training

UXO teams will consist of personnel qualified to the requirements of DDESB TP-18, “Minimum Qualifications for UXO Technicians and Personnel” (Department of Defense, 2004); personnel not meeting the minimum qualifications will not perform any excavation or handle UXO/MEC. All project personnel will complete the OSHA 40-hour training course for hazardous waste site workers as required by the specific task. Additional site-specific training, in accordance with 29 *Code of Federal Regulations* (CFR) 1910.120 “Hazardous Waste Operations and Emergency Response”; EM 385-1-1 *Safety and Health Requirements Manual* [USACE, September 2008 (updated July 2012)]; Engineering Regulation (ER) 385-1-92, *Safety and Occupational Health Document Requirements for Hazardous, Toxic, and Radioactive Waste and Ordnance and Explosive Waste Activities* (USACE, 2007); and the approved work plan will be provided to all personnel upon their initial mobilization. SES and Sterling have a medical surveillance program requiring each member of the field team to have passed a medical exam within the past 12 months. All UXO personnel will meet the requirements set forth in DDESB TP-18. All UXO personnel, regardless of their labor category, must be a graduate of either the U.S. Naval EOD School or a Department of Defense-certified equivalent course. Individual UXO personnel qualifications are

- SUXOS: The SUXOS must have at least 10 years of combined active duty military EOD and contractor UXO experience, including at least 10 years in supervisory EOD and UXO positions. This individual must have experience with or specialized training in the type of MEC expected to be encountered. As the most senior UXO-qualified individual on site, the SUXOS directly supervises all daily MEC activities. This individual is responsible for the successful performance of field teams, early detection and identification of potential problem areas, and for instituting

corrective measures. The Sterling SUXOS will document site conditions, photographically document operations, prepare project reports, and identify efforts to accomplish the PWS.

- UXOSO/ UXOQCS (dual-hatted position): The UXOSO/UXOQCS will have the following skills/knowledge:
  - The ability to identify fuzing, necessary precautions, and fuze condition (armed, functioned, or armed and functioning) and how this condition can or will affect the munitions payload if other forces are applied;
  - The ability to recognize munitions/ordnance types and to determine the hazards and make risk assessments. This includes identifying potential fillers, such as those in extremely deteriorated condition ([high explosives (HEs)], fragmentation, white phosphorus (WP), and CWM. The UXOSO must also be able to determine if munitions can be moved before destroying or if the munitions must be blown in place (BIP), fragmentation radius, and, in the case of CWM, the potential downwind hazard along with the engineering controls to mitigate risk;
  - The same minimum prerequisites as the UXOT3. In addition, the UXOSO will also have the specific training, knowledge, and experience to implement the safety plan and verify compliance with applicable safety and health requirements; and
  - Experience in UXO/MEC clearance operations and supervising personnel. This individual will have at least eight years combined active duty military EOD and contractor UXO/MEC experience. The role of UXOQCS may also be performed by the UXOSO.
- UXOT3: The UXOT3 supervises a UXO team. This individual must have experience in MEC clearance operations and supervising personnel. The UXOT3 must have at least eight years combined active duty experience in military EOD and contractor UXO positions.
- UXOT2: The UXOT2 may be a UXO technician I (UXOT1) with at least three years combined military EOD or contractor UXO experience.
- UXOT1: The UXOT1 will not perform UXO procedures without the direct supervision of a fully qualified UXOT2 or higher. A UXOT1 may become a UXOT2 with three years contractor UXO experience.

### **6.c.2 Site-Specific Training**

On-site personnel must receive site-specific training. Site workers will receive information on site hazards, hazard controls, and emergency procedures. Visitors will receive information relevant to the purpose of their visit. Signatures of those attending and the type of briefing must be entered into the field logbook before site access will be granted. Site-specific training will include the following information, as appropriate:

- Names of health and safety personnel,
- Contents of the project APP and work plan,
- Hazards and symptoms of chemical exposure,
- Physical hazards on the site,
- Location and availability of the Hazard Communication Program documents,
- Site- and task-specific PPE,
- Safe work practices,
- Safe use of engineering controls and equipment,
- Medical surveillance requirements,
- Site control measures,
- Reporting requirements for spills and emergencies,
- Personnel decontamination procedures,

- Contingency plans, and
- Emergency equipment.

### 6.c.3 Pre-Task Safety Plan

Safety briefings will be held daily before the start of work activities and whenever conditions at the site change. The field manager or the SSHO will conduct these, and the briefings will be required for all site workers. These briefings will address site- and task-specific safety hazards and control measures and issues and will be used to refresh and train workers on specific procedures and controls.

**6.d. Emergency Response Training:** All site workers will be trained during the site orientation and project safety briefing session on emergency procedures to be followed specifically pertaining to this project. The training will include recognizing emergencies, reporting emergencies, and responding to emergencies, including the locations of first aid and firefighting equipment as well as the assembly areas for accountability when an emergency notification is broadcasted.

The SSHO or field manager will designate the evacuation routes and assembly areas and emphasize these during the project orientation and safety briefing meeting. The routes and assembly areas will be posted on the central job board as well. All employees will be required to be familiar with these routes and assembly areas. These procedures will be reviewed and documented periodically during the daily pre-task safety plan sessions. Additional emergency response training will be conducted as identified in accordance with the requirements in Section 9.b.

## 7. SAFETY AND HEALTH INSPECTIONS

**7.a. Safety Inspection Personnel:** The SSHO serving as the competent person (qualifications, resume, and assignment thereof provided in the attachments) will conduct *daily and weekly* site safety inspections of the work site, material, and equipment. These inspections/audits shall be documented in writing and available upon request to the GDA. They shall include the name of the inspector, date, and all findings.

Identified safety and health issues and deficiencies and the actions, timetable, and responsibility for correcting the deficiencies will be recorded in inspection reports. Follow-up inspections to ensure correction of any identified deficiencies will be conducted and documented in inspection reports.

SES has established a safety and occupational health deficiency tracking system that lists and monitors the status of safety and health deficiencies in chronological order.

The list shall be posted on the project safety bulletin board, be updated daily, and provide the following information:

1. Date deficiency identified,
2. Description of deficiency,
3. Name of person responsible for correcting deficiency,
4. Projected resolution date, and
5. Date actually resolved.

**7.b. External Inspections/Certifications:** SES will immediately notify the GDA of any OSHA or other regulatory agency inspection and provide the GDA an opportunity to accompany SES on the inspection. (The inspection will not be delayed if the GDA is unavailable.) SES will provide the GDA with a copy of

any citations or reports issued by the inspector and any corrective action responses to the citation(s) or report(s).

The corporate safety and health manager may make announced or unannounced site visits. The corporate safety and health manager also reviews all projects quarterly to ensure the proper documentation and follow-up of safety meetings, inspections, and briefings.

The SES SSHO will accommodate all USACE, U.S. Coast Guard, or other applicable inspection agencies as necessary to ensure that project compliance is maintained for all activities.

## **8. ACCIDENT REPORTING**

**8.a. Exposure/Man-Hours:** Mr. Doug Hawn (SES) will provide monthly reporting of man-hours and exposure data per EM 385-1-1 01.D.05 and contract requirements.

**8.b. Accident Investigations, Reports, and Logs:** SES will thoroughly investigate all accidents as required and submit findings/results and appropriate corrective actions to the contracting officer (CO)/COR in the prescribed format as soon as possible but no later than five working days after the accident.

SES will report all accidents as required to the CO/COR as soon as possible but not more than 24 hours later. Corrective actions must be implemented and tracked to closure as soon as reasonably possible.

The field manager and SSHO will initiate and coordinate all site incident investigations. Subcontractor safety contacts are to be engaged and involved in all site investigations involving subcontractor personnel or equipment. All subcontractor incidents must be reported as soon as practically possible if not immediately to SES, depending on circumstances surrounding the incident. Subcontractors must submit an initial written incident report to the SES site representative within eight hours of the incident.

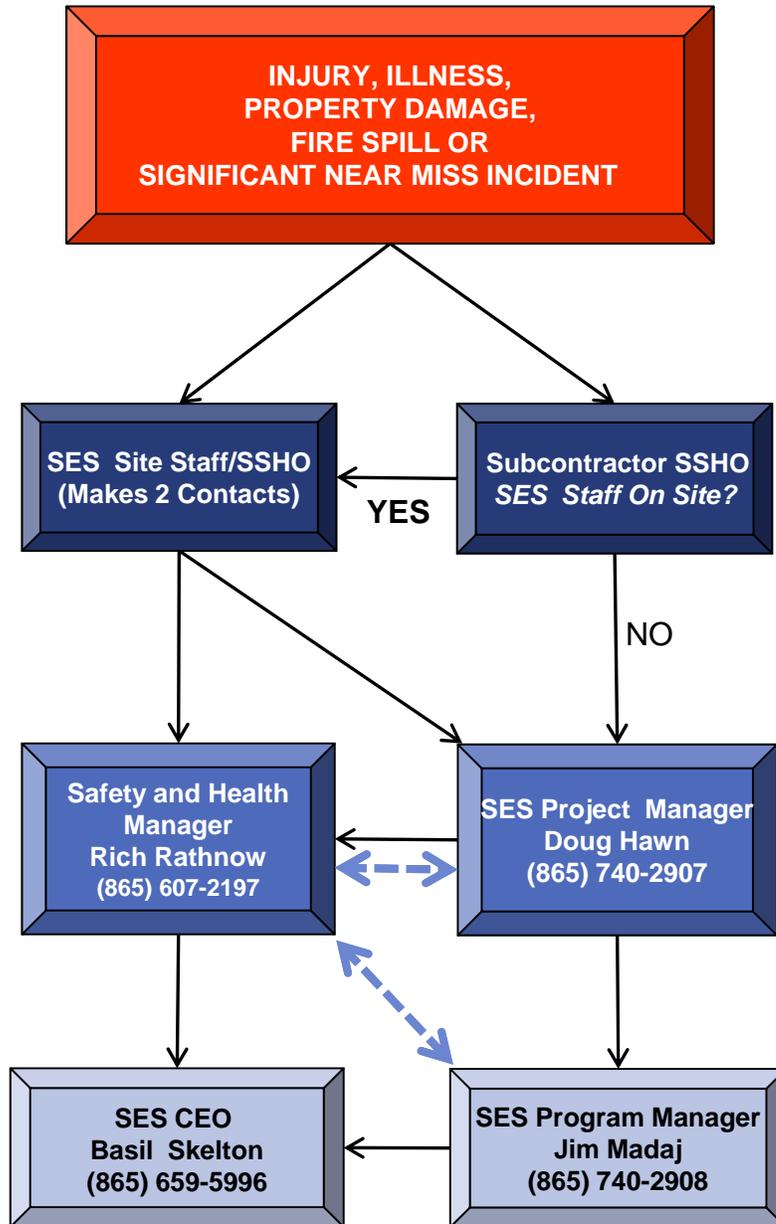
**8.c. Accident Notification:** The following specific incidents require immediate incident notification to the CO/COR:

1. A fatal injury,
2. A permanent total disability,
3. A permanent partial disability,
4. The hospitalization of three or more people resulting from a single occurrence, or
5. Property damage of \$200,000 or more.

The SSHO shall immediately report the following information to the safety and health manager and project manager by phone and e-mail (Figure 8-1):

- Project name/site manager,
- Date and time of the incident,
- Description of the incident,
- Extent of known injuries/damage,
- Level of medical attention, and
- Preliminary root cause/corrective actions.

The SES team shall comply with all applicable statutory incident reporting requirements such as those to OSHA and the police.



↔ = Verify notification

**Figure 8-1 SES Incident Reporting Process**

## 9. PLANS, PROGRAMS AND PROCEDURES REQUIRED BY THE SAFETY MANUAL

The following elements of the SES S&H program will be used to manage project-specific occupational risks. EM 385-1-1, *Safety and Health Requirements Manual* [September 2008 (updated July 2012)] is used as a guide to develop and include these plans.

**9.a. Layout Plans:** A layout plan is not required because the elements described relating to temporary facilities are not applicable to this project scope of work. SES will be working out of field vehicles for this project.

### 9.b. Emergency Response Plans

#### 9.b.1 Procedures and Tests

SES has developed and will implement a project emergency plan to ensure employee safety in case of fire or other emergency. The plan is below and will be reviewed with all affected project employees.

*This emergency plan will be tested. A discussion below is included as to how the plan will be tested to ensure effectiveness.*

#### Escape Procedures and Routes

The assembly area and evacuation routes are in Figure 9-1. All employees will be familiar with these routes and assembly areas. **An initial test** and monthly review of this process and the designated assembly areas will be conducted.

- Evacuation routes and assembly areas will be explained to workers at the start of fieldwork.
- The SSHO will designate evacuation route(s) and assembly area(s) before work begins, communicate them to all workers, and review them frequently.
- Personnel will assemble at the designated assembly area(s) upon hearing the emergency signal for evacuation.

#### Critical Plant Operations

This section is not applicable to the scope of work because the work is not being conducted inside a plant area or affected by plant operations.

#### Accounting for Employees following Evacuation

- The SSHO and a “buddy” will remain on the site after the site has been evacuated (if safe) to assist local responders and advise them of the nature and location of the incident.
- The SSHO will account for all personnel in the on-site assembly area.
- A designated person will account for personnel at alternate assembly area(s) as may be established to meet project site conditions.
- ***A documented practice drill/test will be performed initially and monthly. This process will be reviewed and practiced as described in this plan.***

## Rescue and Medical Duties

The SSHO coordinates emergency response rescue and medical duties with SES on-site parties, the facility, and local emergency service providers as appropriate.

SES personnel shall review and implement all applicable components of SES S&H Manual Section 21.0, “Work Site Emergency Procedure,” except where other requirements may be more stringent.

- Where appropriate and acceptable to the client, the SSHO will inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies.
- Review changed site conditions, on-site operations, and personnel availability in relation to emergency response procedures.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside, and keep keys in ignition during field activities.
- Inventory and check site emergency equipment, supplies, and potable water regularly.
- Communicate/train emergency procedures for personnel injury, exposures, fires, explosions, and releases.
- Rehearse the emergency response plan before site activities begin, including the driving route to hospital.
- Train new workers on the emergency response plan.

## Reporting Emergencies

The SSHO performs the applicable reporting of emergency duties and other pre-emergency planning tasks before starting field activities.

**SES personnel shall review and implement all applicable components of SES S&H Manual Section 21.0, “Work Site Emergency Procedure,” except where other requirements are more stringent.**

The SSHO also will perform the following responsibilities:

- Review the facility emergency and contingency plans where applicable;
- Determine what on-site communication equipment is available (two-way radio, air horn);
- Determine what off-site communication equipment is needed (nearest telephone, cell phone); and
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to the hospital and communicate the information to on-site personnel.

## People to Be Contacted for Information or Clarification

Table 9-1 identifies SES personnel who may be contacted for additional information or clarification.

**Table 9-1 Contacts**

<b>Name</b>	<b>Telephone</b>
SES – Jim Madaj, Senior Program Manager	(865) 481-7837 ext. 266
SES SSHO LeAnn McNeal	(912) 660-4782
SES Project Manager Doug Hawn	(865) 740-2907
SES – Rich Rathnow, Safety and Health Manager	(865) 481-7837 (865) 607-2197 (cell)

## Integration of On-Site Emergency Planning with Off-Site Emergency Support

The SSHO will verify the off-site emergency services contact numbers and offer these services the opportunity for an on-site orientation of the project and associated hazards. Where appropriate and acceptable to the client, the SSHO will inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies. Emergency contacts are in Table 9-2. The SSHO will verify these contacts before project activities start.

**Table 9-2 Emergency Contacts**

<b>Name</b>	<b>Telephone</b>
Fort Stewart Military Police	911
Fire Department	911
Police	911
Emergency Medical Services	911
Hospital –Winn Army Community Hospital	(912) 435-6666
Hospital – Liberty Regional Medical Center	(912) 369-9400
USACE – Savannah District	(912) 652-5838
Range Control	(912) 435-8777
Environmental Compliance	(912) 315-5144

### **9.b.2 Spill Plans**

SES has developed and will implement the spill plan contained herein to ensure employee safety in case of spills that might occur during project work. The spill plan shall be reviewed with all workers periodically to ensure understanding of its detailed implementation and effectiveness.

#### Hazard Evaluation

All operations, materials, and equipment have been evaluated in relation to the potential for spills to determine the presence of hazardous environments or if hazardous or toxic agents could be released into the work environment. It has been determined through implementation of the Risk Management System via hazard inventory, general pre-task hazard analysis, and AHAs that there is no risk of significant hazardous or toxic agents being released into the work environment during this work.

There is a minimal risk of general use materials listed below being spilled in small quantities at the project site. The initial response to any spill or discharge will be to protect human health and safety and then the environment. Identification, containment, treatment, and disposal assessment will be the secondary response.

The following is a list of materials or chemicals that are considered to pose a minimal risk for spill on site. These may be brought on site and incorporated as part of the final completion of the work, generated during the execution of the work for off-site disposal or recycling or used to facilitate site work. The items on this list may require spill prevention and countermeasure control processes to ensure sensitive environmental receptors are not adversely impacted if a spill/release were to occur.

- Metals -- including antimony, copper, and lead -- from the project site;
- Diesel fuel (heavy equipment fueling);
- Gasoline (small safety containers for fueling generators);
- Motor and hydraulic oil (heavy equipment operations);

- Decontamination fluids (inorganic metals, semivolatile organic compound impacted); and
- Grease (lubricating heavy equipment).

In the event of a hazardous substance release to the air, soil, or water, SES and its subcontractors will immediately notify the Fort Stewart USACE Environmental Department, the USACE COR, and the SES safety and health manager. The magnitude and potential impact of the release will be assessed. If it is safe to do so, site personnel will isolate the source of the spill, prevent further spill, and contain the spilled and/or affected materials as follows:

- The spill or release will be approached cautiously. Real-time air monitoring will be continuously performed in the spill vicinity.
- Hazards will be identified based on available information from witnesses or material identification documents (placards, MSDSs/SDSs, logs). The potential hazards will be evaluated to determine the proper personal protection levels, methods, and equipment necessary for response.
- If necessary, the release area will be evacuated, isolated, and secured.
- If possible, spill containment will initially be made without entering the immediate hazard area.
- Entry to the release area will be made with the PPE, personnel, methods, and equipment necessary to perform the work. Hazardous spill containment and collection will be performed in four steps as follows:
  1. Contain the spill with absorbent socks, booms, granules, or construction of temporary dikes.
  2. Control the spill at the source by plugging leaks, uprighting containers, overpacking containers, or transferring contents of a leaking container.
  3. Collect the spilled material with shovels or heavy equipment as necessary.
  4. Store the spilled material for further treatment or disposal. Treatment and/or disposal options of the material will depend on the amount and type of material.

If site personnel cannot safely and sufficiently respond to an environmental release, evacuation of the area may be warranted. The decision to evacuate will depend upon the risk of exposure to the client, SES, and subcontractor personnel and the severity of the release. In the event of a spill, appropriate personnel will be notified depending upon the quantity. Upon their arrival at the site, the SSHO will brief them on the current situation and any potential hazards the team may face.

The project manager has the authority to commit resources as needed to contain and control released material and to prevent its spread to off-site areas. The project manager is responsible for notification to the SES senior program manager and safety and health manager.

**Through the Risk Management Process**, which included the use of pre-task hazard analysis and AHAs, engineering and administrative controls have been identified to address these concerns and shall be used to control these hazards. PPE specific to this limited chemical use is typical for this type of operation and includes American National Standards Institute (ANSI)-approved hard hats, safety glasses, safety boots, chemical splash goggles, and Nitrile gloves. Additional engineering and administrative controls above normal manufacturer-recommended handling procedures as identified in the MSDS/SDS will be needed for safe performance of this work. These controls are identified in the AHAs attached to this plan.

This plan and the AHAs attached serve as certification of this task hazard assessment and include **the workplace and activities evaluated**, the name of the person certifying that the evaluation has been performed, and the date of the evaluation.

SES Corporate Safety and Health Manager Rich Rathnow, an American Board of Industrial Hygiene-certified industrial hygienist and a Board of Certified Safety Professionals-certified safety professional, has evaluated the activities to be performed during this scope of work along with the materials and equipment involving potential exposure to hazardous or toxic agents or environments. *All activities will undergo this process annually as applicable.*

### 9.b.3 Firefighting Plan

SES personnel will only attempt to fight small fires that can be controlled comfortably through use of a portable handheld fire extinguisher. Only those individuals who have been trained in and are comfortable using portable fire extinguishers for this purpose will attempt to extinguish small fires.

Only small quantities of flammable liquids will be maintained on site per Section 9.q Fire Prevention Plan of this APP. SES will shut off all energy sources or materials that might feed into the fire (in this case there are no such instances).

In the event of a fire emergency that is beyond the capability of SES personnel, SES will contact the base fire department for assistance with the fire. The base fire and emergency services will be contacted prior to mobilization to obtain authorization and agreement in gaining their assistance for fire and other emergencies, injuries, and illnesses. SES does not assume that government resources for such situations are automatically available and will gain the appropriate approval and agreement prior to the work being performed.

### 9.b.4 Posting of Emergency Telephone Numbers

Emergency telephone numbers will be placed and maintained in all project vehicles with clear directions for contacting local emergency support services and appropriate company and client contacts. The most direct route to the nearest occupational medical clinic or hospital for emergencies also will be placed in all project vehicles as well. Emergency contacts and phone numbers are listed in Table 9-3. This information is provided again in Attachment 4 for posting at the site.

**Table 9-3 Emergency Contacts**

Contact	Telephone Number
Fort Stewart Military Police	911
Fire Department	911
Police	911
Emergency Medical Services	911
Hospital –Winn Army Community Hospital	(912) 435-6666
Hospital – Liberty Regional Medical Center	(912) 369-9400
USACE – Savannah District	(912) 652-5838
Range Control	(912) 435-8777
Environmental Compliance	(912) 315-5144
SES – Jim Madaj, Senior Program Manager	(865) 481-7837 ext. 266
SES SSHO LeAnn McNeal	(912) 660-4782
SES Project Manager Doug Hawn	(865) 740-2907
SES – Rich Rathnow, Safety and Health Manager	(865) 481-7837; (865) 607-2197 (cell)

SES = SpecPro Environmental Services

USACE = U.S. Army Corps of Engineers

### 9.b.5 Man Overboard/Abandon Ship

This section does not apply to this project scope of work because it refers to the section on Floating Plants and Marine Activities (Section 19 of EM 385-1-1).

### 9.b.6 Medical Support

The procedures listed below may also be applied to nonemergency incidents. SES employee injuries and illnesses must be reported to the human resources contact in Attachment 4 of this APP after all other notification requirements have been fulfilled. If there is doubt about whether medical treatment is necessary or if the injured person is reluctant to accept medical treatment, contact Rich Rathnow, corporate safety and health manager. During nonemergencies, follow these procedures as appropriate.

- The SSHO shall ensure that potable water, an ANSI-approved portable eye wash station, and an easily accessible, clearly marked, and fully stocked first aid kit in a Type III container are present at the project site primary work area. Each vehicle will also contain a first aid kit.
- Notify appropriate emergency response authorities.
- The SSHO will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury.
- Initiate first aid and CPR where feasible.
- For life-threatening emergencies, get or summon medical attention immediately.
- Perform decontamination where feasible; lifesaving and first aid or medical treatment take priority.
- Make certain that the injured person is accompanied to the emergency room.
- When contacting the medical consultant, give your name and telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.
- Report the incident as outlined in Section 8.
- **A map showing the route to the nearest local hospital is in Attachment 4.**

In the event of a medical emergency, the field manager will immediately notify local emergency medical services as identified in the project emergency telephone contacts list. At least two first aid/CPR- and bloodborne pathogen-trained personnel will be on site at all times, and these personnel will perform first aid pending release of the injured person to medical personnel. An injured person who may be contaminated will be decontaminated to the extent feasible. Decontamination may be bypassed for life-threatening injuries or illnesses.

On-site first aid services will be rendered by first aid-trained individuals and documented in the project first aid injury log.

Injuries that are nonemergency yet require medical attention will be transported to a local occupational medical physician for proper treatment.

Qualified individuals for providing first aid and CPR include the following:

LeAnn McNeal  
Chris Napoleon and  
Subcontractor personnel (TBD).

**9.c. Alcohol and Drug Abuse Prevention Plan:** SES participates in a Drug-Free Workplace Program, which is certified by the state of Tennessee. No alcoholic beverages or illegal substances may be used during work hours or stored on the person or in company vehicles. Personnel who appear to be under the influence of these substances at any time during the work period shall not operate any motorized tools, equipment, or vehicles. Personnel who appear to be under the influence of over-the-counter drugs or medications (antihistamines, allergy medication, etc.) that impair their ability to function (fitness for duty such as operation of equipment or vehicles) shall be prevented from doing so. The on-site manager (SSHO or alternate) shall contact the SES project manager and human resources manager for guidance in accordance with the SES Alcohol and Drug Abuse Policy.

1. The first violation will result in immediate suspension without pay for two (2) weeks, at which time the employee can return to work upon providing SES with a copy of a current negative drug test at his/her own expense. A "First Warning" documenting the incident and the measures taken, signed by the employee and an authorized representative of SES will be placed in the employee's personnel file;
2. The second violation will result in immediate suspension without pay for one (1) month, at which time the employee can return to work if there is a position open upon providing SES with a copy of a current negative drug test at his/her own expense. A "Second Warning" documenting the incident and the measures taken, signed by the employee and an authorized representative of SES will be placed in the employee's personnel file;
3. The third violation will result in immediate suspension without pay and without benefits for six (6) months. The employee may reapply for a position, if one is available, with SES upon providing SES with a copy of a current negative drug test at his/her own expense. A "Third Warning" documenting the incident and the measures taken, signed by the employee and an authorized representative of SES will be placed in the employee's personnel file.

If a disciplined employee works for a full year from the date the employee returns to work after their suspension without further disciplinary action under this policy, the next violation may be treated as a first violation under this policy. However, SES may still consider all past disciplinary actions in evaluating the employee.

SES will continue to test under the following circumstances: (1) pre-employment; (2) for-cause testing; (3) post-accident testing; and (4) random testing.

Two groups will be established for random testing. The first group will consist of all employees who have warnings in their personnel files. The second group will consist of all other employees. SES has purchased a software program specifically designed to make random test selection. The program is set up to make one selection from the first group and two selections from the second group on a quarterly basis. SES will determine the date, time, and location for testing. The employees picked will be notified of their selection and must report to the designated testing center within one (1) hour of notification, or as otherwise instructed by management. A "no-show" at the designated time and place will be interpreted as a positive test result.

Under normal circumstances, SES endorses this policy of progressive discipline, where employees will receive notice of violation and an opportunity to improve. SES does, however, retain the right to administer discipline in any manner it sees fit based on the individual circumstances of the incident. This policy does not modify the status of employees-at-will or in any way restrict SES's right to bypass the disciplinary procedures suggested.

## **9.d. Site Sanitation Plan**

### **9.d.1 Housekeeping**

- Good housekeeping must be maintained at all times in all project work areas.
- Common paths of travel should be established and kept free from accumulation of material.
- Keep access to aisles, exits, ladders, stairways, scaffolding, and emergency equipment free from obstructions.
- Provide slip-resistant surfaces, ropes, and/or other devices.
- Specific areas should be designated for the proper storage of materials.
- Tools, equipment, materials, and supplies shall be stored in an orderly manner.
- As work progresses, scrap and unessential materials must be neatly stored or removed from the work area.
- Containers should be provided for collecting trash and other debris and shall be removed at regular intervals.
- All spills shall be quickly cleaned up. Oil and grease shall be cleaned from walking and working surfaces.

### **9.d.2 Drinking Water**

- Potable water will be maintained on site for both drinking and personal cleansing.
- Drinking water must be dispensed in a manner that prevents contamination between the worker and the water source.
- Water dispensing systems must be capable of being closed and shall have a tap.
- Water dispensing containers shall be marked “Drinking Water” and will not be used for other purposes.
- Do not use open containers, such as barrels or pails from which the water is “dipped” or poured, for drinking purposes.
- Workers must be provided individual drinking cups, and a common cup will not be allowed.
- Unused drinking cups must be kept in sanitary containers, and a waste receptacle must be provided for used cups.
- During hot weather, cool water must be available for site workers.
- Where a project trailer is used, it shall be properly connected to the local municipal water supply unless the remote location makes this impossible.
- Temporary potable water systems can be used with services provided by a licensed potable water contractor.
- Do NOT use reclaimed water under any circumstances.

### **9.d.3 Nonpotable Water**

- Outlets dispensing nonpotable water will be conspicuously posted “Caution – Water Unsafe for Drinking, Washing, or Cooking.”
- There will be no cross-connection between a system furnishing potable water and a system supplying nonpotable water.
- Nonpotable water may be used for cleaning work areas except where food is prepared or consumed and in personal service rooms. This water must not contain fecal coli form or other substances that might create unsanitary conditions or be harmful to workers.

#### **9.d.4 Toilets**

- Clean restrooms in compliance with EM 385-1-1 Section 02.E.02 for Construction Sites will be available for employees through the use of a Porta Potty standard portable restroom.
- Adequate ventilation will be available in toilet areas.
- All personnel are expected to use good personal hygiene practices when exiting potentially contaminated work areas.
- Observing hygiene practices will minimize the potential migration of contaminants from “dirty” areas into “clean” areas.

#### **9.d.5 Washing Facilities and Hand Washing**

- Washing facilities will be provided at toilet facilities and as needed to maintain healthful and sanitary conditions through the use of a standalone portable sink station with soap and paper towels.
- Each washing facility will be maintained in a sanitary condition and provided with water, soap, and individual means of drying.
- Workers are encouraged to wash hands thoroughly prior to and after using the restroom facilities.

**9.e. Access and Haul Road Plan:** This does not apply to this project because haul road construction is not part of the scope of work.

**9.f. Respiratory Protection Plan:** A respiratory protection plan will not be required because respiratory protection will not be used during this project. During this work, there will be no occupational exposure levels that exceed OSHA Permissible Exposure Limits or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values requiring its use.

Table 4-1 of the SSHP requires respiratory protection training for a minimum of two people at the site for work inside a controlled area under conditions that pose a potential risk of exposure to hazardous waste or chemicals. Based on the information available from reference documents and site characterization data, respiratory protection is not required for this project; however, unforeseeable site conditions may warrant the use of respiratory equipment. If an upgrade in PPE involving respiratory protection is required, the SSHP will stop work and notify the site manager and the safety and health manager. If respiratory protection is needed, the SES Respiratory Protection Program will be attached to this document and/or available at the project site for use and implementation with approval from the GDA.

#### **9.g. Health Hazard Control Programs**

##### **9.g.1 Hazard Evaluation**

All operations, materials, and equipment have been evaluated in relation to the potential for worker exposure to health hazards to determine the presence of hazardous environments or if hazardous or toxic agents could be released into the work environment. Implementation of the Risk Management System via hazard inventory, general pre-task hazard analysis, and AHAs shows there is no risk of significant hazardous or toxic agents being released into the work environment during this work.

This plan and the attached AHAs serve as certification of this task hazard assessment and include the workplace and activities evaluated, the name of the person certifying that the evaluation has been performed, and the date of the evaluation. SES Corporate Safety and Health Manager Rich Rathnow, an

American Board of Industrial Hygiene-certified industrial hygienist and a Board of Certified Safety Professionals-certified safety professional, has evaluated the operations to be performed during this scope of work along with the materials and equipment involved to make the health hazard control determination.

There is minimal risk of low level exposure to metals as identified earlier in this plan, including antimony, copper, and lead.

### Noise Exposure Control

SES's priority is to establish the use of administrative controls for controlling noise exposures. A sound level survey will be performed using a noise dosimeter for Geoprobe operation at startup. Sound levels will be identified at the source and then again at intervals of every 10 feet concentrically. Using the results of the sound level survey along with the premise that every doubling of distance from the noise source reduces noise 6 dB, boundary barrier zones will be established identifying

1. The zone where noise levels exceed 105 dB and double hearing protection is mandatory;
2. The zone where noise levels exceed 85 dB but do not exceed 105 dB and single-layer hearing protection with a minimum NRR of 32 is required; and
3. The preferred worker location zone, where noise exposures are controlled administratively to less than 85 dB(A) by distance from the source.

Signs will be posted and enforced at these barrier zones alerting personnel and visitors/ public to the hearing protection requirements. Personnel operating heavy equipment or other machinery will wear hearing protection.

In addition, hearing protection with a noise reduction rating (NRR) sufficient to reduce worker exposure below 85 dBA will be used. The minimum NRR for hearing protection on this project will be 32, which will be adequate for noise levels up to 105 dBA. OSHA requires the subtraction of 7 dB(A) from the product listed NRR to estimate the NRR, which would then be 25 dB(A). If noise levels are suspected of exceeding 105 dBA, double-layer hearing protection will be required. The addition of wearing double hearing protection will add an additional 5 dB(A) to the NRR property establishing an effective NRR of 30 dB(A).

When double hearing protection is required (noise greater than 105 dBA), affected employees will switch from ANSI 87.1-2010 standard safety glasses with side shields to safety goggles that meet the requirements of ANSI 87.1-2010 where the elastic strap can be worn over the exterior of the earmuff rather than the stem of the safety glasses breaking the seal of the earmuffs.

*All activities will undergo this process annually as applicable.*

### **9.g.2 Testing and Monitoring**

Table 9-4 provides direct reading monitoring specifications.

**Table 9-4 Direct Reading Monitoring Specifications**

<b>Instrument</b>	<b>Tasks</b>	<b>Action Levels<sup>a</sup></b>	<b>Protection</b>	<b>Frequency<sup>b</sup></b>	<b>Calibration</b>
<b>Dust Monitor:</b> Dataram or equivalent	During any work in potentially contaminated soils	< 1.0 mg/m <sup>3</sup>  ≥ 1.0 mg/m <sup>3</sup>	Continue operations and use wet dust suppression methods.  Shut down and implement wetting/dust suppression methods until total airborne dust levels decrease and are maintained below 1.0 mg/m <sup>3</sup> . If dust suppression does not succeed in maintaining dust levels to below 1.0 mg/m <sup>3</sup> , stop work and contact Rich Rathnow, SES safety and health manager.	Continuous during work in contaminated soils	Zero Daily
<b>Noise-Level Monitor<sup>c</sup>:</b>	As necessary per the SSHO and Section 9.g.1	<85 dB(A) 85-105 dB(A)  >105 dB(A)	No action required Hearing protection required (NRR 32) Stop and reevaluate periodically Establish the use of administrative controls in the form of noise control barriers and zones for controlling noise exposures as described in Section 9.g.1. In addition double hearing protection (ear plugs with NRR 32 plus ear muffs) will be worn for noise exposures >105 db(A). Ear plugs with a minimum NRR of 32 will be worn for all exposures > 85 db(A)	Initially and periodically during task	Daily

<sup>a</sup> Action levels apply to sustained breathing-zone measurements above background.

<sup>b</sup> The exact frequency of monitoring depends on field conditions and is to be determined by the SSHO; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time, measurement results, personnel monitored, and place/location where measurement is taken (e.g., “Breathing Zone/MW-3”, “at surface/SB-2”, etc.).

<sup>c</sup> Noise monitoring and audiometric testing also required.

< = less than

db(A) = A-weighted decibels

> = greater than

NRR = noise reduction rating

Dust suppression and control measures will be used to avoid worker, client, and community exposure to nuisance dusts.

## **9.h. Hazard Communication Program**

### **9.h.1 Hazardous or Toxic Agent Inventory**

The SSHO will establish and maintain a chemical register/inventory using the form in Attachment 2 of this APP. The form identifies

- Site location and name,
- Hazard communication coordinator's name,
- Name of the chemical,
- Quantity of the chemical,
- Location of the chemical,
- Whether the chemical is labeled properly,
- Whether an MSDS/SDS is present for the chemical, and
- Location where MSDS/SDSs can be viewed.

For mobilization purposes the following are the estimated quantities of materials covered under the SES Hazard Communication Program at the onset of this project. Other materials brought on site will be evaluated, added to the inventory, and workers briefed on potential hazards and properties of the material prior to their use.

- Diesel fuel (heavy equipment fueling), 5 gallons;
- Gasoline (small safety containers for fueling demolition saw or generators), 5-10 gallons;
- Motor and hydraulic oil (heavy equipment operations), 4-6 quarts;
- Grease (lubricating heavy equipment), 1 pint;
- Sand, 100 pounds;
- Bentonite, 100 pounds;
- Acidified sample jars, 20; and
- Acid for sample jars, less than 1 liter.

### **9.h.2 Hazardous or Toxic Agent Labeling**

At a minimum, the following actions will be taken.

- All hazardous material containers on site will be labeled. The SSHO will inventory all chemicals initially and update monthly checking containers to ensure that they are correctly labeled. The SSHO will check labeling status during daily and weekly site inspections.
- Labels will include
  - Contents of the container;
  - Designation of health, flammability, and reactivity hazards; and
  - Name and address of the manufacturer.

### **9.h.3 MSDS/SDS Management Procedures to Ensure that MSDSs/SDSs Are Maintained for Each Agent**

- MSDSs/SDSs for all hazardous materials that are present will be maintained on site.
- Subcontractors bringing chemicals on site will provide an MSDS/SDS to the SSHO immediately upon the material's arrival.
- The SSHO will provide site-specific training to all affected site workers and will cover hazards posed by the materials, protective measures, location of the materials, and emergency procedures.
- Applicable MSDS/SDS information is contained in the general hazard analysis and in the AHAs for the project.

- MSDS/SDS information will be followed at all times during use, storage, and disposal of material and selection of hazard control and emergency response measures.

#### **9.h.4 Employee Information and Training**

Using the form in Attachment 2 of this APP, the SSHO/hazard communication coordinator will conduct and document chemical-specific training initially and periodically when the use of hazardous or toxic agents is altered or modified to accommodate changing on-site work procedures. This training must be documented prior to employees working with the specific chemicals for the first time. This training and form cover the following topics.

1. Requirements and use of the hazcom program on the project,
2. The location of all hazardous or toxic agents at the project (Figure 9-1),
3. Identification and recognition of hazardous or toxic agents on the project,
4. Physical and health hazards of the hazardous or toxic agents pertinent to project activities, and
5. Protective measures employees can implement when working with project-specific hazardous or toxic agents.

**9.i. Process Safety Management Plan:** Process safety management does not apply to the scope of this work in accordance with Section 06.B.04 of EM 385-1-1 because it does not meet the following:

- Chemicals on site are not used at or above the threshold quantity listed in Appendix A of 29 CFR 1926.64 and
- The process does not involve a flammable liquid or gas on site in one location in a quantity of 10,000 pounds or more.

**9.j. Lead Abatement Plan:** The project scope of work has been evaluated using the risk management process for the potential to contact lead-containing materials. The result is that there is no potential to contact lead-containing materials as described in Section 06.B.05 of EM 385-1-1.

**9.k. Asbestos Abatement Plan:** The project scope of work has been evaluated using the risk management process for the potential to contact asbestos-containing materials. The result is that there is no potential to contact asbestos-containing materials as described in Section 06.B.05 of EM 385-1-1.

**9.l. Radiation Safety Program:** The project scope of work has been evaluated to determine if anyone will be using, possessing, transporting, transferring, or disposing of radioactive materials or radiation-generating devices. The result is that there is not going to be anyone who will be using, possessing, transporting, transferring, or disposing of radioactive materials or radiation-generating devices as described in Section 06.E. of EM 385-1-1.

**9.m. Abrasive Blasting:** The project scope of work has been evaluated, and there will be no abrasive blasting activities during this project.

#### **9.n. Inclement Weather and Heat/Cold Stress Management**

##### **9.n.1 Inclement Weather**

Sudden inclement weather can rapidly encroach upon field personnel. Field crew members performing work outdoors should carry clothing appropriate for bad weather. In severe weather conditions (high wind or electrical storms), the field crews should leave the area and find safe shelter until the weather abates and until a decision is made to resume the field activities. When there are warnings or indications

of impending severe weather, the SSHO shall monitor the weather conditions using a weather station that is part of the National Oceanic and Atmospheric Administration weather radio all hazards network or similar notification system.

Severe weather triggers to alert the SSHO to monitor weather conditions:

- Storm on horizon,
- High winds,
- Driving rain,
- Lightning when thunder sounds within 30 seconds after the flash,
- Funnel clouds/ tornadoes, or
- Communication from base authorities.

The site manager or SSHO shall monitor weather forecasts for predictions of storms in the area. At first sight of lightning, operations shall be stopped and only resumed when conditions permit. The site manager or SSHO shall monitor weather conditions to determine when it is appropriate to resume work. The lightning safety recommendation is 30-30: Seek refuge when thunder sounds within 30 seconds after a lightning flash, and do not resume activity until 30 minutes after the last thunder clap.

#### Training on Severe Weather Precautions and Actions

The SSHO will be knowledgeable about extreme weather conditions typically experienced in the region for the project. The SSHO will train site workers about what conditions to expect during the various seasons when work is being completed. This training will describe conditions that might occur, what can be expected, and the actions that personnel are to take in the event of each identified condition.

#### Identified Area of Retreat

The site evacuation assembly area and route are identified in Figure 9-1. Field vehicles will be used as areas of retreat for the project. The SSHO will communicate this again at project onset. All workers will be made aware of actions to take during a weather emergency. These plans are further discussed in the Emergency Evacuation Section of this APP. Workers shall retreat to the designated assembly area as shown on Figure 9-1.

Some other general precautions in regard to areas of retreat include

- The inclination to see trees as enormous umbrellas is the most frequent and most deadly mistake. Do not go under a large tree that is standing alone. Likewise, avoid poles, antennae, and towers.
- Stay away from lakes, streams, pools, or any water.
- Stay away from railroad tracks, which can carry lightning charges for long distances.
- If the area is wide open, go to a valley or ravine, but be aware of flash flooding. Do not stand on top of a hill.
- If you are caught in a level open area during an electrical storm and you feel your hair stand on end, drop to your knees, bend forward and put your hands on your knees or crouch. The idea is to make your body less vulnerable by being as low to the ground as possible and taking up as little ground space as possible. Lying down is dangerous because the wet earth can conduct electricity. Do not touch the ground with your hands.
- Do not use telephones during electrical storms except in an emergency.

## 9.n.2 Heat/ Cold Stress Monitoring Plan

### Heat-Related Exposures

Heat-related illnesses are caused by more than just temperature and humidity factors. SES has implemented a heat-related exposure safety program that includes the exposure thresholds found in the ACGIH “Threshold Limit Values and Biological Exposure Indices” as guidance as well as other references, including the U.S. Army (wind-chill index), and the National Safety Council (NSC).

In hot environments, the following guidelines will be followed to prevent heat-related injury.

- Drinking water shall be made available to employees and employees encouraged to drink one cup every 15-20 minutes; the water shall be kept cool.
- Tool box training in hot environments shall include training on the symptoms of heat-related problems, contributing factors to heat-related injuries, and prevention techniques.
- When possible, work should be scheduled for cooler periods during the day.
- SES employees shall be encouraged to take breaks in a cooler location and use cooling devices as necessary, such as cooling vests, to prevent heat-related injury. A buddy system shall be established to encourage fluid intake and watch for symptoms of heat-related injury.
- The SSHO shall monitor those individuals who have had a previous heat-related injury, are known to be on medication, or exhibit signs of possibly having consumed large amounts of alcohol in the previous 24 hours for signs or indicating symptoms of heat-related injuries.
- Individuals who are not acclimatized shall be allowed additional breaks. The SSHO will determine the period and number and provide them to the supervisor and employee for implementation.

**In situations where heat stress may impact employee safety and health, employee acclimatization and workloads shall be assessed and work/rest regimens shall be established.**

- For employees in permeable work clothing, Wet Bulb Globe Temperature Index or physiological monitoring shall be conducted and work/rest regimens established. The SSHO in coordination with the SES safety and health manager will assess the condition of the employees, specific weather conditions, work tasks, and other environmental factors and conditions to determine when to begin monitoring. Refer to Table 9-5 for the work/ rest regimen using the Wet Bulb Globe Temperature Index.

**Table 9-5 WBGT Permissible Heat Exposure Threshold Limit Values**

Work/Rest Regimen	Work Load*		
	Light	Moderate	Heavy
Continuous work	30.0°C (86°F)	26.7°C (80°F)	25.0°C (77°F)
75% work, 25% rest, each hour	30.6°C (87°F)	28.0°C (82°F)	25.9°C (78°F)
50% work, 50% rest, each hour	31.4°C (89°F)	29.4°C (85°F)	27.9°C (82°F)
25% work, 75% rest, each hour	32.2°C (90°F)	31.1°C (88°F)	30.0°C (86°F)
<p>*Values are in °C and °F, WBGT.</p> <p>These TLVs are based on the assumption that nearly all acclimatized, fully clothed workers with adequate water and salt intake should be able to function effectively under the given working conditions without exceeding a deep body temperature of 38°C (100.4°F). They are also based on the assumption that the WBGT of the resting place is the same or very close to that of the workplace. Where the WBGT of the work area is different from that of the rest area, a time-weighted average will be used. These TLVs apply to physically fit and acclimatized individuals wearing light summer clothing. If heavier clothing that impedes sweat or has a higher insulation value is required, the permissible heat exposure TLVs will be reduced by the corrections shown below.</p>			
Clothing Type	Clo* Value	WBGT Correction	
Summer lightweight working clothing	0.6	0	
Cotton overalls	1.0	-2	
Winter work clothing	1.4	-4	
Water barrier, permeable	1.2	-6	
<p>*Clo: Insulation value of clothing. One clo = 5.55 kcal/m<sup>2</sup>/hr of heat exchange by radiation and convection for each degree °C difference in temperature between the skin and the adjusted dry bulb temperature.</p>			

% = percent

°F = degrees Fahrenheit

WBGT = Wet Bulb Globe Temperature

°C = degrees Celsius

TLV = Threshold Limit Value

- For employees in impermeable work clothing, only physiological monitoring will be conducted, and work/rest regimens with fluid replacement schedules shall be established.
- Where employees are exposed to solar radiation for short periods and there is the potential for sunburn or exposure for prolonged periods that could lead to health effect such as skin cancer, SES will provide sunscreen with a sun protection factor (SPF) appropriate for their skin type and exposure. Sunscreens shall be used only in accordance with the manufacturer's recommendations.
- SES employees who work in conditions that increase the risk of heat stress will be personally monitored. These conditions include wearing semipermeable or impermeable clothing when the temperature exceeds 69.8 degrees Fahrenheit (21 degrees Celsius), working at extreme metabolic loads (greater than 500 kcal/hour), etc.
- Personal worker monitoring will be done by checking the heart rate. To check the heart rate, workers will count their radial pulse for 30 seconds at the beginning of the rest period. If the heart rate exceeds 110 beats per minute, the next work period will be shortened by one-third and the same rest period maintained. This will be continued until the heart rate does not exceed 110 beats per minute at the beginning of the rest period.
- The SSO will document all physiological monitoring, including radial pulse checks and break and work times, in his/ her daily logbook.

## Cold-Related Exposures

- Employees working in air temperatures of minus 15 degrees Fahrenheit (minus 26 degrees Celsius) or less shall use the work-/warm-up regimen specified in ACGIH's "Threshold Limit Values and Biological Exposure Indices."
- At air temperatures of 36 degrees Fahrenheit (2 degrees Celsius) or less, employees who become immersed in water or whose clothing becomes wet shall immediately change into dry clothing/blankets and be treated for hypothermia. Blankets shall be included as part of the first aid equipment on such activities, and employees shall ensure they have a change of clothing.
- When manual dexterity is not required, employees shall wear thermally protective gloves when exposed to the following temperatures.
  - For light work, 40 degrees Fahrenheit (4 degrees Celsius) and below and
  - For moderate and heavy work, 20 degrees Fahrenheit (minus 6.6 degrees Celsius) and below.
- When fine work is required to be performed with bare hands for more than 10 to 20 minutes in an environment below 50 degrees Fahrenheit (10 degrees Celsius), procedures will be established for keeping employees' hands warm.
- Metal handles and control bars will be covered by thermal insulating material at temperatures below 30 degrees Fahrenheit (minus 1 degree Celsius).
- Cold weather sheltering and clothing requirements:
  - If wind chill is a factor at a work location, the cooling effect of the wind shall be reduced by shielding the work area, or SES employees will wear an outer windbreak layer garment. The project AHAs will include details for specific controls to minimize employee exposure to extreme cold.
  - Extremities, ears, toes, and nose shall be protected from extreme cold by proper clothing such as hats, gloves, masks, etc.
  - Employees whose clothing may become wet will wear an outer layer of clothing that is impermeable to water.
  - Outer garments must provide for ventilation to prevent wetting of inner clothing by sweat.
  - If clothing is wet, the employee shall change into dry clothes before entering a cold environment.
  - Employees will change socks and removable felt insoles at regular daily intervals or shall use vapor barrier boots.
  - Because of the added danger of cold injury from evaporative cooling, employees handling evaporative liquid (such as gasoline, alcohol, or cleaning fluids) at air temperatures below 40 degrees Fahrenheit (4 degrees Celsius) will be trained in precautions to avoid soaking of clothing or contact with skin.
  - Eyewear providing protection against ultraviolet light, glare, and blowing ice crystals shall be provided to employees in snow and/ or ice-covered terrain.
- Environmental monitoring shall be conducted as follows:
  - At air temperatures below 45 degrees Fahrenheit (7 degrees Celsius) the temperature shall be monitored a minimum of every eight hours or as warranted.
  - At temperatures below 45 degrees Fahrenheit (7 degrees Celsius) and above 30 degrees Fahrenheit (minus 1 degree Celsius) the temperature and wind speed shall be monitored every four hours or as warranted.
  - At air temperatures below 30 degrees Fahrenheit (minus 1 degree Celsius) the temperature and wind speed shall be measured and recorded at least every four hours or more frequently if it begins to lower.

- The equivalent chill temperature and frostbite precautions shall be determined by using Figure 9-2.
- SES employees who express concern about their ability to work in a cold environment shall provide medical documentation on their ability to work in cold weather [30 degrees Fahrenheit (minus 1 degree Celsius) or below]. If medical documentation is provided that shows they are suffering from diseases or taking medication that interferes with normal body temperature regulation or reduces tolerance to work in cold environments, they will be excluded from the cold weather tasks.

**9.o. Crystalline Silica Monitoring Plan:** The project scope of work has been evaluated using the risk management process for the potential of exposure to materials containing crystalline silica. The result is that there are no tasks identified with potential for exposure to materials containing crystalline silica as described in Section 06.M of EM 385-1-1.

**9.p. Night Operations Lighting Plan:** A daytime work schedule has been planned; therefore, this section is not applicable to this project work scope.

**9.q. Fire Prevention Plan:** SES will follow the fire prevention and control procedures listed below.

The major workplace fire hazards for this project scope of work include

- Small quantities of flammable liquids use and storage,
- Ordinary combustible materials and storage, and
- Equipment or machinery.

Potential ignition sources include

- Overheating of engine components,
- Smoking materials,
- Hot work activities,
- Electrical short circuit, and
- Static electrical charges.

#### **9.q.1 Types of Fire Suppression Equipment**

Fire extinguishers will be used as the primary fire suppression equipment at the project site.

- The SSHO is responsible for maintaining fire extinguishers in the proper locations, inspected monthly, and fully charged for use.
- The SSHO is responsible for controlling fuel source hazards and ensuring safe housekeeping is maintained during this project.

#### **9.q.2 Housekeeping Procedures**

- The area in front of extinguishers must be kept clear.
- Post “Exit” signs over exiting doors, and post “Fire Extinguisher” signs over extinguisher locations.
- Combustible materials stored outside should be at least 10 feet from any building.
- Solvent waste and oily rags must be kept in a fire-resistant, covered container and removed from the site weekly.
- Good housekeeping must be maintained at all times in all project work areas.

### Wind Chill Temperature Table

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

LITTLE DANGER                      INCREASED DANGER                      GREAT DANGER

RISK OF FROSTBITE (see times on chart below)

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)

#### Wind Chill Category

Work Intensity	Little Danger	Increased Danger	Great Danger
<b>High</b> Digging foxhole, running, marching with rucksack, making or breaking bivouac	Increased surveillance by small unit leaders; Black gloves optional - mandatory below 0°F (-18°C);	ECWCS or equivalent; Mittens with liners; No facial camouflage; Exposed skin covered and kept dry; Rest in warm, sheltered area; Vapor barrier boots below 0°F (-18°C) Provide warming facilities	Postpone non-essential training; Essential tasks only with <15 minute exposure; Work groups of no less than 2; Cover all exposed skin, Provide warming facilities
<b>Low</b> Walking, marching without rucksack, drill and ceremony	Increased surveillance; Cover exposed flesh when possible; Mittens with liner and no facial camouflage below 10°F (-12°C); Full head cover below 0°F (-18°C). Keep skin dry - especially around nose and mouth.	Restrict Non-essential training; 30-40 minute work cycles with frequent supervisory surveillance for essential tasks. See above.	Cancel Outdoor Training
<b>Sedentary</b> Sentry duty, eating, resting, sleeping, clerical work	See above; Full head cover and no facial camouflage below 10°F (-12°C); Cold-weather boots (VB) below 0°F (-18°C); Shorten duty cycles; Provide warming facilities	Postpone non-essential training; 15-20 minute work cycles for essential tasks; Work groups of no less than 2 personnel; No exposed skin	Cancel Outdoor Training

**These guidelines are generalized for worldwide use. Commanders of units with extensive extreme cold-weather training and specialized equipment may opt to use less conservative guidelines.**

Source: USARIEM Technical Note "SUSTAINING HEALTH & PERFORMANCE IN COLD WEATHER OPERATIONS," October 2001

**Figure 9-2 Wind Chill Temperature and Frostbite Precautions**

- Common paths of travel should be established and kept free from the accumulation of materials.
- Keep access to aisles, exits, ladders, stairways, scaffolding, and emergency equipment free from obstructions.
- Provide slip-resistant surfaces, ropes, and/or other devices.
- Specific areas should be designated for the proper storage of materials.
- Tools, equipment, materials, and supplies shall be stored in an orderly manner.
- As work progresses, scrap and unessential materials must be neatly stored or removed from the work area.
- Containers should be provided for collecting trash and other debris and shall be removed at regular intervals.
- All spills shall be quickly cleaned up. Oil and grease shall be cleaned from walking and working surfaces.

This plan shall be used to brief employees and emergency first responders on the fire hazards, the materials and processes to which they are exposed, and the emergency evacuation procedures.

- A qualified person shall annually survey the suitability and effectiveness of fire prevention and protection measures and facilities at each project or Installation.
- Records of the survey findings and recommendations shall be retained on file at the project site or Installation.
- When unusual fire hazards exist or fire emergencies develop, additional protection shall be provided as required.
- Fires and open flame devices shall not be left unattended.
- All sources of ignition shall be prohibited within 50 feet of operations with a potential fire hazard.
- The area shall be conspicuously and legibly posted "**NO SMOKING, MATCHES, OR OPEN FLAME.**"
- Smoking shall be prohibited in all areas where flammable, combustible, or oxidizing materials are stored. "**NO SMOKING, MATCHES, OR OPEN FLAME**" signs will be posted in all prohibited areas.
- A barrier having a fire resistance rating equivalent to a listing of at least one hour shall segregate Department of Transportation-identified incompatible materials that may create a fire hazard.
- A good housekeeping program that provides for the prompt removal and disposal of accumulations of combustible scrap and debris shall be implemented on the site.
- Self-closing containers shall be used to collect waste saturated with flammable or combustible liquids. Only noncombustible or Underwriters Laboratory-labeled nonmetallic containers may be used to dispose of waste and rubbish.
- Measures must be taken to control the growth of tall grass, brush, and weeds next to facilities. A break of at least 3 feet shall be maintained around all facilities.
- Paint-soiled clothing and drop cloths when not in use shall be stored in well-ventilated steel cabinets or containers.
- Insulating material with a combustible vapor barrier shall be stored at least 25 feet from buildings or structures. Only the quantity required for one day's use shall be permitted in buildings under construction.
- Disposal of combustible waste materials shall comply with applicable fire and environmental laws and regulations.
- Low-density fiberboard, combustible insulation, or vapor barriers with a flame spread rating greater than 25 shall not be installed in permanent buildings.
- Temporary enclosures shall be covered with flame-resistant tarpaulins or material of equivalent fire-resistant characteristics.

- When outside help is relied upon for fire protection, a written agreement or a memorandum of record shall be made, stating the terms of the arrangement and the details for fire protection services; this shall be provided to the GDA.
- Temporary building spacing shall be in accordance with the International Building Code (IBC).
- Fire lanes providing access to all areas shall be established and maintained free of obstruction.
- Vehicles, equipment, materials, and supplies shall not obstruct access to fire hydrants and other firefighting equipment.

### **9.q.3 Hazardous Locations**

- Electrical lighting shall be the only means of artificial illumination in areas where flammable liquids, vapors, fumes, dust, or gases are present.
- All electrical equipment and installations in hazardous locations shall be in accordance with the National Electrical Code (NEC) for hazardous locations.
- Globes or lamps shall not be removed or replaced nor shall repairs be made on the electrical circuit until it has been deenergized.
- Sufficient clearance shall be maintained around lights and heating units to prevent ignition of combustible materials.
- All combustibles shall be shielded from the flames of torches used to cut or sweat pipe.
- Recommendations of the National Fire Protection Association shall be complied with in situations not covered in this section. Where local building codes are established, the more stringent requirements shall apply.

**9.r. Wild Land Fire Management Plan:** The project scope of work has been evaluated using the risk management process for the potential exposure to wild land fire. The result is that there are no tasks identified that present a significant risk with potential for exposure to wild land fires as described in Section 09.K of EM 385-1-1; however, parking with hot engines over high weeds or grass may pose the potential for fires in dry weather.

- Work areas will be cleared and grubbed to the best extent possible to remove any tall grasses or other brush that may become dry and be susceptible to ignition from hot vehicle components.
- There will be no smoking or open flames allowed in the vicinity of dry brush or tall grasses, etc.
- Drivers will make an effort to drive and park vehicles on pavement whenever possible and minimize the time they operate on dry brush and tall grasses.
- Equipment will be shut off and not allowed to remain running when not in use when parked over dry brush and tall grass.
- Every vehicle and piece of heavy equipment will be equipped with a minimum of a 5 lb. ABC fire extinguisher.
- A 10 lb. ABC fire extinguisher will be available in the immediate vicinity of work being performed.
- A nonpotable water tank will be kept near operations for both dust control and for fire prevention and protection relating to dry brush and tall grasses.

**9.s. Hazardous Energy Control Plan:** At this time, no lockout/tagout activities that would require development of a hazardous energy control plan are anticipated for this project.

Overhead line distances will be checked before raising loads overhead. Dig permits will be obtained before any excavation work is performed.

**9.t. Critical Lift Procedures:** By definition of EM 385-1-1 16.H.01 critical lifts are not planned as part of this scope of work.

**9.u. Contingency Plan for Severe Weather:** This section is not applicable to the project scope of work because it applies to floating plants and marine activities per Section 19.A.03 of EM 385-1-1.

**9.v. Float Plan:** The scope of work of this project does not include boat operation that will be remote or include solo travel. This element, therefore, is not applicable to the project scope of work.

**9.w. Site-Specific Fall Protection and Prevention Plan:** This project is not anticipated to have personnel who will be working at heights or exposed to fall hazards and who will be wearing fall protection equipment.

If work from an elevated position requiring the use of fall protection equipment arises, the SSHO must contact the safety and health manager so a site-specific fall protection plan can be established and AHAs developed for the work accordingly.

**9.x. Demolition Plan:** This project scope of work does not include any activities that would fall under the demolition category.

**9.y. Excavation/Trenching Plan:** In accordance with EM 385-1-1 25.A.01 there will not be any excavations during the course of this work that will exceed 5 feet deep so an excavation plan is not required. The safety measures to be taken for ensuring safe work as it relates to excavations are contained in the AHAs attached to this APP.

**9.z. Emergency Rescue (Tunneling):** The scope of work does not include activities pertaining to EM 385-1-1 Section 26 Underground Construction (Tunnels), Shafts, and Caissons.

**9.aa. Underground Construction Fire Prevention and Protection Plan:** The scope of work does not include activities pertaining to EM 385-1-1 Section 26 Underground Construction (Tunnels), Shafts, and Caissons.

**9.bb. Compressed Air Plan:** The scope of work does not include activities pertaining to EM 385-1-1 Section 26 Underground Construction (Tunnels), Shafts, and Caissons.

**9.cc. Formwork and Shoring Erection and Removal Plans:** The scope of work does not include activities pertaining to EM 385-1-1 Section 27 Concrete, Masonry, Steel Erection and Residential Construction.

**9.dd. Pre-Cast Concrete Plan:** The scope of work does not include activities pertaining to EM 385-1-1 Section 27 Concrete, Masonry, Steel Erection and Residential Construction.

**9.ee. Lift Slab Plans:** The scope of work does not include activities pertaining to EM 385-1-1 Section 27 Concrete, Masonry, Steel Erection and Residential Construction.

**9.ff. Steel Erection Plan:** The scope of work does not include activities pertaining to EM 385-1-1 Section 27 Concrete, Masonry, Steel Erection and Residential Construction.

**9.gg. Site Safety and Health Plan for HTRW Work:** An SSHP in accordance with EM 385-1-1 Section 28B is available in Attachment 8.

**9.hh. Blasting Plan:** A blasting plan will not be required in accordance with EM 385-1-1 Section 29.A.01 because no blasting activities are included in the scope of work.

**9.ii. Diving Plan:** A diving plan will not be required in accordance with EM 385-1-1 Section 30.A.13 because no diving activities are included in the scope of work.

**9.jj. Confined Space Program:** Entry into a confined space is not expected during this project. Trench work will be a maximum of 48 inches deep and will involve only very minimal entry. Therefore, it has been determined using the risk management process that confined space entry hazards are not a concern for this scope of work.

## **10. RISK MANAGEMENT PROCESSES**

An initial hazard inventory and general hazard identification and analysis have been completed for this project. Control measures for the major hazard categories are also included. Prior to any task for a phase of work being initiated, an AHA that addresses each major phase/activity of work is developed. These AHAs are included as attachments to the APP. The AHAs detail project-specific hazards and hazard control measures that are associated with the sequential task element. The AHAs are reviewed and discussed with all affected site workers prior to beginning work. A daily pretask safety plan session is held with all site workers to review the specific work to be performed each day along with the hazards that might be encountered as well as the hazard control measures to be implemented for safe work.

# **Attachment 1**

## **Reporting Forms**

**Employee Signature Page**  
**Project Safety Orientation Checklist**  
**ENG Form 3394**  
**SES Loss Investigation Report**  
**SES First Aid Injury Log**  
**Equipment Daily Inspection Checklist**  
**Daily Tool Box/ Pre-Task Safety Meetings Documentation Form**  
**Weekly Job Site Checklist**  
**Drilling Self Assessment Checklist**  
**Air Monitoring Log**  
**Deficiency Tracking Log**

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## PROJECT SAFETY ORIENTATION CHECKLIST

Project Name: \_\_\_\_\_

Job Start Date: \_\_\_\_\_ Project Location: \_\_\_\_\_

### Introduction to the Project

- Job Name
- Scope of Work
- SSHO \_\_\_\_\_
- SSHO Phone Number: \_\_\_\_\_
- Superintendent
- Parking
- Rest Rooms
- Lunch Areas
- First Aid Kit Location
- First Aid Trained Personnel
- Project specific APP reviewed
- Project specific AHA's reviewed
- Other \_\_\_\_\_

### General Information

- Location of Safety Bulletin Board
- Employer's Safety Standards and Work Rules
- Drug and Alcohol Program
- If there is a safety problem, take care of it at the time or report it immediately
- Location of Emergency Plan
- Daily Pre Task Safety Plan

### Incident Reporting

- Reporting near misses, accidents and incidents
- Report all injuries to supervisor immediately
- Location of site-designated medical clinic
- Location of nearest hospital
- For serious injuries, dial 911 and location of phones
- Emergency Plan and assembly area

### Required Personal Protective Equipment (PPE)

- Hard Hats
- ANSI Z87 Safety Glasses w/side shields
- ANSI Safety toed boots
- Sleeved Shirt
- ANSI Type II High Visibility Vests
- Other \_\_\_\_\_

### Hazardous Materials

- If any questions about the material being used, ask supervisor/SSHO
- Material Safety Data Sheets (MSDS) location
- Explain use of MSDS
- Need a MSDS for all material brought to site
- Materials bring used on this site
- Other \_\_\_\_\_

### Fall Protection

- No exposure to a fall over 6 feet.
- Use of fall prevention/fall arresting equipment
- Use and maintenance of guard rails and perimeter protection/barricades
- Safe use of ladders and scaffolds
- Inspection required for equipment
- Competent Person \_\_\_\_\_

### Struck By

- Watch for mobile equipment
- Back-up alarms use required on job
- Stay out from under suspended loads
- Stay away, guard swing radius of excavator or crane
- Avoid equipment blind spots
- Make eye contact with operator when approaching
- Other \_\_\_\_\_

### Electrical

- GFCIs used for all electrical equipment program used on job
- Electrical equipment inspection done daily before use
- Replace damaged cords and equipment immediately
- Other \_\_\_\_\_

### Specific Hazards

- Excavations
- Lock-out/Tag-out
- Crane Use
- Fall Protection
- Confined Space Entry
- Arc Flash Hazards



UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT

1. ACCIDENT CLASSIFICATION. Personnel Classification (Civilian/Military/Contractor/Public), Injury/Illness/Fatal, Property Damage (Fire/Other), Motor Vehicle Involved, Diving.

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 (On Duty/TDY/Off Duty), h. EMPLOYMENT STATUS AT TIME OF ACCIDENT (Army Active/Reserve/Volunteer/Permanent/Foreign National/Seasonal/Temporary/Student/Other).

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 (Construction/Service/A/E/Other), g. HAZARDOUS/TOXIC WASTE ACTIVITY (Superfund/DERP/IRP/Other).

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) # PRIMARY, (CODE) # SECONDARY, f. NATURE OF ILLNESS / INJURY (CODE) #, g. TYPE AND SOURCE OF INJURY/ILLNESS (TYPE/SOURCE) (CODE) #.

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 (Pickup/Van/Automobile/Truck/Other), b. TYPE OF COLLISION (Side Swipe/Head On/Rear End/Broadside/Roll Over/Backing/Other), c. SEAT BELTS (Used/Not Used/Not Available) (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). See attached page.

11. CAUSAL FACTOR(S) <i>(Read Instruction Before Completing)</i>					
<p>a. (Explain YES answers in item 13)</p> <p>DESIGN: Was design of facility, workplace or equipment a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>INSPECTION/MAINTENANCE: Were inspection &amp; maintenance procedures a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>OPERATING PROCEDURES: Were operating procedures a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p>			<p>a. <i>(CONTINUED)</i></p> <p>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? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO</p>		
			<p>b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?</p> <p><input type="checkbox"/> YES <i>(If yes, attach a copy.)</i> <input type="checkbox"/> NO</p>		

12. TRAINING		
<p>a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>b. TYPE OF TRAINING.</p> <p><input type="checkbox"/> CLASSROOM <input type="checkbox"/> ON JOB</p>	<p>c. DATE OF MOST RECENT FORMAL TRAINING.</p> <p>(Month) (Day) (Year)</p>

13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES <i>(See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)</i>	
<p>a. DIRECT CAUSE</p>	<p>See attached page.</p>
<p>b. INDIRECT CAUSE(S)</p>	<p>See attached page.</p>

14. ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).	
<p>DESCRIBE FULLY:</p> <p>See attached page.</p>	

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		d. DATE (Mo/Da/Yr)	e. ORGANIZATION IDENTIFIER (Div, Br, Sect)	f. OFFICE SYMBOL	
CORPS _____					
CONTRACTOR _____					

16. MANAGEMENT REVIEW <i>(1st)</i>		
<p>a. <input type="checkbox"/> CONCUR    b. <input type="checkbox"/> NON CONCUR    c. COMMENTS</p>		
SIGNATURE	TITLE	DATE

17. MANAGEMENT REVIEW <i>(2nd - Chief Operations, Construction, Engineering, etc.)</i>		
<p>a. <input type="checkbox"/> CONCUR    b. <input type="checkbox"/> NON CONCUR    c. COMMENTS</p>		
SIGNATURE	TITLE	DATE

18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW		
<p>a. <input type="checkbox"/> CONCUR    b. <input type="checkbox"/> NON CONCUR    c. ADDITIONAL ACTIONS/COMMENTS</p>		
SIGNATURE	TITLE	DATE

19. COMMAND APPROVAL	
COMMENTS	
COMMANDER SIGNATURE	DATE

**10.**

**ACCIDENT DESCRIPTION** *(Continuation)*

**13a.**

**DIRECT CAUSE** *(Continuation)*

**13b.**

**INDIRECT CAUSES** *(Continuation)*

**14.**

**ACTION(S) TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE(S)** *(Continuation)*

## SES LOSS/NEAR LOSS INCIDENT INVESTIGATION FORM

I. The Employee		II. The Injury/Illness	
1. Name:		6. Nature of Injury /Incident and Body Parts Affected:	
2. Employee/SS No.:	3. Job Title:		
4. Temporary or Full Time (circle one)	5. Time on This Job:	7. Date Injury/Incident Reported or Illness Diagnosed:	
<b>III. The Incident</b>			
<input type="checkbox"/> Near Miss <input type="checkbox"/> First Aid <input type="checkbox"/> Doctor/Hospital Visit <input type="checkbox"/> Property Damage <input type="checkbox"/> Spill			
8. Date of Incident:	9. Day of Week	10. Time of Incident:	11. Exact Location of Incident:
12. Job Performing When Incident Occurred:		13. Exact Step or Job Part Being Performed:	
14. Description of Incident: Describe so that a person unfamiliar with the plant and operation will understand. Give necessary background, the involved employee's position relative to surroundings, what the person was doing, how it was being done, what triggered the incident, the source of injury, the incident type, etc.			
15. Incident Type: (check one) <input type="checkbox"/> Struck By <input type="checkbox"/> Struck Against <input type="checkbox"/> Caught Between <input type="checkbox"/> Same Level Fall <input type="checkbox"/> Different Level Fall <input type="checkbox"/> Chemical Exposure <input type="checkbox"/> Strain/Over Exertion <input type="checkbox"/> Other (Explain)_____			
16. Frequency Potential Select the potential for the incident to occur <input type="checkbox"/> Frequent <input type="checkbox"/> Occasional <input type="checkbox"/> Rare		17. Severity Potential Select the potential severity of an injury <input type="checkbox"/> Major <input type="checkbox"/> Serious <input type="checkbox"/> Minor	
18. Names of Witnesses to the Incident:		19. Property Damage Did equipment or other property damage result from the incident? <input type="checkbox"/> Yes <input type="checkbox"/> No	

<b>IV. The Causes</b>			
<b>20. Direct Personal Causes</b> What did a person – the victim or someone else do – or fail to do that contributed directly to this incident? Be specific, for example, “operated machine without authority”  _____ _____	<b>22. Direct Environmental Causes</b> What defective or otherwise unsafe condition(s) or tools, machinery, equipment, product, working surface, structures, or work area contributed to this incident? Be specific, for example “Hand-railing missing”.  _____ _____		
<b>21. Indirect Personal Causes (check all that apply)</b> Check items below that best indicate reasons why act identified in above was committed. Write in information for indirect causes not listed.  1. <input type="checkbox"/> Unaware of job hazards      8. <input type="checkbox"/> Influence of emotions 2. <input type="checkbox"/> Inattentive of hazards      9. <input type="checkbox"/> Influence of fatigue 3. <input type="checkbox"/> Unaware of safe method      10. <input type="checkbox"/> Influence of illness 4. <input type="checkbox"/> Low level of job skill      11. <input type="checkbox"/> Influence of intoxicants 5. <input type="checkbox"/> Tried to gain or save time      12. <input type="checkbox"/> Defective hearing/vision 6. <input type="checkbox"/> Tried to avoid extra effort      13. <input type="checkbox"/> Unable to determine 7. <input type="checkbox"/> Acted to avoid discomfort      14. <input type="checkbox"/> Other (explain)  _____	<b>23. Indirect Environmental Causes (check all that apply)</b> Check items below that best indicate reasons why condition identified in above existed. Write in information for indirect causes not listed.  1. <input type="checkbox"/> Worn out from normal use      11. <input type="checkbox"/> Inadequate illumination 2. <input type="checkbox"/> Abuse or misuse by others      12. <input type="checkbox"/> Fault Construction 3. <input type="checkbox"/> Required inspection not done      13. <input type="checkbox"/> Lubrication failure 4. <input type="checkbox"/> Inspection not required      14. <input type="checkbox"/> Exposure to corrosion 5. <input type="checkbox"/> Clean-up failure      15. <input type="checkbox"/> Exposure to vibration 6. <input type="checkbox"/> Clean-up not required      16. <input type="checkbox"/> Exposure to temp. extreme 7. <input type="checkbox"/> Clean-up not done      17. <input type="checkbox"/> Tampering 8. <input type="checkbox"/> Inadequate ventilation      18. <input type="checkbox"/> Supervisor failed to correct 9. <input type="checkbox"/> Congestion – lack of space      19. <input type="checkbox"/> Unable to determine 10. <input type="checkbox"/> Unsafe design      20. <input type="checkbox"/> Other (explain)  _____		
<b>24. Primary Unsafe Act (check one)</b> <b style="text-align: center;">MAIN CAUSE</b> 1. <input type="checkbox"/> Operating or using equipment without authority 2. <input type="checkbox"/> Failure to secure against unexpected movement 3. <input type="checkbox"/> Operating or working at an unsafe speed 4. <input type="checkbox"/> Failure to warn or signal as required 5. <input type="checkbox"/> Removing or making safety devices inoperative 6. <input type="checkbox"/> Using defective tools or equipment 7. <input type="checkbox"/> Taking an unsafe position or posture 8. <input type="checkbox"/> Servicing moving, energized or otherwise hazardous equip. 9. <input type="checkbox"/> Riding hazardous moving equipment 10. <input type="checkbox"/> Horseplay, distracting, startling, teasing, etc. 11. <input type="checkbox"/> Failure to wear personal protective equipment 12. <input type="checkbox"/> Failure to evaluate/consider/plan for work surroundings 13. <input type="checkbox"/> Other than above 14. <input type="checkbox"/> None	<b>25. Primary Unsafe Condition (check one)</b> <b style="text-align: center;">ENVIRONMENTAL CAUSE</b> 1. <input type="checkbox"/> Lack of or inadequate guards and safety devices 2. <input type="checkbox"/> Lack of or inadequate warning system 3. <input type="checkbox"/> Fire and explosion hazards 4. <input type="checkbox"/> Unexpected movement hazards 5. <input type="checkbox"/> Poor housekeeping hazards 6. <input type="checkbox"/> Protruding objects hazard 7. <input type="checkbox"/> Close clearance and congestion hazards 8. <input type="checkbox"/> Hazardous atmospheric conditions 9. <input type="checkbox"/> Hazardous arrangement, placement, or storage 10. <input type="checkbox"/> Hazardous defects of tools, equipment, etc. 11. <input type="checkbox"/> Inadequate illumination; intense noise 12. <input type="checkbox"/> Hazardous personal attire 13. <input type="checkbox"/> Other than above 14. <input type="checkbox"/> None		
26. Does the investigation require additional technical support? <input type="checkbox"/> Yes <input type="checkbox"/> No			
<b>V. The Correction</b>			
<b>27. Corrective Action Taken (check all that apply)</b> Check those actions taken to prevent recurrence. Fill in the appropriate box for corrective actions decided upon or planned but not yet initiated or completed.  1. <input type="checkbox"/> Reinstruction of those involved      5. <input type="checkbox"/> Action to improve inspection      9. <input type="checkbox"/> Improve design      13. <input type="checkbox"/> Check with manufacturer 2. <input type="checkbox"/> Discipline of those involved      6. <input type="checkbox"/> Order job safety analysis done      10. <input type="checkbox"/> Install guard or device      14. <input type="checkbox"/> Inform other supervision 3. <input type="checkbox"/> Job reassignment      7. <input type="checkbox"/> Improve housekeeping      11. <input type="checkbox"/> Correct congestion      15. <input type="checkbox"/> Other than above 4. <input type="checkbox"/> Equipment repair or replace      8. <input type="checkbox"/> Improve personal protection      12. <input type="checkbox"/> Order pre-job instructions			
Corrective Action: _____ _____			
28. Person Responsible for Corrective Action:		29. Target Date:	30. Date Completed:
31. Safety Member:	Date:	32. Division Manager:	Date:
33. Employee:	Date:	34. Project Manager:	Date:



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## DAILY SAFETY MEETING/ PRE-TASK SAFETY PLAN (PTSP)

### DAILY PRE-TASK SAFETY PLAN (PTSP)

Page 1 of 3

Project: \_\_\_\_\_ Location: \_\_\_\_\_ Date: \_\_\_\_\_

Site Safety & Health Officer: \_\_\_\_\_ Job Activity: \_\_\_\_\_ Site #: \_\_\_\_\_

Task Personnel:

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List Tasks:

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Tools/Equipment/Materials required (ladders, scaffolds, fall protection, cranes/rigging, heavy equipment, power tools, cords, generators, compressed gases, regulated chemical products, etc.):

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

<input type="checkbox"/> <b>Chemical burns/contact</b> Dermal protection (hands), eye protection. See SSHP/AHAs for PPE requirements per task.	<input type="checkbox"/> <b>Trench, excavations, cave-ins</b>	<input type="checkbox"/> <b>Ergonomics</b>
<input type="checkbox"/> <b>Pressurized lines/equipment</b>	<input type="checkbox"/> <b>Overexertion</b> Work/break regiment as dictated by task. Maintain fluid intake for hydration.	<input type="checkbox"/> <b>Chemical splash</b> Use PPE in accordance with SSHP/AHAs. Protect hands from splash during decon. activities.
<input type="checkbox"/> <b>Thermal burns</b> Watch for warm engine/muffler components on generators.	<input type="checkbox"/> <b>Pinch points</b>	<input type="checkbox"/> <b>Poisonous plants/insects</b> Review SSHP/AHAs for identification of poisonous snakes in the geographic area. Long sleeves in areas where poison ivy, sumac or oak may exist. Use insect repellent. Tape pant legs to boots (ticks).
<input type="checkbox"/> <b>Electrical</b> GCFIs for generators, Inspect. & protect extension Chords, Chords rated for use & have 3 <sup>rd</sup> wire grounding	<input type="checkbox"/> <b>Cuts/abrasions</b> Do not use razor knives. Cut away from body. Identify and avoid rusty/jagged or sharp surfaces from above ground features (brush, pipe chases/supports, utility structures, doors)	<input type="checkbox"/> <b>Eye hazards/flying projectile</b> Use eye protection at all times. Ensure head protection is used in areas where heavy brush, trees, thorns, vines exist when accessing well heads.
<input type="checkbox"/> <b>Weather conditions</b> Foul and cold weather clothing as dictated by expected conditions	<input type="checkbox"/> <b>Spills</b> Use funnels & nozzles during fueling of generators.	<input type="checkbox"/> <b>Inhalation hazard</b>
<input type="checkbox"/> <b>Heights/fall &gt; 6'</b>	<input type="checkbox"/> <b>Overhead Electrical hazards</b>	<input type="checkbox"/> <b>Heat/cold stress</b> Work/break regiment as dictated by heat exposure. Provide sufficient fluids for employee intake. Recommended employees begin with 16 oz. of water before initiating field work.
<input type="checkbox"/> <b>Noise</b> Use hear protection in loud work environments	<input type="checkbox"/> <b>Elevated loads</b>	<input type="checkbox"/> <b>Water/drowning hazard</b>
<input type="checkbox"/> <b>Explosion/fire</b> Metal safety cans for fuel storage, No open flame, sparks ignition in hazardous/flammable/combustible storage areas. Let engine surfaces cool before fueling.	<input type="checkbox"/> <b>Slips, trip and falls</b> Exercise good general house keeping practices. Identify/remove slip/trip falls hazards in work area. Watch for and avoid holes, ground protrusions. Watch for entanglement of feet around vines and brush.	<input type="checkbox"/> <b>Heavy equipment</b>
<input type="checkbox"/> <b>Radiation</b> Solar. UV protection on skin and UV eye protection. ANSI rated safety eye protection only.	<input type="checkbox"/> <b>Manual lifting</b> >50 lbs or awkward loads, get assistance. If employee not capable of lifting 40 lbs. seek assistance.	<input type="checkbox"/> <b>Aerial lifts/platforms</b>
<input type="checkbox"/> <b>Confined space entry</b>	<input type="checkbox"/> <b>Welding/cutting</b>	<input type="checkbox"/> <b>Demolition</b>

**Continue on page 3 of 3 (if necessary)**

**Hazard Control Measures (Check all that apply):**

<b>PPE</b> <input type="checkbox"/> Head protection <input type="checkbox"/> Face protection <input type="checkbox"/> Hard toe work boots <input type="checkbox"/> Thermal/lined <input type="checkbox"/> Eye <input type="checkbox"/> Dermal/hand <input type="checkbox"/> Hearing <input type="checkbox"/> Respiratory <input type="checkbox"/> Reflective vests	<b>Protective Systems</b> <input type="checkbox"/> Locate buried utilities <input type="checkbox"/> Competent person <input type="checkbox"/> Daily inspections <input type="checkbox"/> Sloping <input type="checkbox"/> Shoring <input type="checkbox"/> Trench box <input type="checkbox"/> Barricades	<b>Fire Protection</b> <input type="checkbox"/> Fire extinguishers <input type="checkbox"/> Fire watch <input type="checkbox"/> Non-spark tools <input type="checkbox"/> Grounding/bonding <input type="checkbox"/> Intrinsically safe equipment <input type="checkbox"/> Combustible materials storage <input type="checkbox"/> Chemical Storage	<b>Electrical</b> <input type="checkbox"/> Lockout/tagout <input type="checkbox"/> Grounded <input type="checkbox"/> Panels covered <input type="checkbox"/> GFCI/extension cords <input type="checkbox"/> Power tools/cord inspected <input type="checkbox"/> Insulated tools/gloves
<b>Fall Protection</b> <input type="checkbox"/> Harness/lanyards <input type="checkbox"/> Adequate anchorage <input type="checkbox"/> Guardrail system <input type="checkbox"/> Covered opening <input type="checkbox"/> Fixed barricades <input type="checkbox"/> Warning system	<b>Air Monitoring</b> <input type="checkbox"/> PID/FID <input type="checkbox"/> Detector tubes <input type="checkbox"/> Radiation <input type="checkbox"/> Personnel sampling <input type="checkbox"/> LEL/O2 <input type="checkbox"/> Other	<b>Proper Equipment</b> <input type="checkbox"/> Aerial lift/ladders/scaffolds <input type="checkbox"/> Forklift/ Heavy equipment <input type="checkbox"/> Backup alarms <input type="checkbox"/> Hand/power tools <input type="checkbox"/> Crane w/current inspection <input type="checkbox"/> Proper rigging <input type="checkbox"/> Operator qualified	<b>Welding &amp; Cutting</b> <input type="checkbox"/> Cylinders secured/capped <input type="checkbox"/> Cylinders separated/upright <input type="checkbox"/> Flash-back arrestors <input type="checkbox"/> No cylinders in CSE <input type="checkbox"/> Flame retardant clothing <input type="checkbox"/> Appropriate goggles
<b>Confined Space Entry</b> <input type="checkbox"/> Isolation <input type="checkbox"/> Air monitoring <input type="checkbox"/> Trained personnel <input type="checkbox"/> Permit completed <input type="checkbox"/> Rescue provisions	<b>Medical/Emerg. Response</b> <input type="checkbox"/> First-aid & BBP kit <input type="checkbox"/> Eye wash <input type="checkbox"/> FA-CPR training <input type="checkbox"/> Route to hospital	<b>Heat/Cold Stress</b> <input type="checkbox"/> Work/rest regime <input type="checkbox"/> Rest area <input type="checkbox"/> Liquids available <input type="checkbox"/> Monitoring <input type="checkbox"/> Training	<b>Vehicle/Traffic</b> <input type="checkbox"/> Traffic Awareness <input type="checkbox"/> Traffic control <input type="checkbox"/> Barricades <input type="checkbox"/> Flags <input type="checkbox"/> Signs
<b>Permits</b> <input type="checkbox"/> Hot work <input type="checkbox"/> Confined space <input type="checkbox"/> Lockout/tagout <input type="checkbox"/> Excavation <input type="checkbox"/> Demolition <input type="checkbox"/> Energized work <input type="checkbox"/> Local/Environmental	<b>Demolition</b> <input type="checkbox"/> Pre-demolition survey <input type="checkbox"/> Structure condition <input type="checkbox"/> Isolate area/utilities <input type="checkbox"/> Competent person <input type="checkbox"/> Hazmat present	<b>Inspections</b> <input type="checkbox"/> Ladders/aerial lifts <input type="checkbox"/> Lanyards/harness <input type="checkbox"/> Scaffolds <input type="checkbox"/> Heavy equipment <input type="checkbox"/> Cranes and rigging <input type="checkbox"/> Other per Field Safety Plan	<b>Training</b> <input type="checkbox"/> Hazwaste <input type="checkbox"/> Construction <input type="checkbox"/> Equipment <input type="checkbox"/> Competent person <input type="checkbox"/> Task-specific (AHA) <input type="checkbox"/> Hazcom

FieldNotes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



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### Weekly Job Site Inspection Checklist

**Project Name:** \_\_\_\_\_

**Inspection Date:** \_\_\_\_\_

**Project Supervisor:** \_\_\_\_\_

DESCRIPTION	YES	NO	N/A	If NO Why?
<b>1.0 Project Administration: 1926, Subpart C</b>				
1.1 OSHA and other required posters/sign posted on safety bulletin board				
1.2 Do all employees meet the required training levels?				
1.3 Was a pre-job safety orientation meeting held/documented for all employees?				
1.4 Are Daily Pre-Task Safety Plan meetings conducted and documented for all workers including subcontractors?				
1.5 Are Loss Prevention Observations conducted and documented at least weekly?				
<b>2.0 General/Trailers/Site Control/Housekeeping</b>				
2.1 General orderliness of the site acceptable?				
2.2 Passageways and walkways clear?				
2.3 Containers with lids provided for trash?				
2.4 Office and storage trailers anchored?				
2.5 Stairs to trailer have handrails if 4 or more steps				
2.6 Floors, working spaces, and passageways free from protruding nails, splinters, loose boards, clutter?				
2.7 Has traffic control around site been adequately addressed?				
2.8 Are construction areas barricaded with adequate warning to prevent pedestrian and vehicle entry				
2.9 Are excavations barricaded to prevent inadvertent worker, pedestrian or vehicle entry?				
2.10 Are construction hazard warning signs properly posted and visible every 150 ft.?				
<b>3.0 Medical Services and First Aid</b>				
3.1 Has a local occupational provider been identified for medical attention of a non-emergency nature?				
3.2 Is there a safety bulletin board erected with emergency numbers, map to hospital, and deficiency tracking system?				
3.3 Two employees on site with current CPR/First Aid?				
3.4 First aid kits (type III, 16 unit) provided and properly stocked?				
<b>4.0 Sanitation, 1926, Subpart D</b>				
4.1 Adequate supply of drinking water provided with disposable cups and and a waste receptacle present				
4.2 Toilet facilities with locks (1 per 20 people) and washing facilities available?				
<b>5.0 Hazard Communication</b>				
5.1 Is a hazardous material inventory available?				
5.2 Are MSDSs available for all hazardous materials on site?				
5.3 Are all containers properly labeled?				
5.4 Have all employees been trained?				

DESCRIPTION		YES	NO	N/A	If NO Why?
<b>6.0</b>	<b>Personal Protective Equipment: 1926, Subpart E</b>				
6.1	Are approved hard hats worn by all personnel?				
6.2	ANSI approved safety glasses with side shields, other eye and face protection provided and used as needed?				
6.3	Are employees wearing the work gloves when handling construction materials and as otherwise required?				
6.4	Are employees dressed in appropriate work clothing?				
6.5	Are employees wearing ANSI approved safety footwear?				
6.6	Is all equipment inspected regularly and maintained in a safe and sanitary condition?				
6.7	Are employees wearing ANSI Type II high visibility apparel when exposed to vehicular or equipment traffic?				
6.8	Workers wearing Coast Guard approved PFB when working adjacent to or over water?				
<b>7.0</b>	<b>Fire Protection and Prevention: 1926, Subpart F</b>				
7.1	Is the necessary fire-fighting equipment provided?				
7.2	Are fire extinguishers provided and visible every 75 ft. for low hazard areas and 50 ft. for high hazard areas?				
7.3	Are fire extinguishers inspected monthly with inspection recorded on tags?				
7.4	Fire extinguishers present for hot work activities?				
7.5	Are No Smoking signs posted within 50 feet of flammable liquids?				
7.6	Are combustible or flammable materials stored, dispensed, and used properly?				
7.7	Is fuel stored in red safety (self-closing with baffle/spark arrester) cans with yellow band and labeled with contents listed?				
<b>8.0</b>	<b>Material Handling and Storage: 1926, Subpart H</b>				
8.1	Is material stacked, racked, blocked, or otherwise secured to prevent falling or collapse?				
8.2	Are correct lifting methods used?				
8.3	Is all rigging equipment properly used and inspected by a qualified person?				
8.4	Is the Crane Operator certified and trained?				
8.5	Crane inspected by competent person daily?				
8.6	Heavy Equipment operators trained and qualified?				
8.7	Workers avoid equipment blind spots?				
8.8	Daily equipment inspections documented?				
8.9	Seatbelts used where provided?				
8.10	Backup alarms operational? Spotter used?				
8.11	Equipment operated at safe speeds and under control?				
8.12	Signal person is trained and qualified?				
8.13	Equipment operated a safe distance from overhead electrical sources.				
8.14	Forklift (including lull) operators trained and licensed?				
<b>9.0</b>	<b>Tools – Hand and Power: 1926, Subpart I</b>				
9.1	Proper tools being used for the job?				
9.2	Proper inspection and maintenance of tools?				

DESCRIPTION		YES	NO	N/A	If NO Why?
9.3	Tools and cords in good condition & free of defects?				
9.4	All mechanical safeguards in place?				
9.5	Ground fault protection being utilized?				
<b>10.0</b>	<b>Electrical: 1926, Subpart K</b>				
<b>10.1</b>	Electrical work performed by qualified persons?				
<b>10.2</b>	Energized work permit in place prior to start of work?				
<b>10.3</b>	Arc Flash requirements known an in place?				
10.4	Adequate wiring, well-insulated, no frayed cords?				
10.5	GFCIs used for all outdoor/wet locations?				
10.6	Are extension cords 3-prong and designed for extra hard usage?				
<b>10.7</b>	Flexible cords inspected daily and protected from damage by equipment, materials, or structures?				
<b>10.8</b>	<b>Scaffolds 1926 Subpart L</b>				
<b>10.9</b>	Designated scaffold competent person oversees erection, dismantling and moving of scaffold?				
<b>10.10</b>	Scaffolds erected level on base plates and mud sills on a firm foundation?				
<b>10.11</b>	Cross bracing, top rails, mid-rails, toe boards in place?				
<b>10.12</b>	Planks overlap 6"-12" over end with toe boards?				
<b>10.13</b>	Scaffolds > 4 times the height vs. width secured in place or outriggers used?				
<b>10.14</b>	Area beneath scaffold barricaded with "construction area do not enter" signs in place.				
<b>10.15</b>	Safe access provided to each level?				
<b>10.16</b>	Casters on rolling scaffolds locked while in use?				
<b>11.0</b>	<b>Fall Protection and Roofing 1926 Subpart M</b>				
<b>11.1</b>	Have all workers above the six foot fall protection threshold been protected from falling to a lower level?				
<b>11.2</b>	Effective rescue plan is in place that uses a buddy system?				
<b>11.3</b>	Employees trained to specific fall protection system in use by competent person?				
<b>11.4</b>	Designated competent person on site?				
<b>11.5</b>	Has a daily inspection been completed by the competent person for roofing work?				
<b>11.6</b>	Kettles a minimum of 25 feet from buildings, tanks etc.				
<b>11.7</b>	Kettle attendant wearing assigned personal protective equipment?				
<b>11.8</b>	Two fire extinguishers located at the kettle?				
<b>11.9</b>	Fuel cylinders at least 10 ft. from open flame?				
<b>11.10</b>	If warning lines used for low slope roofs are they properly installed and maintained?				
<b>12.0</b>	<b>Excavations 1926 Subpart P</b>				
<b>12.1</b>	Designated competent person able to demonstrate training, experience, and knowledge of soil analysis and protective systems and authority to stop work.				
<b>12.2</b>	Daily inspection by competent person performed?				
<b>12.3</b>	Ladder provided every 25 feet when trench is over 4 feet deep and 2 means of egress?				
<b>12.4</b>	Spoil pile at least 2 feet from edge of excavation				

DESCRIPTION		YES	NO	N/A	If NO Why?
12.5	Over 5 feet trench is properly sloped and/or shored.				
12.6	Water controlled or removed?				
12.7	Perimeter protection that meets Class I, Class II, or Class III requirements provided?				
<b>13.0</b>	<b>Stairways and Ladders 1926 Subpart X</b>				
13.1	Ladders extend 3 ft. above landing platform and secured?				
13.2	Ladders at proper ¼ distance from structure				
13.3	All flights of stairs over 4 or more risers have hand rails				
13.4	Ladders inspected before use?				
13.5	3 points of contact rule observed?				
13.6	No carrying of tools up or down ladders?				
13.7	No work off of top of step ladders?				
<b>14.0</b>	<b>Others</b>				
14.1	Are environmentally sensitive areas, equipment, or storage clearly identified and controlled?				

Supervisor Signature: \_\_\_\_\_

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



**Safety and Health Self-Assessment Checklist - DRILLING**

This checklist shall be used by SES personnel **only** and shall be completed at the frequency specified in the project's APP/SHSP.

This checklist is to be used at locations where: 1) SES employees are potentially exposed to hazards associated with drilling operations (complete Sections 1 and 3), and/or 2) SES oversight of a drilling subcontractor is required (complete entire checklist).

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

Completed checklists shall be sent to the health and safety manager for review.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_  
 Location: \_\_\_\_\_ PM: \_\_\_\_\_  
 Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

- Evaluate SES employee exposures to drilling hazards
  - Evaluate a SES subcontractor's compliance with drilling HS&E requirements
- Subcontractors Name: \_\_\_\_\_

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

**SECTION 1**

**Yes    No    N/A    N/O**

**PERSONNEL SAFE WORK PRACTICES**

1. Only authorized personnel operating drill rig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Personnel cleared during rig startup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Personnel clear of rotating parts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Personnel not positioned under hoisted loads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Loose clothing and jewelry removed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Personnel instructed not to approach equipment that has become electrically energized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Smoking is prohibited around drilling operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Personnel wearing appropriate PPE, per APP/SHSP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Safety and Health Self-Assessment Checklist - DRILLING**

<u>SECTION 2</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>GENERAL</b>				
9. Aquifer evaluated for contamination, sole source and wellhead protection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Daily safety briefing/meeting conducted with crew	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Daily inspection of drill rig and equipment conducted before use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILL RIG PLACEMENT</b>				
12. Location of underground utilities identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Safe clearance distance maintained from overhead powerlines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Drilling pad established, when necessary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Drill rig leveled and stabilized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILL RIG TRAVEL</b>				
16. Rig shut down and mast lowered and secured prior to rig movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Tools and equipment secured prior to rig movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Only personnel seated in cab are riding on rig during movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Safe clearance distance maintained while traveling under overhead powerlines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Backup alarm or spotter used when backing rig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILL RIG OPERATION</b>				
21. Kill switch clearly identified and operational	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. All machine guards are in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Rig ropes not wrapped around body parts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Pressurized lines and hoses secured from whipping hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Drill operation stopped during inclement weather	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Air monitoring conducted per APP/SHSP for hazardous atmospheres	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Rig placed in neutral when operator not at controls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILL RIG MAINTENANCE</b>				
28. Defective components repaired immediately	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Lockout/tagout procedures used prior to maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Cathead in clean, sound condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Drill rig ropes in clean, sound condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Fall protection used for fall exposures of 6 feet or greater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Rig in neutral and augers stopped rotating before cleaning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Good housekeeping maintained on and around rig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILLING WASTE MANAGEMENT</b>				
35. Drill cuttings and purge water managed and disposed properly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILLING AT HAZARDOUS WASTE SITES</b>				
36. Waste disposed of according to APP/SHSP and RCRA regulations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Appropriate decontamination procedures being followed, per APP/SHSP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>FORMS/PERMITS</b>				
38. Driller license/certification and drill rig permit obtained	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Well development/abandonment notifications and logs submitted and in project files	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Water withdrawal permit obtained, where required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Dig permit obtained, where required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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**Attachment 2**  
**Chemical Inventory**  
**Material Safety Data Sheets/ Safety Data Sheets**

**Gasoline**  
**Diesel**  
**Motor Oil**  
**Hydraulic Oil**  
**Lubricating Grease**  
**Antimony**  
**Copper**  
**Lead**  
**Alconox**  
**Bentonite**

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## CHEMICAL-SPECIFIC TRAINING FORM

Location:	Project # : E0209.0025
Hazard Communication Coordinator:	Trainer:

### TRAINING PARTICIPANTS:

NAME	SIGNATURE	NAME	SIGNATURE

### REGULATED PRODUCTS/TASKS COVERED BY THIS TRAINING:


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

- Physical and health hazards
- Control measures that can be used to provide protection (including appropriate work practices, emergency procedures, and personal protective equipment to be used)
- Methods and observations used to detect the presence or release of the regulated product in the workplace (including periodic monitoring, continuous monitoring devices, visual appearance or odor of regulated product when being released, etc.)

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

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

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# Safety Data Sheet

**Material Name: Gasoline All Grades**

**SDS No. 9950**  
US GHS

**Synonyms:** Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

## \*\*\* Section 1 - Product and Company Identification \*\*\*

### Manufacturer Information

Hess Corporation  
1 Hess Plaza  
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS  
Emergency # 800-424-9300 CHEMTREC  
[www.hess.com](http://www.hess.com) (Environment, Health, Safety Internet Website)

## \*\*\* Section 2 - Hazards Identification \*\*\*

### GHS Classification:

Flammable Liquid - Category 2  
Skin Corrosion/Irritation - Category 2  
Germ Cell Mutagenicity - Category 1B  
Carcinogenicity - Category 1B  
Toxic to Reproduction - Category 1A  
Specific Target Organ Toxicity (Single Exposure) - Category 3 (respiratory irritation, narcosis)  
Specific Target Organ Toxicity (Repeat Exposure) - Category 1 (liver, kidneys, bladder, blood, bone marrow, nervous system)  
Aspiration Hazard - Category 1  
Hazardous to the Aquatic Environment – Acute Hazard - Category 3

### GHS LABEL ELEMENTS

#### Symbol(s)



#### Signal Word

DANGER

#### Hazard Statements

Highly flammable liquid and vapour.  
Causes skin irritation.  
May cause genetic defects.  
May cause cancer.  
May damage fertility or the unborn child.  
May cause respiratory irritation.  
May cause drowsiness or dizziness.  
Causes damage to organs (liver, kidneys, bladder, blood, bone marrow, nervous system) through prolonged or repeated exposure.  
May be fatal if swallowed and enters airways.  
Harmful to aquatic life.

# Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

## 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.  
Wear protective gloves/protective clothing/eye protection/face protection.  
Wash hands and forearms thoroughly after handling.  
Obtain special instructions before use.  
Do not handle until all safety precautions have been read and understood.  
Do not breathe mist/vapours/spray.  
Use only outdoors or in well-ventilated area.  
Do not eat, drink or smoke when using this product.  
Avoid release to the environment.

### Response

In case of fire: Use water spray, fog, dry chemical fire extinguishers or hand held fire extinguisher.  
IF ON SKIN (or hair): Wash with plenty of soap and water. Remove/Take off immediately all contaminated clothing and wash before reuse. If skin irritation occurs, get medical advice/attention.  
IF exposed or concerned: Get medical advice/attention.  
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.  
Get medical advice/attention if you feel unwell.  
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do not induce vomiting.

### Storage

Store in a well-ventilated place.  
Keep cool. Keep container tightly closed.  
Store locked up.

### Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

## \* \* \* Section 3 - Composition / Information on Ingredients \* \* \*

CAS #	Component	Percent
86290-81-5	Gasoline, motor fuel	100
108-88-3	Toluene	1-25
106-97-8	Butane	<10
1330-20-7	Xylenes (o-, m-, p- isomers)	1-15
95-63-6	Benzene, 1,2,4-trimethyl-	<6
64-17-5	Ethyl alcohol	0-10
100-41-4	Ethylbenzene	<3
71-43-2	Benzene	0.1-4.9

# Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

110-54-3	Hexane	0.5-4
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A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol). Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

## \*\*\* Section 4 - First Aid Measures \*\*\*

### First Aid: Eyes

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

### First Aid: Skin

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops.

### First Aid: Ingestion

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

### First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

## \*\*\* Section 5 - Fire Fighting Measures \*\*\*

### General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

### Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitroresols that can decompose violently.

### Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO<sub>2</sub>, water spray, fire fighting foam, or gaseous extinguishing agent.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration.

### Unsuitable Extinguishing Media

None

# Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

## Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

## \* \* \* Section 6 - Accidental Release Measures \* \* \*

### Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

### Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Caution, flammable vapors may accumulate in closed containers.

### Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

### Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

### Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

### Prevention of Secondary Hazards

None

## \* \* \* Section 7 - Handling and Storage \* \* \*

### Handling Procedures

USE ONLY AS A MOTOR FUEL.  
DO NOT SIPHON BY MOUTH

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

# Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

## Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

## Incompatibilities

Keep away from strong oxidizers.

## \* \* \* Section 8 - Exposure Controls / Personal Protection \* \* \*

### Component Exposure Limits

#### Gasoline, motor fuel (86290-81-5)

ACGIH: 300 ppm TWA  
500 ppm STEL

#### Toluene (108-88-3)

ACGIH: 20 ppm TWA  
OSHA: 200 ppm TWA; 375 mg/m3 TWA  
150 ppm STEL; 560 mg/m3 STEL  
NIOSH: 100 ppm TWA; 375 mg/m3 TWA  
150 ppm STEL; 560 mg/m3 STEL

#### Butane (106-97-8)

ACGIH: 1000 ppm TWA (listed under Aliphatic hydrocarbon gases: Alkane C1-4)  
OSHA: 800 ppm TWA; 1900 mg/m3 TWA  
NIOSH: 800 ppm TWA; 1900 mg/m3 TWA

#### Xylenes (o-, m-, p- isomers) (1330-20-7)

ACGIH: 100 ppm TWA  
150 ppm STEL  
OSHA: 100 ppm TWA; 435 mg/m3 TWA  
150 ppm STEL; 655 mg/m3 STEL

#### Benzene, 1,2,4-trimethyl- (95-63-6)

NIOSH: 25 ppm TWA; 125 mg/m3 TWA

#### Ethyl alcohol (64-17-5)

ACGIH: 1000 ppm STEL  
OSHA: 1000 ppm TWA; 1900 mg/m3 TWA  
NIOSH: 1000 ppm TWA; 1900 mg/m3 TWA

# Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

## Ethylbenzene (100-41-4)

ACGIH: 20 ppm TWA  
OSHA: 100 ppm TWA; 435 mg/m<sup>3</sup> TWA  
125 ppm STEL; 545 mg/m<sup>3</sup> STEL  
NIOSH: 100 ppm TWA; 435 mg/m<sup>3</sup> TWA  
125 ppm STEL; 545 mg/m<sup>3</sup> STEL

## Benzene (71-43-2)

ACGIH: 0.5 ppm TWA  
2.5 ppm STEL  
Skin - potential significant contribution to overall exposure by the cutaneous route  
OSHA: 5 ppm STEL (Cancer hazard, Flammable, See 29 CFR 1910.1028, 15 min); 0.5 ppm Action Level; 1 ppm TWA  
NIOSH: 0.1 ppm TWA  
1 ppm STEL

## Hexane (110-54-3)

ACGIH: 50 ppm TWA  
Skin - potential significant contribution to overall exposure by the cutaneous route  
OSHA: 500 ppm TWA; 1800 mg/m<sup>3</sup> TWA  
NIOSH: 50 ppm TWA; 180 mg/m<sup>3</sup> TWA

## Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

## Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

## Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

## PERSONAL PROTECTIVE EQUIPMENT

### Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

### Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

# Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

## \*\*\* Section 9 - Physical & Chemical Properties \*\*\*

<b>Appearance:</b>	Translucent, straw-colored or light yellow	<b>Odor:</b>	Strong, characteristic aromatic hydrocarbon odor. Sweet-ether like
<b>Physical State:</b>	Liquid	<b>pH:</b>	ND
<b>Vapor Pressure:</b>	6.4 - 15 RVP @ 100 °F (38 °C) (275-475 mm Hg @ 68 °F (20 °C)	<b>Vapor Density:</b>	AP 3-4
<b>Boiling Point:</b>	85-437 °F (39-200 °C)	<b>Melting Point:</b>	ND
<b>Solubility (H2O):</b>	Negligible to Slight	<b>Specific Gravity:</b>	0.70-0.78
<b>Evaporation Rate:</b>	10-11	<b>VOC:</b>	ND
<b>Percent Volatile:</b>	100%	<b>Octanol/H2O Coeff.:</b>	ND
<b>Flash Point:</b>	-45 °F (-43 °C)	<b>Flash Point Method:</b>	PMCC
<b>Upper Flammability Limit (UFL):</b>	7.6%	<b>Lower Flammability Limit (LFL):</b>	1.4%
<b>Burning Rate:</b>	ND	<b>Auto Ignition:</b>	>530°F (>280°C)

## \*\*\* Section 10 - Chemical Stability & Reactivity Information \*\*\*

### Chemical Stability

This is a stable material.

### Hazardous Reaction Potential

Will not occur.

### Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

### Incompatible Products

Keep away from strong oxidizers.

### Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

## \*\*\* Section 11 - Toxicological Information \*\*\*

### Acute Toxicity

#### A: General Product Information

Harmful if swallowed.

#### B: Component Analysis - LD50/LC50

##### Gasoline, motor fuel (86290-81-5)

Inhalation LC50 Rat >5.2 mg/L 4 h; Oral LD50 Rat 14000 mg/kg; Dermal LD50 Rabbit >2000 mg/kg

##### Toluene (108-88-3)

Inhalation LC50 Rat 12.5 mg/L 4 h; Inhalation LC50 Rat >26700 ppm 1 h; Oral LD50 Rat 636 mg/kg; Dermal LD50 Rabbit 8390 mg/kg; Dermal LD50 Rat 12124 mg/kg

##### Butane (106-97-8)

Inhalation LC50 Rat 658 mg/L 4 h

# Safety Data Sheet

**Material Name: Gasoline All Grades**

**SDS No. 9950**

**Xylenes (o-, m-, p- isomers) (1330-20-7)**

Inhalation LC50 Rat 5000 ppm 4 h; Inhalation LC50 Rat 47635 mg/L 4 h; Oral LD50 Rat 4300 mg/kg; Dermal LD50 Rabbit >1700 mg/kg

**Benzene, 1,2,4-trimethyl- (95-63-6)**

Inhalation LC50 Rat 18 g/m<sup>3</sup> 4 h; Oral LD50 Rat 3400 mg/kg; Dermal LD50 Rabbit >3160 mg/kg

**Ethyl alcohol (64-17-5)**

Oral LD50 Rat 7060 mg/kg; Inhalation LC50 Rat 124.7 mg/L 4 h

**Ethylbenzene (100-41-4)**

Inhalation LC50 Rat 17.2 mg/L 4 h; Oral LD50 Rat 3500 mg/kg; Dermal LD50 Rabbit 15354 mg/kg

**Benzene (71-43-2)**

Inhalation LC50 Rat 13050-14380 ppm 4 h; Oral LD50 Rat 1800 mg/kg

**Hexane (110-54-3)**

Inhalation LC50 Rat 48000 ppm 4 h; Oral LD50 Rat 25 g/kg; Dermal LD50 Rabbit 3000 mg/kg

**Potential Health Effects: Skin Corrosion Property/Stimulativeness**

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

**Potential Health Effects: Eye Critical Damage/ Stimulativeness**

Moderate irritant. Contact with liquid or vapor may cause irritation.

**Potential Health Effects: Ingestion**

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

**Potential Health Effects: Inhalation**

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

**Respiratory Organs Sensitization/Skin Sensitization**

This product is not reported to have any skin sensitization effects.

**Generative Cell Mutagenicity**

This product may cause genetic defects.

**Carcinogenicity**

**A: General Product Information**

May cause cancer.

# Safety Data Sheet

**Material Name: Gasoline All Grades**

**SDS No. 9950**

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

## **B: Component Carcinogenicity**

### **Gasoline, motor fuel (86290-81-5)**

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

### **Toluene (108-88-3)**

ACGIH: A4 - Not Classifiable as a Human Carcinogen

IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

### **Xylenes (o-, m-, p- isomers) (1330-20-7)**

ACGIH: A4 - Not Classifiable as a Human Carcinogen

IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

### **Ethyl alcohol (64-17-5)**

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

IARC: Monograph 100E [in preparation] (in alcoholic beverages); Monograph 96 [2010] (in alcoholic beverages) (Group 1 (carcinogenic to humans))

### **Ethylbenzene (100-41-4)**

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

IARC: Monograph 77 [2000] (Group 2B (possibly carcinogenic to humans))

### **Benzene (71-43-2)**

ACGIH: A1 - Confirmed Human Carcinogen

OSHA: 5 ppm STEL (Cancer hazard, Flammable, See 29 CFR 1910.1028, 15 min); 0.5 ppm Action Level; 1 ppm TWA

NIOSH: potential occupational carcinogen

NTP: Known Human Carcinogen (Select Carcinogen)

IARC: Monograph 100F [in preparation]; Supplement 7 [1987]; Monograph 29 [1982] (Group 1 (carcinogenic to humans))

## **Reproductive Toxicity**

This product is suspected of damaging fertility or the unborn child.

## **Specified Target Organ General Toxicity: Single Exposure**

This product may cause drowsiness or dizziness.

# Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

## Specified Target Organ General Toxicity: Repeated Exposure

This product causes damage to organs through prolonged or repeated exposure.

## Aspiration Respiratory Organs Hazard

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

## \* \* \* Section 12 - Ecological Information \* \* \*

### Ecotoxicity

#### A: General Product Information

Very toxic to aquatic life with long lasting effects. Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

#### B: Component Analysis - Ecotoxicity - Aquatic Toxicity

##### Gasoline, motor fuel (86290-81-5)

Test & Species	Conditions
96 Hr LC50 Alburnus alburnus	119 mg/L [static]
96 Hr LC50 Cyprinodon variegatus	82 mg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	56 mg/L
24 Hr EC50 Daphnia magna	170 mg/L

##### Toluene (108-88-3)

Test & Species	Conditions	
96 Hr LC50 Pimephales promelas	15.22-19.05 mg/L [flow-through]	1 day old
96 Hr LC50 Pimephales promelas	12.6 mg/L [static]	
96 Hr LC50 Oncorhynchus mykiss	5.89-7.81 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	14.1-17.16 mg/L [static]	
96 Hr LC50 Oncorhynchus mykiss	5.8 mg/L [semi-static]	
96 Hr LC50 Lepomis macrochirus	11.0-15.0 mg/L [static]	
96 Hr LC50 Oryzias latipes	54 mg/L [static]	
96 Hr LC50 Poecilia reticulata	28.2 mg/L [semi-static]	
96 Hr LC50 Poecilia reticulata	50.87-70.34 mg/L [static]	
96 Hr EC50 Pseudokirchneriella subcapitata	>433 mg/L	
72 Hr EC50 Pseudokirchneriella subcapitata	12.5 mg/L [static]	
48 Hr EC50 Daphnia magna	5.46 - 9.83 mg/L [Static]	
48 Hr EC50 Daphnia magna	11.5 mg/L	

##### Xylenes (o-, m-, p- isomers) (1330-20-7)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	13.4 mg/L [flow-through]

# Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

96 Hr LC50 Oncorhynchus mykiss	2.661-4.093 mg/L [static]
96 Hr LC50 Oncorhynchus mykiss	13.5-17.3 mg/L
96 Hr LC50 Lepomis macrochirus	13.1-16.5 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	19 mg/L
96 Hr LC50 Lepomis macrochirus	7.711-9.591 mg/L [static]
96 Hr LC50 Pimephales promelas	23.53-29.97 mg/L [static]
96 Hr LC50 Cyprinus carpio	780 mg/L [semi- static]
96 Hr LC50 Cyprinus carpio	>780 mg/L
96 Hr LC50 Poecilia reticulata	30.26-40.75 mg/L [static]
48 Hr EC50 water flea	3.82 mg/L
48 Hr LC50 Gammarus lacustris	0.6 mg/L

## Benzene, 1,2,4-trimethyl- (95-63-6)

### Test & Species

96 Hr LC50 Pimephales promelas	7.19-8.28 mg/L [flow-through]
48 Hr EC50 Daphnia magna	6.14 mg/L

### Conditions

## Ethyl alcohol (64-17-5)

### Test & Species

96 Hr LC50 Oncorhynchus mykiss	12.0 - 16.0 mL/L [static]
96 Hr LC50 Pimephales promelas	>100 mg/L [static]
96 Hr LC50 Pimephales promelas	13400 - 15100 mg/L [flow-through]
48 Hr LC50 Daphnia magna	9268 - 14221 mg/L
24 Hr EC50 Daphnia magna	10800 mg/L
48 Hr EC50 Daphnia magna	2 mg/L [Static]

### Conditions

## Ethylbenzene (100-41-4)

### Test & Species

96 Hr LC50 Oncorhynchus mykiss	11.0-18.0 mg/L [static]
96 Hr LC50 Oncorhynchus mykiss	4.2 mg/L [semi- static]
96 Hr LC50 Pimephales promelas	7.55-11 mg/L [flow- through]
96 Hr LC50 Lepomis macrochirus	32 mg/L [static]
96 Hr LC50 Pimephales promelas	9.1-15.6 mg/L [static]
96 Hr LC50 Poecilia reticulata	9.6 mg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	4.6 mg/L
96 Hr EC50 Pseudokirchneriella subcapitata	>438 mg/L
72 Hr EC50 Pseudokirchneriella subcapitata	2.6 - 11.3 mg/L [static]

### Conditions

# Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

96 Hr EC50 Pseudokirchneriella subcapitata	1.7 - 7.6 mg/L [static]
48 Hr EC50 Daphnia magna	1.8 - 2.4 mg/L

## Benzene (71-43-2)

### Test & Species

### Conditions

96 Hr LC50 Pimephales promelas	10.7-14.7 mg/L [flow-through]
96 Hr LC50 Oncorhynchus mykiss	5.3 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	22.49 mg/L [static]
96 Hr LC50 Poecilia reticulata	28.6 mg/L [static]
96 Hr LC50 Pimephales promelas	22330-41160 µg/L [static]
96 Hr LC50 Lepomis macrochirus	70000-142000 µg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	29 mg/L
48 Hr EC50 Daphnia magna	8.76 - 15.6 mg/L [Static]
48 Hr EC50 Daphnia magna	10 mg/L

## Hexane (110-54-3)

### Test & Species

### Conditions

96 Hr LC50 Pimephales promelas	2.1-2.98 mg/L [flow-through]
24 Hr EC50 Daphnia magna	>1000 mg/L

## Persistence/Degradability

No information available.

## Bioaccumulation

No information available.

## Mobility in Soil

No information available.

## \* \* \* 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.

# Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

## \*\*\* Section 14 - Transportation Information \*\*\*

### Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Gasoline, motor fuel	86290-81-5	DOT regulated marine pollutant

### DOT Information

Shipping Name: Gasoline

UN #: 1203 Hazard Class: 3 Packing Group: II

Placard:



## \*\*\* Section 15 - Regulatory Information \*\*\*

### Regulatory Information

#### A: Component Analysis

This material contains one or more of the following 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).

##### Toluene (108-88-3)

SARA 313: 1.0 % de minimis concentration  
CERCLA: 1000 lb final RQ; 454 kg final RQ

##### Xylenes (o-, m-, p- isomers) (1330-20-7)

SARA 313: 1.0 % de minimis concentration  
CERCLA: 100 lb final RQ; 45.4 kg final RQ

##### Benzene, 1,2,4-trimethyl- (95-63-6)

SARA 313: 1.0 % de minimis concentration

##### Ethylbenzene (100-41-4)

SARA 313: 0.1 % de minimis concentration  
CERCLA: 1000 lb final RQ; 454 kg final RQ

##### Benzene (71-43-2)

SARA 313: 0.1 % de minimis concentration  
CERCLA: 10 lb final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule); 4.54 kg final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule)

# Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

## Hexane (110-54-3)

SARA 313: 1.0 % de minimis concentration

CERCLA: 5000 lb final RQ; 2270 kg final RQ

## SARA Section 311/312 – Hazard Classes

Acute Health

X

Chronic Health

X

Fire

X

Sudden Release of Pressure

--

Reactive

--

## Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Gasoline, motor fuel	86290-81-5	DOT regulated marine pollutant

## 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
Gasoline, motor fuel	86290-81-5	No	No	No	No	Yes	No
Toluene	108-88-3	Yes	Yes	Yes	Yes	Yes	No
Butane	106-97-8	Yes	Yes	Yes	Yes	Yes	No
Xylenes (o-, m-, p- isomers)	1330-20-7	Yes	Yes	Yes	Yes	Yes	No
Benzene, 1,2,4-trimethyl-	95-63-6	No	Yes	Yes	Yes	Yes	No
Ethyl alcohol	64-17-5	Yes	Yes	Yes	Yes	Yes	No
Ethylbenzene	100-41-4	Yes	Yes	Yes	Yes	Yes	No
Benzene	71-43-2	Yes	Yes	Yes	Yes	Yes	No
Hexane	110-54-3	No	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.

# Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

## Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Toluene	108-88-3	1 %
Butane	106-97-8	1 %
Benzene, 1,2,4-trimethyl-	95-63-6	0.1 %
Ethyl alcohol	64-17-5	0.1 %
Ethylbenzene	100-41-4	0.1 %
Benzene	71-43-2	0.1 %
Hexane	110-54-3	1 %

## Additional Regulatory Information

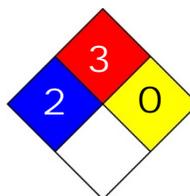
## Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Gasoline, motor fuel	86290-81-5	No	DSL	EINECS
Toluene	108-88-3	Yes	DSL	EINECS
Butane	106-97-8	Yes	DSL	EINECS
Xylenes (o-, m-, p- isomers)	1330-20-7	Yes	DSL	EINECS
Benzene, 1,2,4-trimethyl-	95-63-6	Yes	DSL	EINECS
Ethyl alcohol	64-17-5	Yes	DSL	EINECS
Ethylbenzene	100-41-4	Yes	DSL	EINECS
Benzene	71-43-2	Yes	DSL	EINECS
Hexane	110-54-3	Yes	DSL	EINECS

## \*\*\* Section 16 - Other Information \*\*\*

**NFPA® Hazard Rating**

Health	2
Fire	3
Reactivity	0



**HMIS® Hazard Rating**

Health	2	Moderate
Fire	3	Serious
Physical	0	Minimal

\*Chronic

## 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

# Safety Data Sheet

**Material Name: Gasoline All Grades**

**SDS No. 9950**

## Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet



# Safety Data Sheet

**Material Name: Diesel Fuel, All Types**

**SDS No. 9909**  
US GHS

**Synonyms:** Ultra Low Sulfur Diesel; Low Sulfur Diesel; No. 2 Diesel; Motor Vehicle Diesel Fuel; Non-Road Diesel Fuel; Locomotive/Marine Diesel Fuel

## \*\*\* Section 1 - Product and Company Identification \*\*\*

### Manufacturer Information

Hess Corporation  
1 Hess Plaza  
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS  
Emergency # 800-424-9300 CHEMTREC  
[www.hess.com](http://www.hess.com) (Environment, Health, Safety Internet Website)

## \*\*\* Section 2 - Hazards Identification \*\*\*

### GHS Classification:

Flammable Liquids - Category 3  
Skin Corrosion/Irritation – Category 2  
Germ Cell Mutagenicity – Category 2  
Carcinogenicity - Category 2  
Specific Target Organ Toxicity (Single Exposure) - Category 3 (respiratory irritation, narcosis)  
Aspiration Hazard – Category 1  
Hazardous to the Aquatic Environment, Acute Hazard – Category 3

### GHS LABEL ELEMENTS

#### Symbol(s)



#### Signal Word

DANGER

#### Hazard Statements

Flammable liquid and vapor.  
Causes skin irritation.  
Suspected of causing genetic defects.  
Suspected of causing cancer.  
May cause respiratory irritation.  
May cause drowsiness or dizziness.  
May be fatal if swallowed and enters airways.  
Harmful to aquatic life.

#### Precautionary Statements

##### Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking  
Keep container tightly closed.  
Ground/bond container and receiving equipment.

# Safety Data Sheet

**Material Name: Diesel Fuel, All Types**

**SDS No. 9909**

Use explosion-proof electrical/ventilating/lighting/equipment.  
Use only non-sparking tools.  
Take precautionary measures against static discharge.  
Wear protective gloves/protective clothing/eye protection/face protection.  
Wash hands and forearms thoroughly after handling.  
Obtain special instructions before use.  
Do not handle until all safety precautions have been read and understood.  
Avoid breathing fume/mist/vapours/spray.

## Response

In case of fire: Use water spray, fog or foam to extinguish.  
IF ON SKIN (or hair): Wash with plenty of soap and water. Remove/Take off immediately all contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical advice/attention.  
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell.  
If swallowed: Immediately call a poison center or doctor. Do NOT induce vomiting.  
IF exposed or concerned: Get medical advice/attention.

## Storage

Store in a well-ventilated place. Keep cool.  
Keep container tightly closed.  
Store locked up.

## Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

## \* \* \* Section 3 - Composition / Information on Ingredients \* \* \*

CAS #	Component	Percent
68476-34-6	Fuels, diesel, no. 2	100
91-20-3	Naphthalene	<0.1

A complex mixture of hydrocarbons with carbon numbers in the range C9 and higher.

## \* \* \* Section 4 - First Aid Measures \* \* \*

### First Aid: Eyes

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

### First Aid: Skin

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops. Thermal burns require immediate medical attention depending on the severity and the area of the body burned.

### First Aid: Ingestion

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

# Safety Data Sheet

Material Name: Diesel Fuel, All Types

SDS No. 9909

## First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

## \* \* \* Section 5 - Fire Fighting Measures \* \* \*

### General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

### Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

### Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO<sub>2</sub>, water spray, fire fighting foam, and other gaseous agents.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

### Unsuitable Extinguishing Media

None

### Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

## \* \* \* Section 6 - Accidental Release Measures \* \* \*

### Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

### Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Caution, flammable vapors may accumulate in closed containers.

### Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

# Safety Data Sheet

Material Name: Diesel Fuel, All Types

SDS No. 9909

## Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

## Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

## Prevention of Secondary Hazards

None

## \* \* \* Section 7 - Handling and Storage \* \* \*

### Handling Procedures

Handle as a combustible liquid. Keep away from heat, sparks, excessive temperatures and open flame! No smoking or open flame in storage, use or handling areas. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

### Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks."

### Incompatibilities

Keep away from strong oxidizers.

## \* \* \* Section 8 - Exposure Controls / Personal Protection \* \* \*

### Component Exposure Limits

#### Fuels, diesel, no. 2 (68476-34-6)

ACGIH: 100 mg/m<sup>3</sup> TWA (inhalable fraction and vapor, as total hydrocarbons, listed under Diesel fuel)  
Skin - potential significant contribution to overall exposure by the cutaneous route (listed under Diesel fuel)

# Safety Data Sheet

Material Name: Diesel Fuel, All Types

SDS No. 9909

## Naphthalene (91-20-3)

ACGIH: 10 ppm TWA  
15 ppm STEL  
Skin - potential significant contribution to overall exposure by the cutaneous route  
OSHA: 10 ppm TWA; 50 mg/m<sup>3</sup> TWA  
NIOSH: 10 ppm TWA; 50 mg/m<sup>3</sup> TWA  
15 ppm STEL; 75 mg/m<sup>3</sup> STEL

## Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

## Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

## Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

## Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

## Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

## \* \* \* Section 9 - Physical & Chemical Properties \* \* \*

<b>Appearance:</b>	Clear, straw-yellow.	<b>Odor:</b>	Mild, petroleum distillate odor
<b>Physical State:</b>	Liquid	<b>pH:</b>	ND
<b>Vapor Pressure:</b>	0.009 psia @ 70 °F (21 °C)	<b>Vapor Density:</b>	>1.0
<b>Boiling Point:</b>	320 to 690 °F (160 to 366 °C)	<b>Melting Point:</b>	ND
<b>Solubility (H<sub>2</sub>O):</b>	Negligible	<b>Specific Gravity:</b>	0.83-0.876 @ 60°F (16°C)
<b>Evaporation Rate:</b>	Slow; varies with conditions	<b>VOC:</b>	ND
<b>Percent Volatile:</b>	100%	<b>Octanol/H<sub>2</sub>O Coeff.:</b>	ND
<b>Flash Point:</b>	>125 °F (>52 °C) minimum	<b>Flash Point Method:</b>	PMCC
<b>Upper Flammability Limit (UFL):</b>	7.5	<b>Lower Flammability Limit (LFL):</b>	0.6
<b>Burning Rate:</b>	ND	<b>Auto Ignition:</b>	494°F (257°C)

## \* \* \* Section 10 - Chemical Stability & Reactivity Information \* \* \*

### Chemical Stability

This is a stable material.

### Hazardous Reaction Potential

Will not occur.

# Safety Data Sheet

Material Name: Diesel Fuel, All Types

SDS No. 9909

## Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

## Incompatible Products

Keep away from strong oxidizers.

## Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

## \* \* \* Section 11 - Toxicological Information \* \* \*

### Acute Toxicity

#### A: General Product Information

Harmful if swallowed.

#### B: Component Analysis - LD50/LC50

##### Naphthalene (91-20-3)

Inhalation LC50 Rat >340 mg/m<sup>3</sup> 1 h; Oral LD50 Rat 490 mg/kg; Dermal LD50 Rat >2500 mg/kg; Dermal LD50 Rabbit >20 g/kg

### Potential Health Effects: Skin Corrosion Property/Stimulativeness

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

### Potential Health Effects: Eye Critical Damage/ Stimulativeness

Contact with eyes may cause mild irritation.

### Potential Health Effects: Ingestion

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

### Potential Health Effects: Inhalation

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

### Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

### Generative Cell Mutagenicity

This material has been positive in a mutagenicity study.

### Carcinogenicity

#### A: General Product Information

Suspected of causing cancer.

# Safety Data Sheet

Material Name: Diesel Fuel, All Types

SDS No. 9909

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

## B: Component Carcinogenicity

### Fuels, diesel, no. 2 (68476-34-6)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans (listed under Diesel fuel)

### Naphthalene (91-20-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)

IARC: Monograph 82 [2002] (Group 2B (possibly 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

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

## \* \* \* Section 12 - Ecological Information \* \* \*

## Ecotoxicity

### A: General Product Information

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

### B: Component Analysis - Ecotoxicity - Aquatic Toxicity

#### Fuels, diesel, no. 2 (68476-34-6)

##### Test & Species

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	35 mg/L [flow-through]

##### Conditions

#### Naphthalene (91-20-3)

##### Test & Species

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	5.74-6.44 mg/L [flow-through]
96 Hr LC50 Oncorhynchus mykiss	1.6 mg/L [flow-through]
96 Hr LC50 Oncorhynchus mykiss	0.91-2.82 mg/L [static]
96 Hr LC50 Pimephales promelas	1.99 mg/L [static]

##### Conditions

# Safety Data Sheet

Material Name: Diesel Fuel, All Types

SDS No. 9909

96 Hr LC50 Lepomis macrochirus	31.0265 mg/L [static]
72 Hr EC50 Skeletonema costatum	0.4 mg/L
48 Hr LC50 Daphnia magna	2.16 mg/L
48 Hr EC50 Daphnia magna	1.96 mg/L [Flow through]
48 Hr EC50 Daphnia magna	1.09 - 3.4 mg/L [Static]

## Persistence/Degradability

No information available.

## Bioaccumulation

No information available.

## Mobility in Soil

No information available.

### \*\*\* 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 \*\*\*

## DOT Information

Shipping Name: Diesel Fuel

NA #: 1993 Hazard Class: 3 Packing Group: III

Placard:



### \*\*\* Section 15 - Regulatory Information \*\*\*

## Regulatory Information

### Component Analysis

This material contains one or more of the following 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).

#### Naphthalene (91-20-3)

CERCLA: 100 lb final RQ; 45.4 kg final RQ

#### SARA Section 311/312 – Hazard Classes

<u>Acute Health</u>	<u>Chronic Health</u>	<u>Fire</u>	<u>Sudden Release of Pressure</u>	<u>Reactive</u>
X	X	X	--	--

# Safety Data Sheet

Material Name: Diesel Fuel, All Types

SDS No. 9909

## SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the de minimis levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Hess Corporate Safety if you require additional information regarding this product.

## 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
Fuels, diesel, no. 2	68476-34-6	No	No	No	Yes	No	No
Naphthalene	91-20-3	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.

### Component Analysis - WHMIS IDL

No components are listed in the WHMIS IDL.

### Additional Regulatory Information

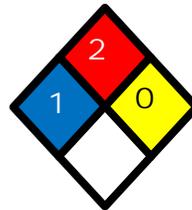
### Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Fuels, diesel, no. 2	68476-34-6	Yes	DSL	EINECS
Naphthalene	91-20-3	Yes	DSL	EINECS

## \*\*\* Section 16 - Other Information \*\*\*

**NFPA® Hazard Rating**

Health	1
Fire	2
Reactivity	0



**HMIS® Hazard Rating**

Health	1*	Slight
Fire	2	Moderate
Physical	0	Minimal

\*Chronic

# Safety Data Sheet

Material Name: Diesel Fuel, All Types

SDS No. 9909

## Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; AS = Standards Australia; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EU = European Union; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer; IMO = International Maritime Organization; IATA = International Air Transport Association; MAK = Maximum Concentration Value in the Workplace; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NOHSC = National Occupational Health & Safety Commission; NTP = National Toxicology Program; STEL = Short-term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

## Literature References

None

## Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet

# MATERIAL SAFETY DATA SHEET

QUAKER STATE® PEAK PERFORMANCE CONVENTIONAL MOTOR OIL - ALL GRADES

## 1. PRODUCT AND COMPANY IDENTIFICATION

MSDS Number: 14938

Version Date: 07/16/02

**Product Name:** QUAKER STATE® PEAK PERFORMANCE CONVENTIONAL MOTOR OIL - ALL GRADES

**Product Use:** Engine oil

**Synonyms:** 5W-30, 10W-30, 10W-40, 20W-50, 15W-40

### Company Information

SOPUS Products  
P.O. Box 4427  
Houston, TX 77210-4427  
USA

### Phone Numbers

**Medical Emergency:** 1-800-546-6040  
**Transportation Emergency (USA):** 1-800-424-9300  
**Transportation Emergency (International):**  
1-703-527-3887 (Call Collect)  
**MSDS Assistance:** 1-800-546-6227  
**Fax On Demand:** 1-800-546-6227  
**Technical Assistance:** 1-800-458-4998  
**Customer Service:** 1-800-468-8397  
**Fax Number:** 713-217-3181  
**Internet Address:** www.MSDS.PZLQS.com

## 2. COMPONENT INFORMATION

Component	CAS No.	Weight Percent Range	Hazardous in Blend
HYDROTREATED HEAVY PARAFFINIC PETROLEUM DISTILLATES	64742-54-7	< 70	No
SOLVENT-DEWAXED HEAVY PARAFFINIC DISTILLATE	64742-65-0	< 70	No
DETERGENT/DISPERSANT	MIXTURE	5 - 10	No
VISCOSITY MODIFIER	9003-29-6	< 10	No
POUR POINT DEPRESSANT	MIXTURE	< 2	No

Under normal conditions of use or in a foreseeable emergency, this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**Other:** No information available

## 3. HAZARDS IDENTIFICATION

### Emergency and Hazards Overview

**CAUTION:** Contains Petroleum Lubricant. Repeated skin contact can cause skin disorders.

**ATTENTION:** Used motor oil is a possible skin cancer hazard based on animal data. Repeated exposure to oil mist in excess of the OSHA limit (5mg/m<sup>3</sup>) can result in accumulation of oil droplets in pulmonary tissue.

**NFPA Ratings:** Health 1 Flammability 1 Reactivity 0

**Primary Route of Exposure:** Skin X Inhalation -- Eye X

### Health Effect Information

**Eye Contact:** This product is practically non-irritating to the eyes upon direct contact. Based on testing of similar products and/or components.

# MATERIAL SAFETY DATA SHEET

## QUAKER STATE® PEAK PERFORMANCE CONVENTIONAL MOTOR OIL - ALL GRADES

**Skin Contact:** Avoid skin contact. This product is minimally irritating to the skin upon direct contact. Based on testing of similar products and/or components. Prolonged or repeated contact may result in contact dermatitis which is characterized by dryness, chapping, and reddening. Prolonged or repeated contact may result in oil acne which is characterized by blackheads with possible secondary infection. Avoid prolonged and repeated skin contact with used motor oils. See Section 11 - Toxicological Information.

**Inhalation:** This product has a low vapor pressure and is not expected to present an inhalation hazard at ambient conditions. Caution should be taken to prevent aerosolization or misting of this product. On rare occasions, prolonged and repeated exposure to oil mist poses a risk of pulmonary disease such as chronic lung inflammation. Signs of respiratory effects vary with concentration and length of exposure and include nasal discharge, sore throat, coughing, bronchitis, pulmonary edema and difficulty breathing. Shortness of breath and cough are the most common symptoms.

**Ingestion:** Do not ingest. This product is relatively non-toxic by ingestion. This product has laxative properties and may result in abdominal cramps and diarrhea. Exposure to a large single dose, or repeated smaller doses, may lead to lung aspiration, which can lead to lipid pneumonia or chronic lung inflammation. These are low-grade, chronic localized tissue reactions.

**Medical Conditions Aggravated by Exposure:** Drying and chapping may make the skin more susceptible to other irritants, sensitizers and disease.

**Other:** No information available

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#### 4. FIRST AID INFORMATION

**Eye Contact:** Immediately flush eyes with large amounts of water and continue flushing until irritation subsides. If material is hot, treat for thermal burns and seek immediate medical attention.

**Skin Contact:** No treatment is necessary under ordinary circumstances. Remove contaminated clothing. Wash contaminated area thoroughly with soap and water. If material is hot, submerge injured area in cold water. If victim is severely burned, remove to a hospital immediately.

**Inhalation:** This material has a low vapor pressure and is not expected to present an inhalation exposure at ambient conditions. If vapor or mist is generated when the material is heated, and the victim experiences signs of respiratory tract irritation, remove to fresh air.

**Ingestion:** No treatment is necessary under ordinary circumstances. Do not induce vomiting. If victim exhibits signs of lung aspiration such as coughing or choking, seek immediate medical assistance.

**Notes to Physician:** No information available

**Other:** No information available

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#### 5. FIRE AND EXPLOSION INFORMATION

##### Flammable Properties

**Flash Point:** 415 F, 212.8 C

**Test Method:** ASTM 3278 - Closed Cup

##### Flammable Limits in Air

**Upper Percent:** No data available

**Lower Percent:** No data available

**Autoignition Temperature:** No data available

**Test Method:** No information available

**NFPA Classification:** Class III-B combustible liquid

**Extinguishing Media:** Use dry chemical, foam, or carbon dioxide.

# MATERIAL SAFETY DATA SHEET

## QUAKER STATE® PEAK PERFORMANCE CONVENTIONAL MOTOR OIL - ALL GRADES

### Fire Fighting Measures

**Special Fire Fighting Procedures and Equipment:** Water may be ineffective but can be used to cool containers exposed to heat or flame to prevent vapor pressure buildup and possible container rupture. Caution should be exercised when using water or foam as frothing may occur, especially if sprayed into containers of hot, burning liquid.

**Unusual Fire and Explosion Conditions:** Dense smoke may be generated while burning. Carbon monoxide, carbon dioxide, and other oxides may be generated as products of combustion.

**Hazardous Combustion By-Products:** None

**Other:** No information available

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## 6. ACCIDENTAL RELEASE MEASURES

**Personnel Safeguards:** Consult Health Effect Information in Section 3, Personal Protection Information in Section 8, Fire and Explosion Information in Section 5, and Stability and Reactivity Information in Section 10.

**Regulatory Notifications:** Notify appropriate authorities of spill.

**Containment and Clean up:** Contain spill immediately. Do not allow spill to enter sewers or watercourses. Absorb with appropriate inert material such as sand, clay, etc. Large spills may be picked up using vacuum pumps, shovels, buckets, or other means and placed in drums or other suitable containers.

**Other:** No information available

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## 7. HANDLING AND STORAGE INFORMATION

**Handling:** Fire extinguishers should be kept readily available. See NFPA 30 and OSHA 1910.106-- Flammable and Combustible Liquids.

**Storage:** Do not transfer to unmarked containers. Store in closed containers away from heat, sparks, open flame, or oxidizing materials.

### Empty Container Warnings

**Drums:** Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed.

**Plastic:** Empty container may retain product residues.

**Other:** No information available

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## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION INFORMATION

### Exposure Limits and Guidelines

This product does not contain any components with OSHA or ACGIH exposure limits.

### Personal Protective Equipment

**Eye/Face Protection:** Eye protection is not required under conditions of normal use. If material is handled such that it could be splashed into eyes, wear plastic face shield or splash-proof safety goggles.

**MATERIAL SAFETY DATA SHEET**

**QUAKER STATE® PEAK PERFORMANCE CONVENTIONAL  
MOTOR OIL - ALL GRADES**

**Skin Protection:** No skin protection is required for single, short duration exposures. For prolonged or repeated exposures, use impervious clothing (boots, gloves, aprons, etc.) over parts of the body subject to exposure. If handling hot material, use insulated protective clothing (boots, gloves, aprons, etc.). Launder soiled clothes. Properly dispose of contaminated leather articles including shoes, which cannot be decontaminated.

**Respiratory Protection:** Respiratory protection is not required under conditions of normal use. If vapor or mist is generated when the material is heated or handled, use an organic vapor respirator with a dust and mist filter. All respirators must be NIOSH certified. Do not use compressed oxygen in hydrocarbon atmospheres.

**Personal Hygiene:** Consumption of food and beverage should be avoided in work areas where hydrocarbons are present. Always wash hands and face with soap and water before eating, drinking, or smoking.

**Engineering Controls / Work Practices**

**Ventilation:** If vapor or mist is generated when the material is heated or handled, adequate ventilation in accordance with good engineering practice must be provided to maintain concentrations below the specified exposure or flammable limits.

**Other:** The OSHA permissible exposure limit (PEL) and ACGIH threshold limit value (TLV) for oil mist is 5 mg/m<sup>3</sup>. The ACGIH short-term exposure limit (STEL) for oil mist is 10 mg/m<sup>3</sup>.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance:</b> Amber to dark amber	
<b>Odor:</b> Hydrocarbon - mild	<b>Vapor Pressure:</b> No data available
<b>Physical state:</b> Liquid	<b>Vapor Density (air=1):</b> No data available
<b>pH:</b> No data available	<b>Percent Volatile by Volume:</b> No data available
<b>Boiling Point:</b> No data available	<b>Volatile Organic Content:</b> No data available
<b>Melting Point:</b> No data available	<b>Molecular Weight:</b> No data available
<b>Specific Gravity:</b> 0.88 - 0.9 @ 16 C / 60 F	<b>Average Carbon Number:</b> No data available
<b>Pour Point:</b> -15 F, -26.1 C	<b>Viscosity @ 100 F:</b> No data available
	<b>Viscosity @ 40 C:</b> No data available
<b>Solubility in Water:</b> Negligible in water	
<b>Octanol / Water Coefficient: Log K<sub>ow</sub> =</b> No data available	

**10. STABILITY AND REACTIVITY INFORMATION**

**Chemical Stability:** Stable

**Conditions to Avoid:** High heat and open flames.

**Incompatible Materials to Avoid:** May react with strong oxidizing agents.

**Other:** No information available

**11. TOXICOLOGICAL INFORMATION**

**Primary Eye Irritation:** No information available

**Primary Skin Irritation:** No information available

**Acute Dermal Toxicity:** No information available

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**Subacute Dermal Toxicity:** No information available

**Dermal Sensitization:** No information available

**Inhalation Toxicity:** No information available

**Inhalation Sensitization:** No information available

**Oral Toxicity:** No information available

**Mutagenicity:** No information available

**Carcinogenicity:** The International Agency for Research on Cancer (IARC) has concluded that there is inadequate data to evaluate the carcinogenicity to experimental animals of this class of product. IARC has concluded there is sufficient evidence that used gasoline-engine motor oils produce skin tumors in experimental animals. Also, IARC has determined this class of products belongs to Group 3-"not classifiable as to its carcinogenicity to humans".

**Reproductive and Developmental Toxicity:** No information available

**Teratogenicity:** No information available

**Immunotoxicity:** No information available

**Neurotoxicity:** No information available

**Other:** No information available

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## 12. ECOLOGICAL INFORMATION

**Aquatic Toxicity:** No information available

**Terrestrial Toxicity:** No information available

**Chemical Fate and Transport:** No information available

**Other:** No information available

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## 13. DISPOSAL INFORMATION

**Regulatory Information:** All disposals must comply with federal, state, and local regulations. The material, if spilled or discarded, may be a regulated waste. Refer to state and local regulations. Caution! If regulated solvents are used to clean up spilled material, the resulting waste mixture may be regulated. Department of Transportation (DOT) regulations may apply for transporting this material when spilled.

**Waste Disposal Methods:** Waste material may be landfilled or incinerated at an approved facility. Materials should be recycled if possible.

**Other:** No information available

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**14. TRANSPORTATION INFORMATION****U.S. Department of Transportation (DOT)**

Highway / Rail (Bulk): Not Regulated

Highway / Rail (Non-Bulk): Not Regulated

For US shipments, US DOT law requires the shipper to determine the proper shipping description of the material that is being shipped. The shipping information and description contained in this section may not be suitable for all shipments of this material, but may help the shipper determine the proper shipping description for a particular shipment.

**International Information**

Vessel: IMDG Regulated: -- IMDG Not Regulated: X

Air: ICAO Regulated: -- ICAO Not Regulated: X

Other: No information available

**15. Regulatory Information**

**Regulatory Lists Searched:** The components listed in Section 2 of this MSDS were compared to substances that appear on the following regulatory lists. Each list is numerically identified. See Regulatory Search Results below.

**Health & Safety:** 10 - IARC carcinogen, 11 - NTP carcinogen, 12 - OSHA carcinogen, 15 - ACGIH TLV, 16 - OSHA PEL, 17 - NIOSH exposure limit, 20 - US DOT Appendix A, Hazardous substances, 22 - FDA 21 CFR Total food additives, 23 - NFPA 49 or 325

**Environmental:** 30 - CAA 1990 Hazardous air pollutants, 31 - CAA Ozone depleters, 33 - CAA HON rule, 34 - CAA Toxic substance for accidental release prevention, 35 - CAA Volatile organic compounds (VOC's) in SOCOMI, 41 - CERCLA / SARA Section 302 extremely hazardous substances, 42 - CERCLA / SARA Section 313 emissions reporting, 43 - CWA Hazardous substances, 44 - CWA Priority pollutants, 45 - CWA Toxic pollutants, 46 - EPA Proposed test rule for hazardous air pollutants, 47 - RCRA Basis for listing - Appendix VII, 48 - RCRA waste, 49 - SDWA - (S)MCLs

**International:** 50 - Canada - WHMIS Classification of substance, 54 - Mexico - Drinking water - ecological criteria, 55 - Mexico - Wastewater discharges, 56 - US -TSCA Section (12)(b) - export notification

**State Lists:** 60 - CA - Proposition 65, 61 - FL - Substances, 62 - MI - Critical materials, 63 - MA - RTK, 64 - MA - Extraordinarily hazardous substances, 65 - MN - Hazardous substances, 66 - PA - RTK, 67 - NJ - RTK, 68 - NJ - Environmental hazardous substances, 69 - NJ - Special hazardous substances

**Inventories:** 80 - Canada - Domestic substances , 81 - European - EINECS, 82 - Japan - ENCS, 83 - Korea - Existing and evaluated chemical substances, 84 - US - TSCA , 85 - China Inventory

**Regulatory Search Results:**

HYDROTREATED HEAVY PARAFFINIC PETROLEUM DISTILLATES: 80, 81, 83, 84, 85

SOLVENT-DEWAXED HEAVY PARAFFINIC DISTILLATE: 80, 81, 83, 84, 85

VISCOSITY MODIFIER: 35, 80, 83, 84, 85

**U.S. TSCA Inventory:** All components of this material are on the US TSCA Inventory.

**SARA Section 313:** This product is not known to contain any SARA, Title III, Section 313 Reportable Chemicals at or greater than 1.0% (0.1% for carcinogens).

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**IARC:** No information available

**SARA 311 / 312 Categories**

**Acute:**   --   **Chronic:**   --   **Fire:**   --   **Pressure:**   --   **Reactive:**   --  

**Not Regulated:**   X  

**Canadian WHMIS Classification**

Not a controlled substance under WHMIS

**European Union Classification**

**Hazard Symbols:**

No classification recommended

**Risk Phrases:**

No classification recommended

**Safety Phrases:**

No classification recommended

**Other:** No information available

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**16. OTHER INFORMATION**

**Health and Environmental Label Language**

**WARNING:** Continuous contact with used gasoline engine oils has caused skin cancer in animal tests.

**ATTENTION:** Prolonged or repeated skin contact may cause oil acne or dermatitis. Repeated exposure to oil mist in excess of the OSHA limit (5mg/m<sup>3</sup>) can result in accumulation of oil droplets in pulmonary tissue.

**Precautionary Measures:** Avoid prolonged or repeated contact with eyes, skin and clothing. Avoid generation and inhalation of oil mists.

**First Aid:** Skin Contact: Wash skin with soap and water. Launder soiled clothes and discard oil-soaked shoes. If irritation persists seek medical attention. Eye Contact: Flush with water. If irritation persists seek medical attention. Ingestion: Do not induce vomiting. In general, no treatment is necessary unless large quantities of product are ingested. If discomfort persists seek medical assistance.

**Instructions in Case of Fire or Spill:** In case of fire, use water fog, foam, dry chemical or carbon dioxide. Water spray may be ineffective, but can be used to cool containers. Do not use a direct stream of water. Material will float and can be reignited on surface of water.

**Spill or Leak:** Dike and contain spill. Do not use water; soak up with absorbent material such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

**Contains:** highly refined petroleum distillate, mixture; zinc compounds, mixture; polymer additives, mixture.

KEEP OUT OF REACH OF CHILDREN. (If intended for retail also)

**MSDS Revisions**

**Previous Version Date:** 06/01/01

**Previous Version Information**

Revised Section 1 - Product Name

**MATERIAL SAFETY DATA SHEET**  
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**MOTOR OIL - ALL GRADES**

**Other**

No information available

**Prepared By:**

SOPUS Products  
P.O. Box 4427  
Houston, TX 77210-4453 USA

**Disclaimer of Warranty:** The information contained herein is based upon data and information available to us, and reflects our best professional judgment. This product may be formulated in part with components purchased from other companies. In many instances, especially when proprietary or trade secret materials are used, SOPUS Products must rely upon the hazard evaluation of such components submitted by that product's manufacturer or importer. No warranty of merchantability, fitness for any use, or any other warranty is expressed or implied regarding the accuracy of such data or information, the results to be obtained from the use thereof, or that any such use do not infringe any patent. Since the information contained herein may be applied under conditions of use beyond our control and with which we may be unfamiliar, we do not assume responsibility for the results of such application. This information is furnished upon the condition that the person receiving it shall make his own determination of the suitability of the material for his particular use.

# Material Safety Data Sheet



# 308166

Rev. D

Updated: 5/02

 <p>This Data Sheet contains important information. <b>READ AND KEEP FOR REFERENCE.</b></p> <p>INSTRUCTIONS</p>
--

First choice when quality counts.

**IMPORTANT:** Read this MSDS before handling or disposing of this product and pass this information on to employees, customers and users of this product.

Emergency Overview			
Physical State	Liquid.		
Color	Clear to light amber.	Odor	Mild petroleum odor
<b>WARNING!</b> Oil injected into the skin from high-pressure leaks in hydraulic systems can cause severe injury. Most damage occurs during the first few hours. Seek medical attention immediately. Surgical removal of oil may be necessary. Spills may create a slipping hazard.			

Hazard Rankings		
	HMIS	NFPA
Health Hazard	1	0
Fire Hazard	1	1
Reactivity	0	0
* = Chronic Health Hazard		
Protective Equipment		
Minimum Requirements See Section 8 for Details		
		

## 1.0 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Product Name:** Hydraulic Fluid

**Chemical Name:** Industrial Oils

Graco Inc.

P.O. Box 1441

60 11th Ave. NE

Minneapolis, MN 55440-1441

**Part Number(s):** 218-797

**Use:** Hydraulic Fluid used in PT2500 electric driver hydraulic pump.

### Emergency Information

Health Emergency (RMPC): (303)- 623-5716

Chemical Spills (Chemtrec): (800)- 424-9300

## 2.0 COMPOSITION / INFORMATION ON INGREDIENTS

Component %	CAS#	% by Weight
1)Distillates, petroleum, solvent-refined light paraffinic	64741-89-5	30 – 50
2)Distillates, petroleum, solvent-refined heavy paraffinic	64741-89-5	40 – 60
3) Proprietary Ingredients	Proprietary Mixture	0 – 2
4) Zinc alkyldithiophosphate	68649-42-3	0 - 1

For exposure data, see 8.0, Exposure Controls / Personal Protection.

### 3.0 HAZARDS IDENTIFICATION

**Emergency Overview:** **Physical State:** Liquid **Odor:** Mild petroleum odor **Color:** Clear to light amber

#### Potential Health Effects:

<b>Eye Contact</b>	This product can cause transient mild eye irritation with short-term contact with liquid sprays or mists
<b>Skin Contact</b>	This material can cause mild skin irritation from prolonged or repeated skin contact. Injection under the skin can cause inflammation, swelling and mild central nervous system depression. Injection of pressurized hydrocarbons can cause severe, permanent tissue damage. Initial symptoms may be minor. Injection of petroleum hydrocarbons requires immediate medical attention.
<b>Inhalation</b>	At elevated temperatures or in enclosed spaces, product mist or vapors may irritate the mucous membranes of the nose, the throat, bronchi, and lungs
<b>Ingestion</b>	If swallowed, large volumes of material can cause generalized depression, headache, drowsiness, nausea, vomiting and diarrhea. Smaller doses can cause a laxative effect. If aspirated into the lungs, liquid can cause lung damage.
<b>Chronic Health Effects Summary</b>	Contains a petroleum-based mineral oil. Prolonged or repeated skin contact can cause mild irritation and inflammation characterized by drying, cracking, (dermatitis) or oil acne. Repeated or prolonged inhalation of petroleum-based mineral oil mists at concentrations above applicable workplace exposure levels can cause respiratory irritation or other pulmonary effects.
<b>Conditions Aggravated by Exposure</b>	Medical conditions aggravated by exposure to this material may include pre-existing skin disorders.
<b>Target Organs</b>	This material may cause damage to the following organs: skin.
<b>Carcinogenic Potential</b>	This product does not contain any components at concentrations above 0.1% which are considered carcinogenic by OSHA, IARC or NTP.

OSHA Hazard Classification is indicated by an "X" in the box adjacent to the hazard title. If no "X" is present, the product does not exhibit the hazard as defined in the OSHA Hazard Communication Standard (29 CFR 1910.1200).

OSHA Health Hazard Classification		OSHA Physical Hazard Classification			
<b>Irritant</b> <input type="checkbox"/>	<b>Toxic</b> <input type="checkbox"/>	<b>Combustible</b> <input type="checkbox"/>	<b>Explosive</b> <input type="checkbox"/>	<b>Pyrophoric</b> <input type="checkbox"/>	
<b>Sensitizer</b> <input type="checkbox"/>	<b>Highly Toxic</b> <input type="checkbox"/>	<b>Flammable</b> <input type="checkbox"/>	<b>Oxidizer</b> <input type="checkbox"/>	<b>Water-reactive</b> <input type="checkbox"/>	
<b>Corrosive</b> <input type="checkbox"/>	<b>Carcinogenic</b> <input type="checkbox"/>	<b>Compressed Gas</b> <input type="checkbox"/>	<b>Organic Peroxide</b> <input type="checkbox"/>	<b>Unstable</b> <input type="checkbox"/>	

## 4.0 FIRST AID MEASURES

Take proper precautions to ensure your own health and safety before attempting rescue or providing first aid. For more specific information, refer to Exposure Controls and Personal Protection in Section 8 of this MSDS.

<b>Eye</b>	Check for and remove contact lenses. Flush eyes with cool, clean, low-pressure water while occasionally lifting and lowering eyelids. Seek medical attention if excessive tearing, redness, or pain persists.
<b>Skin</b>	Remove contaminated shoes and clothing. Wipe off excess material. Wash exposed skin with mild soap and water. Seek medical attention if tissue appears damaged or if pain or irritation persists. Thoroughly clean contaminated clothing before reuse. Discard contaminated leather goods. If material is injected under the skin, seek medical attention immediately.
<b>Inhalation</b>	Move victim to fresh air. If victim is not breathing, immediately begin rescue breathing. If breathing is difficult, 100 percent humidified oxygen should be administered by a qualified individual. Seek medical attention immediately. Keep the affected individual warm and at rest.
<b>Ingestion</b>	Do not induce vomiting unless directed to by a physician. Do not give anything to drink unless directed to by a physician. Never give anything by mouth to a person who is not fully conscious. Seek medical attention immediately.
<b>Notes to Physician</b>	In the event of injection in underlying tissue, immediate treatment should include extensive incision, debridement and saline irrigation. Inadequate treatment can result in ischemia and gangrene. Early symptoms may be minimal.

. NOTES: NA = Not Applicable;

NE = Not Established;

UN = Unavailable

## 5.0 FIREFIGHTING MEASURES

<b>Flashpoint</b>	OPEN CUP: 212°C (414°F) (Cleveland.).
<b>UFL</b>	No Data
<b>LFL</b>	No Data
<b>Autoignition Temperature</b>	Not Available
<b>Flammability Classification</b>	NFPA Class-IIIB combustible material. Slightly combustible!
<b>Extinguishing Media</b>	Use dry chemical, foam, Carbon Dioxide or water fog
<b>Special Properties</b>	This material can burn but will not readily ignite. This material will release vapors when heated above the flash point temperature that can ignite when exposed to a source of ignition. In enclosed spaces, heated vapor can ignite with explosive force. Mists or sprays may burn at temperatures below the flash point.
<b>Firefighting Equipment</b>	Firefighters must use full bunker gear including NIOSH-approved positive pressure self-contained breathing apparatus to protect against potential hazardous combustion or decomposition products and oxygen deficiencies.
<b>Hazardous Combustion Products</b>	Carbon dioxide, carbon monoxide, smoke, fumes, unburned hydrocarbons and trace oxides of sulfur, phosphorus, zinc and/or nitrogen.

## 6.0 ACCIDENTAL RELEASE MEASURES

**Take proper precautions to ensure your own health and safety before attempting spill control or clean-up. For more specific information, refer to the Emergency Overview on Page 1, Exposure Controls and Personal Protection in Section 8 and Disposal Considerations in Section 13 of this MSDS.**

Do not touch damaged containers or spilled material unless wearing appropriate protective equipment. Slipping hazard; do not walk through spilled material. Stop leak if you can do so without risk. For small spills, absorb or cover with dry earth, sand, or other inert non-combustible absorbent material and place into waste containers for later disposal. Contain large spills to maximize product recovery or disposal. Prevent entry into waterways or sewers. In urban area, cleanup spill as soon as possible. In natural environments, seek cleanup advice from specialists to minimize physical habitat damage. This material will float on water. Absorbent pads and similar materials can be used. Comply with all laws and regulations.

## 7.0 HANDLING AND STORAGE

<b>Handling</b>	Avoid water contamination and extreme temperatures to minimize product degradation. Empty containers may contain product residues that can ignite with explosive force. Do not pressurize, cut, weld, braze solder, drill, grind or expose containers to flames, sparks, heat or other potential ignition sources. Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling or disposing of empty containers and/or waste residues of this product
<b>Storage</b>	Keep container closed. Do not store with strong oxidizing agents. Do not store at temperatures above 120° F or in direct sunlight for extended periods of time. Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling or disposing of empty containers or waste residues of this product.

## 8.0 EXPOSURE CONTROLS / PERSONAL PROTECTION

<p><b>Eye</b></p>	<p>Safety glasses equipped with side shields should be adequate protection under most conditions of use. Wear goggles and/or face shield if splashing or spraying is anticipated. Wear goggles and face shield if material is heated above 125°F (51°C). Have suitable eye wash water available</p>		
<p><b>Personal Protective Equipment</b></p>	<p>Personal protective equipment should be selected based upon the conditions under which this material is used. A hazard assessment of the work area for PPE requirements should be conducted by a qualified professional pursuant to OSHA regulations. The following pictograms represent the minimum requirements for personal protective equipment. For certain operations, additional PPE may be required.</p>		
<p><b>Hand Protection</b></p>	<p>Use gloves constructed of chemical resistant materials such as neoprene or heavy nitrile rubber if frequent or prolonged contact is expected. Use heat-protective gloves when handling product at elevated temperatures.</p>		
<p><b>Body Protection</b></p>	<p>Use clean and impervious protective clothing (e.g., neoprene or Tyvek®) if splashing or spraying conditions are present. Protective clothing may include long-sleeve outer garment, apron, or lab coat. If significant contact occurs, remove oil-contaminated clothing as soon as possible and promptly shower. Launder contaminated before reuse or discard. Wear heat protective boots and protective clothing when handling material at elevated temperatures</p>		
<p><b>Engineering Controls</b></p>	<p>Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of mists and/or vapors below the recommended exposure limits (see below). An eye wash station and safety shower should be located near the work-station</p>		
<p><b>Respiratory Protection</b></p>	<p>Vaporization is not expected at ambient temperatures. Therefore, the need for respiratory protection is not anticipated under normal use conditions and with adequate ventilation. If elevated airborne concentrations above applicable workplace exposure levels are anticipated, a NIOSH-approved organic vapor respirator equipped with a dust/mist prefilter should be used. Protection factors vary depending upon the type of respirator used. Respirators should be used in accordance with OSHA requirements (29 CFR 1910.134).</p>		
<p><b>General Comments</b></p>	<p>Use good personal hygiene practices. Wash hands and other exposed skin areas with plenty of mild soap and water before eating, drinking, smoking, use of toilet facilities, or leaving work. DO NOT use gasoline, kerosene, solvents or harsh abrasives as skin cleaners. Since specific exposure standards/control limits have not been established for this product, the "Oil Mist, Mineral" exposure limits shown below are suggested as minimum control guidelines.</p>		
<p><b>Occupational Exposure Guidelines</b></p>	<table border="0"> <tr> <td style="vertical-align: top;"> <p><b>Substance</b> 1) Oil Mist, Mineral</p> </td> <td style="vertical-align: top;"> <p><b>Applicable Workplace Exposure Levels</b> <b>ACGIH (United States).</b> TWA: 5 mg/m<sup>3</sup> STEL: 10 mg/m<sup>3</sup> <b>OSHA (United States).</b> TWA: 5 mg/m<sup>3</sup></p> </td> </tr> </table>	<p><b>Substance</b> 1) Oil Mist, Mineral</p>	<p><b>Applicable Workplace Exposure Levels</b> <b>ACGIH (United States).</b> TWA: 5 mg/m<sup>3</sup> STEL: 10 mg/m<sup>3</sup> <b>OSHA (United States).</b> TWA: 5 mg/m<sup>3</sup></p>
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## 9.0 CHEMICAL AND PHYSICAL PROPERTIES

<b>Appearance and Odor</b>	Mild petroleum odor
<b>pH</b>	Not Applicable
<b>Vapor Pressure (mm Hg)</b>	<0.001 kPa (<0.01 mmHg) (at 20°C)
<b>Vapor Density (Air = 1)</b>	>1 (Air = 1)
<b>Boiling Point</b>	Not available
<b>Melting Point</b>	Not available
<b>Solubility in Water</b>	Insoluble in cold water.
<b>Specific Gravity (Water = 1)</b>	0.87 (Water = 1)
<b>Physical State</b>	Liquid
<b>Color</b>	Clear to light amber
<b>Viscosity (cST @ 40°C)</b>	33
<b>Volatile Characteristics</b>	Negligible volatility
<b>Additional Properties</b>	Gravity, °API (ASTM D287) = 31.3 @ 60° F Density = 7.42 Lbs/gal. Viscosity (ASTM D2161) = 170 SUS @ 100° F

## 10.0 STABILITY AND REACTIVITY

<b>Stability</b>	Stable.
<b>Conditions to Avoid</b>	Keep away from extreme heat, sparks, open flame, and strongly oxidizing conditions.
<b>Materials to Avoid</b>	Strong oxidizers.
<b>Hazardous Decomposition</b>	No additional hazardous decomposition products were identified other than the combustion products identified in Section 5 of this MSDS
<b>Hazardous Polymerization</b>	Not expected to occur

## 11.0 TOXICOLOGICAL INFORMATION

For other health-related information, refer to the Emergency Overview on Page 1 of the Hazards Identification in Section 3 of this MSDS.

### **Distillates, petroleum, solvent-refined light paraffinic:**

ORAL (LD50): Acute: >5000 mg/kg [Rat].

DERMAL (LD50): Acute: >2000 mg/kg [Rabbit].

### **Distillates, petroleum, solvent-refined heavy paraffinic:**

ORAL (LD50): Acute: >5000 mg/kg [Rat].

DERMAL (LD50): Acute: >2000 mg/kg [Rabbit].

### **Distillates, petroleum, solvent-refined light paraffinic:**

Mineral oil mists derived from highly refined oils are reported to have low acute and sub-acute toxicities in animals. Effects from single and short-term repeated exposures to high concentrations of mineral oil mists well above applicable workplace exposure levels include lung inflammatory reaction, lipoid granuloma formation and lipoid pneumonia. In acute and sub-acute studies involving exposures to lower concentrations of mineral oil mists at or near current work place exposure levels produced no significant toxicological effects. In long term studies (up to two years) no carcinogenic effects have been reported in any animal species tested.

### **Distillates, petroleum, solvent-refined heavy paraffinic:**

Mineral oil mists derived from highly refined oils are reported to have low acute and sub-acute toxicities in animals. Effects from single and short-term repeated exposures to high concentrations of mineral oil mists well above applicable workplace exposure levels include lung inflammatory reaction, lipoid granuloma formation and lipoid pneumonia. In acute and sub-acute studies involving exposures to lower concentrations of mineral oil mists at or near current work place exposure levels produced no significant toxicological effects. In long term studies (up to two years) no carcinogenic effects have been reported in any animal species tested.

### **Hydraulic Oils:**

Repeated or prolonged skin contact with certain hydraulic oils can cause mild skin irritation characterized by drying, cracking (dermatitis) or oil acne. Injection under the skin, in muscle or into the blood stream can cause irritation, inflammation, swelling, fever, and systemic effects, including mild central nervous system depression. Injection of pressurized hydrocarbons can cause severe, permanent tissue damage.

## 12.0 ECOLOGICAL INFORMATION

### Ecotoxicity

Analysis for ecological effects has not been conducted on this product. However, if spilled, this product and any contaminated soil or water may be harmful to human, animal, and aquatic life. Also, the coating action associated with petroleum and petroleum products can be harmful or fatal to aquatic life and waterfowl.

### Environmental Fate

An environmental fate analysis has not been conducted on this specific product. Plants and animals may experience harmful or fatal effects when coated with petroleum-based products. Petroleum-based (mineral) lube oils will normally float on water. In stagnant or slow-flowing waterways, an oil layer can cover a large surface area. As a result, this oil layer might limit or eliminate natural atmospheric oxygen transport into the water. With time, if not removed, oxygen depletion in the waterway can result in a loss of marine life or create an anaerobic environment. This material contains phosphorus which is a controlled element for disposal in effluent waters in most sections of North America. Phosphorus is known to enhance the formation of algae. Severe algae growth can reduce oxygen content in the water possibly below levels necessary to support marine life.

## 13.0 DISPOSAL INFORMATION

**Hazard characteristic and regulatory waste stream classification can change with product use. Accordingly, it is the responsibility of the user to determine the proper storage, transportation, treatment and/or disposal methodologies for spent materials and residues at the time of disposition.**

Conditions of use may cause this material to become a "hazardous waste", as defined by federal or state regulations. It is the responsibility of the user to determine if the material is a "hazardous waste" at the time of disposal. Transportation, treatment, storage, and disposal of waste material must be conducted in accordance with RCRA regulations (see 40 CFR 260 through 40 CFR 271). State and/or local regulations may be more restrictive. Contact the RCRA/Superfund Hotline at (800) 424-9346 or your regional US EPA office for guidance concerning case specific disposal issues. Empty drums and pails retain residue. DO NOT pressurize, cut, weld, braze, solder, drill, grind, or expose this product's empty container to heat, flame, or other ignition sources. DO NOT attempt to clean it. Empty drums and pails should be drained completely, properly bunged or sealed, and promptly sent to a reconditioner.

## 14.0 TRANSPORTATION INFORMATION

**U.S. Dept. of Transportation:** Not a US Department of Transportation regulated material.

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**Hazard Class** - Not regulated

**Packing Group(s)** – Not applicable

**UN/NA ID** – Not regulated

**Reportable Quantity** – A Reportable Quantity (RQ) has not been established for this material.

**Placards**



**Emergency Response Guide No.** Not applicable

**Hazmat STCC No.** – Not assigned

**MARPOL III Status** – Not a DOT “Marine Pollutant” Per 49 CFR 171.8

## 15.0 REGULATORY INFORMATION

<p><b>CERCLA Sections 102A/103 Hazardous Substances (40 CFR Part 302.4)</b></p>	<p>The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center concerning release of quantities of "hazardous substances" equal to or greater than the reportable quantities (RQ's) listed in 40 CFR 302.4. As defined by CERCLA, the term "hazardous substance" does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically designated in 40 CFR 302.4. Chemical substances present in this product or refinery stream that may be subject to this statute are: Zinc and Zinc Compounds, Concentration: 0 - 1%</p>
<p><b>SARA Title III Section 302 Extremely Hazardous Substances (40 CFR Part 355)</b></p>	<p>The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to Subparts 302 and 304 to submit emergency planning and notification information based on Threshold Planning Quantities (TPQs) and Reportable Quantities (RQs) for "Extremely Hazardous Substances" listed in 40 CFR 302.4 and 40 CFR 355. No components were identified</p>
<p><b>SARA Title III Section 311/312 Hazardous Categorization (40 CFR Part 370)</b></p>	<p>The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to this subpart to submit aggregate information on chemicals by "Hazard Category" as defined in 40 CFR 370.2. This material would be classified under the following hazard categories: No SARA 311/312 hazard categories identified.</p>
<p><b>SARA Title III Sections 313 (40 CFR Part 372)</b></p>	<p>This product contains the following components in concentrations above de minimis levels that are listed as toxic chemicals in 40 CFR Part 372 pursuant to the requirements of Section 313 of SARA: No components were identified.</p>
<p><b>U.S. Inventory (TSCA)</b></p>	<p>This product and/or its components are listed on the Toxic Substances Control Act (TSCA) inventory.</p>
<p><b>CWA</b></p>	<p>This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.</p>
<p><b>California Proposition 65</b></p>	<p>This material may contain the following components which are known to the State of California to cause cancer, birth defects or other reproductive harm, and may be subject to the requirements of California Proposition 65 (CA Health &amp; Safety Code Section 25249.5): Toluene: 0.001%</p>
<p><b>New Jersey Right-to-Know Label</b></p>	<p>Petroleum Oil (Hydraulic Fluid)</p>
<p><b>Additional Regulatory Remarks</b></p>	<p>No additional regulatory remarks</p>

## 16.0 OTHER INFORMATION

Refer to the top of Page 1 for the HMIS and NFPA Hazard Ratings for this product.

### ABBREVIATIONS

AP = Approximately, EQ = Equal, > = Greater Than, < = Less Than, NA = Not Applicable, ND = No Data, NE = Not Established

ACGIH = American Conference of Governmental Industrial Hygienists

IARC = International Agency for Research on Cancer

NIOSH = National Institute of Occupational Safety and Health

NPCA = National Paint and Coating Manufacturers Association

NFPA = National Fire Protection Association

AIHA = American Industrial Hygiene Association

NTP = National Toxicology Program

OSHA = Occupational Safety and Health Administration

HMIS = Hazardous Materials Information System

EPA = Environmental Protection Agency

<b>Prepared By</b>	Graco, Inc.
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This Material Safety Data Sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we have received from sources outside our company. We believe that information to be correct, but cannot guarantee its accuracy or completeness. Health and safety precautions in this Data Sheet may not be adequate for all individuals and/or situations. It is the users' obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either express or implied.

**NOTES:** NA = Not Applicable; NE = Not Established; UN = Unavailable

*All written and visual data contained in this document reflects the latest product information available at the time of publication.*

*Graco reserves the right to make changes at any time without notice.*

**Sales Offices:** Minneapolis, Detroit,

**International Offices:** Belgium, Korea, Hong Kong, Japan

**www.graco.com**

PRINTED IN U.S.A.

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## Material Safety Data Sheet

Issue Date: March 25, 2010  
Revised Date: April 21, 2010

Reason: Correct Part Numbers

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Product name:**  
Super Lube® Silicone Lubricating Grease

**Item No's:** 92003, 92150, 92016,  
92005, 92030, 92400

**Product use:** Lubricant, Dielectric Compound

**Company address:**  
Synco Chemical Corporation  
24 DaVinci Dr., P.O. Box 405  
Bohemia, NY 11716

**Contact Information:**  
Telephone: 631-567-5300  
Emergency telephone: 800-424-9300  
Internet: [www.super-lube.com](http://www.super-lube.com)  
E-Mail: info@super-lube.com

### 2. HAZARDS IDENTIFICATION

#### EMERGENCY OVERVIEW

**Physical state:** Semi-solid  
**Color:** Translucent  
**Odor:** Mild

**WHMIS hazard class:** Not Hazardous  
**HMIS codes:** Health - 1  
Fire - 1  
Physical - 0

**WARNING:**  
MAY CAUSE SKIN OR EYE IRRITATION

**Relevant routes of exposure:** Skin, Eyes

#### **Potential Health Effects**

**Inhalation:** Not expected to cause respiratory tract irritation during normal conditions of use.  
**Skin contact:** Repeated or prolonged contact may be irritating to skin.  
**Eye contact:** Contact with eyes may cause irritation.  
**Ingestion:** Not expected under normal conditions of use.

**Existing conditions aggravated by exposure:** None generally recognized.

**See Section 11 for additional toxicological information.**

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Components</u>	<u>%</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>	<u>OTHER</u>
Polydimethylsiloxane 63148-62-9	<90	None	None	None
Silane, dichlorodimethyl- reaction products with silica 68611-44-9	<9	10mg/m <sup>3</sup> TWA	6mg/m <sup>3</sup> TWA	None
Polytetrafluoroethylene 9002-84-0	<7	None	None	
Polyglycol 025322-69-4	<1	None	None	AIHA WEEL is 50 ppm Total 10mg/m <sup>3</sup> aerosol only

### 4. FIRST AID MEASURES

<b>Inhalation:</b>	Inhalation not likely.
<b>Skin contact:</b>	After contact with skin, wash immediately with plenty of water (using soap, if available). Get medical attention if symptoms develop and persist.
<b>Eye contact:</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
<b>Ingestion:</b>	Do not induce vomiting. Get medical attention.

### 5. FIRE-FIGHTING MEASURES

<b>Flash point:</b>	>572° F (300° C) TCC
<b>Auto ignition temperature:</b>	Not Determined
<b>Flammable/Explosive limits-lower %:</b>	No Data
<b>Flammable/Explosive limits-upper %:</b>	No Data
<b>Extinguishing media:</b>	Carbon dioxide (CO <sub>2</sub> ). Dry chemical. Foam.
<b>Special fire fighting procedures:</b>	None
<b>Unusual fire or explosion hazards:</b>	None
<b>Hazardous combustion products:</b>	Oxides of carbon, silica, formaldehyde.
<b>Sensitivity to mechanical impact:</b>	Not Determined

**Sensitivity to static discharge:** Not Determined

## 6. ACCIDENTAL RELEASE MEASURES

**Environmental precautions:** Spilled material may make surface slippery. Do not flush to drain.

**Clean-up methods:** Scrape up and dispose of in accordance with local and national regulations.

## 7. HANDLING AND STORAGE

**Handling:** Good manufacturing procedures should be followed in handling and storage.

**Storage:** Keep in cool, dry area.

**Incompatible products:** Oxidizing agents.

## Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

**Engineering controls:** Local exhaust ventilation is recommended when general ventilation is not sufficient to control airborne contamination.

**Respiratory protection:** If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH.

**Skin protection:** Chemical resistant, impermeable gloves.

**Eye/face protection:** Safety glasses with side-shields.

**See Section 3 for exposure limits.**

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical state:</b>	Semi-solid
<b>Color:</b>	Translucent
<b>Odor:</b>	Mild
<b>Odor Threshold:</b>	Not available
<b>Vapor pressure:</b>	Not determined
<b>pH:</b>	Not applicable
<b>Boiling point/range:</b>	Not available
<b>Melting point/range:</b>	Not available
<b>Specific gravity:</b>	.96
<b>Vapor density:</b>	Not available
<b>Evaporation rate:</b>	Not available
<b>Solubility in water:</b>	Not soluble
<b>Partition coefficient (n-octano/water):</b>	Not determined
<b>VOC content:</b>	Essentially zero

## 10. STABILITY AND REACTIVITY

<b>Stability:</b>	Stable
<b>Hazardous polymerization:</b>	Will not occur.
<b>Hazardous decomposition products:</b>	Thermal: Dimethylcyclosiloxanes, Hydrogen fluoride. Oxidative/Thermal: Formaldehyde
<b>Incompatibility:</b>	Oxidizing agents.
<b>Conditions to avoid:</b>	None known

## 11. TOXICOLOGICAL INFORMATION

<b>Product toxicity data:</b>	Not available
<b>Toxicologically synergistic products:</b>	Not available

Refer to the following for irritancy of Product, Sensitization to Product, Carcinogenicity, Reproductive Toxicity, Teratogenicity, and Mutagenicity.

**Ingredient Toxicity Data & Carcinogen Status**

Components	LD50s & LC50s	Other LD50s and LC50s	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen	ACGIH-Carcinogen
Polydimethyl-siloxane 63148-62-9	Oral LD50 (Rat) >5000 mg/kg	Dermal LD50 (Rat) >2000 mg/kg	No	No	No	No
Silane, dichlorodimethyl reaction products with silica 68611-44-9	Oral LD50 (Rat) >5000 mg/kg	Inhalation LC50 (Rat) >0.477 mg/l/4h	No	No	No	No
Polytetrafluoroethylene 9002-84-0	Not Determined	None	No	No	No	No
Polyglycol 025322-69-4	Oral LD50 (Rats) >2,000 mg/kg	None	No	No	No	No

**Literature Referenced Target Organ & Other Health Effects**

Components	Health Effects/Target Organs
Polydimethyl-siloxane 63148-62-9	No target organs
Silane, dichlorodimethyl reaction products with silica 68611-44-9	No target organs
Polytetrafluoroethylene 9002-84-0	Irritant
Polyglycol 025322-69-4	No target organs

**12. ECOLOGICAL INFORMATION**

**Ecological information:**

General Notes: Water hazard class 1 (self assessment): slightly hazardous for water. Do not allow undiluted product or large quantities of it to reach ground or sewage systems.

**13. DISPOSAL CONSIDERATIONS**

**Information provided is for unused product only.**

**Recommended method of disposal:** Dispose of in accordance with federal and local regulations.

#### 14. TRANSPORT INFORMATION

**Transportation of Dangerous Goods – Ground:**

**Proper shipping name:** Not regulated  
**Hazardous class or division:** None  
**Identification number:** None  
**Packing group:** None

**International Air Transportation (ICAO/IATA):**

**Proper shipping name:** Not regulated  
**Hazardous class or division:** None  
**Identification number:** None  
**Packing group:** None

**Water Transportation (IMO/IMDG):**

**Proper shipping name:** Not regulated  
**Hazardous class or division:** None  
**Identification number:** None  
**Packing group:** None  
**Marine pollutant:** None

#### 15. REGULATORY INFORMATION

**Canada Regulatory Information**

**CEPA DSL/NDSL Status:** All components are listed on or are exempt from listing on the Domestic Substances List.

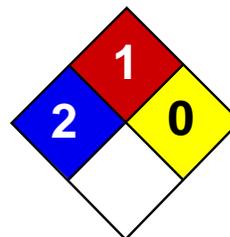
**United States Regulatory Information**

**TSCA 8 (b) Inventory Status:** All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.

#### SECTION 16: OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Product Regulations.

Data prepared by Environment protection department.



Health	2
Fire	1
Reactivity	0
Personal Protection	E

## Material Safety Data Sheet Antimony MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Antimony

**Catalog Codes:** SLA1453, SLA4462

**CAS#:** 7440-36-0

**RTECS:** CC4025000

**TSCA:** TSCA 8(b) inventory: Antimony

**CI#:** Not available.

**Synonym:** Stibium

**Chemical Name:** Not available.

**Chemical Formula:** Sb

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Antimony	7440-36-0	100

**Toxicological Data on Ingredients:** Antimony: ORAL (LD50): Acute: 7000 mg/kg [Rat].

### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator).

**Potential Chronic Health Effects:**

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to blood, kidneys, lungs, the nervous system, liver, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

**Serious Skin Contact:**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

**Serious Ingestion:** Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** Some metallic oxides.

**Fire Hazards in Presence of Various Substances:** Not available.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

### Section 6: Accidental Release Measures

**Small Spill:** Use appropriate tools to put the spilled solid in a convenient waste disposal container.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

### Section 7: Handling and Storage

**Precautions:**

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In

case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

### Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

### Exposure Limits:

TWA: 0.5 Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid.

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 121.75 g/mole

**Color:** Not available.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 1635°C (2975°F)

**Melting Point:** 630°C (1166°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 6.691 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Insoluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Not available.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:** Acute oral toxicity (LD50): 7000 mg/kg [Rat].

**Chronic Effects on Humans:** Causes damage to the following organs: blood, kidneys, lungs, the nervous system, liver, mucous membranes.

**Other Toxic Effects on Humans:**

Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Human: passes through the placenta, excreted in maternal milk.

**Special Remarks on other Toxic Effects on Humans:** Not available.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are more toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

## Section 14: Transport Information

**DOT Classification:** CLASS 6.1: Poisonous material.

**Identification:** : Antimony powder UNNA: UN2871 PG: III

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**

Pennsylvania RTK: Antimony Massachusetts RTK: Antimony TSCA 8(b) inventory: Antimony

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

**Other Classifications:****WHMIS (Canada):**

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):** R36/38- Irritating to eyes and skin.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 1

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 1

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

**Section 16: Other Information**

**References:** Not available.

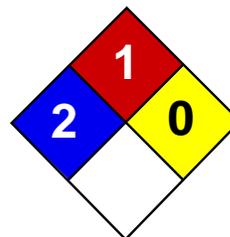
**Other Special Considerations:** Not available.

**Created:** 10/11/2005 11:19 AM

**Last Updated:** 05/21/2013 12:00 PM

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Health	2
Fire	1
Reactivity	0
Personal Protection	E

## Material Safety Data Sheet Copper MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Copper

**Catalog Codes:** SLC4939, SLC2152, SLC3943, SLC1150, SLC2941, SLC4729, SLC1936, SLC3727, SLC5515

**CAS#:** 7440-50-8

**RTECS:** GL5325000

**TSCA:** TSCA 8(b) inventory: Copper

**CI#:** Not available.

**Synonym:**

**Chemical Name:** Not available.

**Chemical Formula:** Cu

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Copper	7440-50-8	100

**Toxicological Data on Ingredients:** Copper LD50: Not available. LC50: Not available.

### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Very hazardous in case of ingestion. Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (irritant).

**Potential Chronic Health Effects:**

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

### Section 4: First Aid Measures

**Eye Contact:** Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

**Skin Contact:**

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

**Serious Skin Contact:** Not available.

**Inhalation:** Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

**Serious Ingestion:** Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** Some metallic oxides.

**Fire Hazards in Presence of Various Substances:** Not available.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

### Section 6: Accidental Release Measures

**Small Spill:**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

### Section 7: Handling and Storage

**Precautions:**

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not breathe dust. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible.

**Storage:**

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

**Section 8: Exposure Controls/Personal Protection****Engineering Controls:**

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:**

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**

TWA: 1 (mg/m<sup>3</sup>) from ACGIH [1990] Consult local authorities for acceptable exposure limits.

**Section 9: Physical and Chemical Properties**

**Physical state and appearance:** Solid.

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 63.54 g/mole

**Color:** Not available.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 2595°C (4703°F)

**Melting Point:** 1083°C (1981.4°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 8.94 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Insoluble in cold water.

**Section 10: Stability and Reactivity Data**

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Not available.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** No.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:**

LD50: Not available. LC50: Not available.

**Chronic Effects on Humans:** The substance is toxic to lungs, mucous membranes.

**Other Toxic Effects on Humans:**

Very hazardous in case of ingestion. Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Human: passes through the placenta, excreted in maternal milk.

**Special Remarks on other Toxic Effects on Humans:** Not available.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are as toxic as the original product.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

## Section 14: Transport Information

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Marine Pollutant

## Section 15: Other Regulatory Information

**Federal and State Regulations:**

Pennsylvania RTK: Copper Massachusetts RTK: Copper TSCA 8(b) inventory: Copper CERCLA: Hazardous substances.: Copper

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

**Other Classifications:**

**WHMIS (Canada):** CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):** R36- Irritating to eyes.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 1

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 1

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

**Section 16: Other Information**

**References:** Not available.

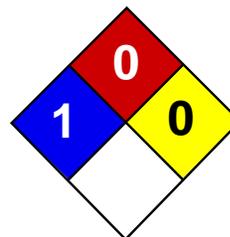
**Other Special Considerations:** Not available.

**Created:** 10/09/2005 04:58 PM

**Last Updated:** 05/21/2013 12:00 PM

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Health	1
Fire	0
Reactivity	0
Personal Protection	E

## Material Safety Data Sheet

### Lead MSDS

#### Section 1: Chemical Product and Company Identification

**Product Name:** Lead

**Catalog Codes:** SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

**CAS#:** 7439-92-1

**RTECS:** OF7525000

**TSCA:** TSCA 8(b) inventory: Lead

**CI#:** Not available.

**Synonym:** Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

**Chemical Name:** Lead

**Chemical Formula:** Pb

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

#### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Lead	7439-92-1	100

**Toxicological Data on Ingredients:** Lead LD50: Not available. LC50: Not available.

#### Section 3: Hazards Identification

**Potential Acute Health Effects:** Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

**Potential Chronic Health Effects:**

Slightly hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

#### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

**Skin Contact:** Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

**Serious Skin Contact:** Not available.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** Some metallic oxides.

**Fire Hazards in Presence of Various Substances:** Non-flammable in presence of open flames and sparks, of shocks, of heat.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** When heated to decomposition it emits highly toxic fumes of lead.

**Special Remarks on Explosion Hazards:** Not available.

## Section 6: Accidental Release Measures

**Small Spill:**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:** Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

### Exposure Limits:

TWA: 0.05 (mg/m<sup>3</sup>) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m<sup>3</sup>) from OSHA (PEL) [United States] TWA: 0.03 (mg/m<sup>3</sup>) from NIOSH [United States] TWA: 0.05 (mg/m<sup>3</sup>) [Canada] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid. (Metal solid.)

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 207.21 g/mole

**Color:** Bluish-white. Silvery. Gray

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 1740°C (3164°F)

**Melting Point:** 327.43°C (621.4°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 11.3 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Insoluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Incompatible materials, excess heat

**Incompatibility with various substances:** Reactive with oxidizing agents.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**

Can react vigorously with oxidizing materials. Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Inhalation. Ingestion.

**Toxicity to Animals:**

LD50: Not available. LC50: Not available.

**Chronic Effects on Humans:**

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

**Other Toxic Effects on Humans:** Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:**

Acute Potential: Skin: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation Eyes: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation. Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungs by mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually absorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, delirium, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead colic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

**Section 13: Disposal Considerations****Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

**Section 14: Transport Information**

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

**Section 15: Other Regulatory Information****Federal and State Regulations:**

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Lead California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead Connecticut hazardous material survey.: Lead Illinois toxic substances disclosure to employee act: Lead Illinois chemical safety act: Lead New York release reporting list: Lead Rhode Island RTK hazardous substances: Lead Pennsylvania RTK: Lead

**Other Regulations:**

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):** CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**

R20/22- Harmful by inhalation and if swallowed. R33- Danger of cumulative effects. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. S36/37- Wear suitable protective clothing and gloves. S44- If you feel unwell, seek medical advice (show the label when possible). S53- Avoid exposure - obtain special instructions before use.

**HMIS (U.S.A.):**

**Health Hazard:** 1

**Fire Hazard:** 0

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 1

**Flammability:** 0

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:21 PM

**Last Updated:** 05/21/2013 12:00 PM

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**Safety Data Sheet**  
 according to 1907/2006/EC (REACH),  
 1272/2008/EC (CLP), and GHS

Printing date 25.05.2012

Revision: 24.05.2012

### 1 Identification of the substance/mixture and of the company/undertaking

- **1.1 Product identifier**
- **Trade name:** ALCONOX
- **Application of the substance / the preparation** Cleaning material/ Detergent
- **1.3 Details of the supplier of the Safety Data Sheet**
- **Manufacturer/Supplier:**  
 Alconox, Inc.  
 30 Glenn St., Suite 309  
 White Plains, NY 10603  
 Phone: 914-948-4040
- **Further information obtainable from:** Product Safety Department
- **1.4 Emergency telephone number:**  
 ChemTel Inc.  
 (800)255-3924, +1 (813)248-0585



### 2 Hazards identification

- **2.1 Classification of the substance or mixture**
- **Classification according to Regulation (EC) No 1272/2008**



GHS05 corrosion

Eye Dam. 1 H318 Causes serious eye damage.



GHS07

Skin Irrit. 2 H315 Causes skin irritation.

- **Classification according to Directive 67/548/EEC or Directive 1999/45/EC**

Xi; Irritant

R38-41: Irritating to skin. Risk of serious damage to eyes.

- **Information concerning particular hazards for human and environment:**

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

- **Classification system:**

The classification is according to the latest editions of the EU-lists, and extended by company and literature data.

- **2.2 Label elements**

- **Labelling according to Regulation (EC) No 1272/2008**

The product is classified and labelled according to the CLP regulation.

- **Hazard pictograms**



GHS05

- **Signal word** Danger

- **Hazard-determining components of labelling:**

Benzenesulfonic Acid, Sodium Salts

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- **Hazard statements**  
 H315 Causes skin irritation.  
 H318 Causes serious eye damage.
- **Precautionary statements**  
 P280 Wear protective gloves/protective clothing/eye protection/face protection.  
 P264 Wash thoroughly after handling.  
 P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
 P310 Immediately call a POISON CENTER or doctor/physician.  
 P321 Specific treatment (see on this label).  
 P362 Take off contaminated clothing and wash before reuse.  
 P332+P313 If skin irritation occurs: Get medical advice/attention.  
 P302+P352 IF ON SKIN: Wash with plenty of soap and water.
- **Hazard description:**
- **WHMIS-symbols:**  
 D2B - Toxic material causing other toxic effects

· **NFPA ratings (scale 0 - 4)**

Health = 1  
 Fire = 0  
 Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

HEALTH 1 Health = 1  
 FIRE 0 Fire = 0  
 REACTIVITY 0 Reactivity = 0

- **2.3 Other hazards**
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.

### 3 Composition/information on ingredients

- **3.2 Mixtures**
- **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**

CAS: 68081-81-2	Benzenesulfonic Acid, Sodium Salts Xi R38-41 Eye Dam. 1, H318 Skin Irrit. 2, H315	10-25%
CAS: 497-19-8 EINECS: 207-838-8 Index number: 011-005-00-2	sodium carbonate Xi R36 Eye Irrit. 2, H319	2,5-10%

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		(Contd. of page 2)
CAS: 7722-88-5 EINECS: 231-767-1	tetrasodium pyrophosphate substance with a Community workplace exposure limit	2,5-10%
CAS: 151-21-3 EINECS: 205-788-1	sodium dodecyl sulphate  	2,5-10%

· **Additional information:** For the wording of the listed risk phrases refer to section 16.

#### 4 First aid measures

· **4.1 Description of first aid measures**

· **After inhalation:** Supply fresh air; consult doctor in case of complaints.

· **After skin contact:**

Immediately wash with water and soap and rinse thoroughly.

If skin irritation continues, consult a doctor.

· **After eye contact:**

Remove contact lenses if worn.

Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.

· **After swallowing:**

Do not induce vomiting; call for medical help immediately.

Rinse out mouth and then drink plenty of water.

· **4.2 Most important symptoms and effects, both acute and delayed**

No further relevant information available.

· **4.3 Indication of any immediate medical attention and special treatment needed**

No further relevant information available.

#### 5 Firefighting measures

· **5.1 Extinguishing media**

· **Suitable extinguishing agents:**

CO<sub>2</sub>, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

· **5.2 Special hazards arising from the substance or mixture**

No further relevant information available.

· **5.3 Advice for firefighters**

· **Protective equipment:**

Wear self-contained respiratory protective device.

Wear fully protective suit.

#### 6 Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures**

Product forms slippery surface when combined with water.

· **6.2 Environmental precautions:** Do not allow to enter sewers/ surface or ground water.

· **6.3 Methods and material for containment and cleaning up:**

Pick up mechanically.

Clean the affected area carefully; suitable cleaners are:

Warm water

· **6.4 Reference to other sections**

See Section 7 for information on safe handling.

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See Section 8 for information on personal protection equipment.  
 See Section 13 for disposal information.

**7 Handling and storage**

- **7.1 Precautions for safe handling**  
 Prevent formation of dust.  
 Keep receptacles tightly sealed.
- **Information about fire - and explosion protection:** No special measures required.
- **7.2 Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:** No special requirements.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:** Protect from humidity and water.
- **7.3 Specific end use(s)** No further relevant information available.

**8 Exposure controls/personal protection**

- **Additional information about design of technical facilities:** No further data; see item 7.

- **8.1 Control parameters**

- **Ingredients with limit values that require monitoring at the workplace:**

**7722-88-5 tetrasodium pyrophosphate**

REL (USA)	5 mg/m <sup>3</sup>
TLV (USA)	TLV withdrawn
EV (Canada)	5 mg/m <sup>3</sup>

- **Additional information:** The lists valid during the making were used as basis.
- **8.2 Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:**  
 Keep away from foodstuffs, beverages and feed.  
 Immediately remove all soiled and contaminated clothing  
 Wash hands before breaks and at the end of work.  
 Avoid contact with the skin.  
 Avoid contact with the eyes and skin.
- **Respiratory protection:**  
 In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
- **Protection of hands:**



Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

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**Trade name: ALCONOX**

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- **Material of gloves**

Butyl rubber, BR  
 Nitrile rubber, NBR  
 Natural rubber, NR  
 Neoprene gloves

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

- **Penetration time of glove material**

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

- **Eye protection:**



Safety glasses

- **Body protection:** Protective work clothing

## 9 Physical and chemical properties

- **9.1 Information on basic physical and chemical properties**

- **General Information**

- **Appearance:**

Form:	Powder
Colour:	White
Odour:	Odourless
Odour threshold:	Not determined.

pH-value (10 g/l) at 20°C:	9,5 (- NA for Powder form)
----------------------------	----------------------------

- **Change in condition**

Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	Undetermined.

Flash point:	Not applicable.
--------------	-----------------

Flammability (solid, gaseous):	Not determined.
--------------------------------	-----------------

- **Ignition temperature:**

Decomposition temperature:	Not determined.
----------------------------	-----------------

Self-igniting:	Product is not selfigniting.
----------------	------------------------------

Danger of explosion:	Product does not present an explosion hazard.
----------------------	---

- **Explosion limits:**

Lower:	Not determined.
Upper:	Not determined.

Vapour pressure:	Not applicable.
------------------	-----------------

Density at 20°C:	1,1 g/cm <sup>3</sup>
Relative density	Not determined.
Vapour density	Not applicable.

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· <b>Evaporation rate</b>	Not applicable.
· <b>Solubility in / Miscibility with water:</b>	Soluble.
· <b>Segregation coefficient (n-octanol/water):</b>	Not determined.
· <b>Viscosity:</b>	
<b>Dynamic:</b>	Not applicable.
<b>Kinematic:</b>	Not applicable.
· <b>Solvent content:</b>	
<b>Organic solvents:</b>	0,0 %
<b>Solids content:</b>	100 %
· <b>9.2 Other information</b>	No further relevant information available.

## 10 Stability and reactivity

- **10.1 Reactivity**
- **10.2 Chemical stability**
- **Thermal decomposition / conditions to be avoided:**  
No decomposition if used according to specifications.
- **10.3 Possibility of hazardous reactions**  
Reacts with acids.  
Reacts with strong alkali.  
Reacts with strong oxidizing agents.
- **10.4 Conditions to avoid** No further relevant information available.
- **10.5 Incompatible materials:** No further relevant information available.
- **10.6 Hazardous decomposition products:**  
Carbon monoxide and carbon dioxide  
Phosphorus compounds  
Sulphur oxides (SO<sub>x</sub>)

## 11 Toxicological information

- **11.1 Information on toxicological effects**
- **Acute toxicity:**
- **Primary irritant effect:**
- **on the skin:** Irritant to skin and mucous membranes.
- **on the eye:** Strong irritant with the danger of severe eye injury.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**  
The product shows the following dangers according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version:  
Irritant  
Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

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**12 Ecological information**

- **12.1 Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **12.2 Persistence and degradability** No further relevant information available.
- **12.3 Bioaccumulative potential** Not worth-mentioning accumulating in organisms
- **12.4 Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:**  
 Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water  
 Do not allow product to reach ground water, water course or sewage system.  
 Danger to drinking water if even small quantities leak into the ground.
- **12.5 Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **12.6 Other adverse effects** No further relevant information available.

**13 Disposal considerations**

- **13.1 Waste treatment methods**
- **Recommendation**  
 Smaller quantities can be disposed of with household waste.  
 Small amounts may be diluted with plenty of water and washed away. Dispose of bigger amounts in accordance with Local Authority requirements.  
 The surfactant used in this product complies with the biodegradability criteria as laid down in Regulation (EC) No. 648/2004 on detergents. Data to support this assertion are held at the disposal of the competent authorities of the Member States and will be made available to them, at their direct request or at the request of a detergent manufacturer.
- **Uncleaned packaging:**
- **Recommendation:** Disposal must be made according to official regulations.
- **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

**14 Transport information**

- |  |     |
|--|-----|
| · <b>14.1 UN-Number</b>                  |     |
| · DOT, ADR, ADN, IMDG, IATA              | N/A |
| · <b>14.2 UN proper shipping name</b>    |     |
| · DOT, ADR, ADN, IMDG, IATA              | N/A |
| · <b>14.3 Transport hazard class(es)</b> |     |
| · DOT, ADR, ADN, IMDG, IATA              |     |
| · Class                                  | N/A |
| · <b>14.4 Packing group</b>              |     |
| · DOT, ADR, IMDG, IATA                   | N/A |
| · <b>14.5 Environmental hazards:</b>     |     |
| · Marine pollutant:                      | No  |

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- |   |                 |
|---|-----------------|
| · <b>14.6 Special precautions for user</b>  | Not applicable. |
| · <b>14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</b> | Not applicable. |
| · <b>UN "Model Regulation":</b>   | N/A             |

**15 Regulatory information**

- **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
- **United States (USA)**
- **SARA**

· <b>Section 355 (extremely hazardous substances):</b>
--

None of the ingredients is listed.
------------------------------------

· <b>Section 313 (Specific toxic chemical listings):</b>
--

None of the ingredients is listed.
------------------------------------

· <b>TSCA (Toxic Substances Control Act):</b>
---

All ingredients are listed.
-----------------------------

· <b>Proposition 65 (California):</b>
---------------------------------------

· <b>Chemicals known to cause cancer:</b>
---

None of the ingredients is listed.
------------------------------------

· <b>Chemicals known to cause reproductive toxicity for females:</b>
--

None of the ingredients is listed.
------------------------------------

· <b>Chemicals known to cause reproductive toxicity for males:</b>
--

None of the ingredients is listed.
------------------------------------

· <b>Chemicals known to cause developmental toxicity:</b>
---

None of the ingredients is listed.
------------------------------------

· <b>Carcinogenic Categories</b>
----------------------------------

· <b>EPA (Environmental Protection Agency)</b>
--

None of the ingredients is listed.
------------------------------------

· <b>TLV (Threshold Limit Value established by ACGIH)</b>
---

None of the ingredients is listed.
------------------------------------

· <b>NIOSH-Ca (National Institute for Occupational Safety and Health)</b>
---

None of the ingredients is listed.
------------------------------------

· <b>OSHA-Ca (Occupational Safety &amp; Health Administration)</b>
--

None of the ingredients is listed.
------------------------------------

· <b>Canada</b>
-----------------

· <b>Canadian Domestic Substances List (DSL)</b>
--

All ingredients are listed.
-----------------------------

· <b>Canadian Ingredient Disclosure list (limit 0.1%)</b>
---

None of the ingredients is listed.
------------------------------------

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· <b>Canadian Ingredient Disclosure list (limit 1%)</b>	
497-19-8	sodium carbonate
7722-88-5	tetrasodium pyrophosphate
151-21-3	sodium dodecyl sulphate

· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

## 16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Relevant phrases**

H302 Harmful if swallowed.

H312 Harmful in contact with skin.

H315 Causes skin irritation.

H318 Causes serious eye damage.

H319 Causes serious eye irritation.

R21/22 Harmful in contact with skin and if swallowed.

R36 Irritating to eyes.

R36/38 Irritating to eyes and skin.

R38 Irritating to skin.

R41 Risk of serious damage to eyes.

· **Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

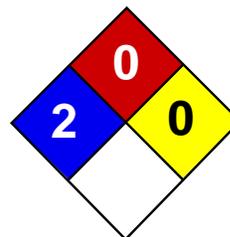
ACGIH: American Conference of Governmental Industrial Hygienists

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

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Health	2
Fire	0
Reactivity	0
Personal Protection	E

## Material Safety Data Sheet Bentonite MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Bentonite

**Catalog Codes:** SLB1441, SLB2935, SLB4435

**CAS#:** 1302-78-9

**RTECS:** CT9450000

**TSCA:** TSCA 8(b) inventory: Bentonite

**CI#:** Not applicable.

**Synonym:** Montmorillonite;

**Chemical Name:** Not available.

**Chemical Formula:**  
(Al,Fe1.67Mg.33)Si10(OH)2Na(+)Ca(++)/2.33

**Contact Information:**

**Sciencelab.com, Inc.**  
14025 Smith Rd.  
Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**  
1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Bentonite	1302-78-9	100

**Toxicological Data on Ingredients:** Bentonite LD50: Not available. LC50: Not available.

### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (irritant), of ingestion.

**Potential Chronic Health Effects:**

Hazardous in case of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs. Repeated or prolonged exposure to the substance can produce target organs damage.

### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

**Skin Contact:** Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

**Serious Skin Contact:** Not available.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** Non-flammable.

**Auto-Ignition Temperature:** Not applicable.

**Flash Points:** Not applicable.

**Flammable Limits:** Not applicable.

**Products of Combustion:** Not available.

**Fire Hazards in Presence of Various Substances:** Not applicable.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:** Not applicable.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

### Section 6: Accidental Release Measures

**Small Spill:**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

### Section 7: Handling and Storage

**Precautions:**

Do not breathe dust. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

### Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:**

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**

TWA: 10 from ACGIH (TLV) [United States] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid.

**Odor:** Odorless.

**Taste:** Not available.

**Molecular Weight:** Not available.

**Color:** Beige. (Light.)

**pH (1% soln/water):** Not available.

**Boiling Point:** Not available.

**Melting Point:** Decomposes.

**Critical Temperature:** Not available.

**Specific Gravity:** 2.5 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:**

Very slightly soluble in cold water, hot water. Insoluble in methanol, diethyl ether, n-octanol, acetone.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Not available.

**Corrosivity:** Not available.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

### Section 11: Toxicological Information

**Routes of Entry:** Eye contact. Inhalation.

**Toxicity to Animals:**

LD50: Not available. LC50: Not available.

**Chronic Effects on Humans:** Causes damage to the following organs: lungs.

**Other Toxic Effects on Humans:**

Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant), of ingestion.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:** Not available.

### Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are as toxic as the original product.

**Special Remarks on the Products of Biodegradation:** Not available.

### Section 13: Disposal Considerations

**Waste Disposal:**

### Section 14: Transport Information

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

### Section 15: Other Regulatory Information

**Federal and State Regulations:** TSCA 8(b) inventory: Bentonite

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

**Other Classifications:**

**WHMIS (Canada):** CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):** R36- Irritating to eyes.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 0

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 0

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:14 PM

**Last Updated:** 05/21/2013 12:00 PM

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.*

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**Attachment 3**  
**Training Certifications**

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### Certifications for Small Arms Range Berm Area

First Name	Last Name	GSWCC (Level 1A)	40-Hour HAZWOPER	8-Hour Refresher	HAZWOPER Supervisor	Respirator Fit Test	Medical	CPR	First Aid
<b>SES Staff</b>									
Greg	Carlson		✓	2/6/2015		6/28/2014	6/28/2014	10/17/2015	10/17/2015
Doug	Hawn		✓	12/5/2014	✓	2/6/2015	6/7/2014	2/7/2016	2/7/2016
LeAnn	McNeal	8/14/2014	✓	2/7/2014	✓	2/6/2015	9/13/2014	7/23/2015	7/23/2015
Chris	Napoleon		✓	11/13/2014	✓	10/11/2014	10/11/2014	10/17/2015	10/17/2015
Jeff	Williams		✓	7/25/2014	✓		10/31/2014	4/24/2015	4/24/2015
<b>Major Drilling Staff</b>									
Kenneth	Burkhead		✓	12/1/2014		11/14/2014	11/14/2014	12/29/2015	12/29/2015
Jim	Chambers		✓	12/11/2014		11/27/2014	11/27/2014	12/29/2015	12/29/2015
David	Chamblee								
Brian	Ray		✓	12/1/2014		3/28/2014	3/28/2014	12/29/2015	12/29/2015
<b>Sterling Staff</b>									
Peggy	Miller		✓	4/29/2014	✓				
Robert	Miller		✓	9/28/2014	✓				
Rickey	Rudd		✓		✓				
Patrick	Tatman		✓	3/4/2014	✓				

Please note: Dates listed indicate expiration date.

## Certifications for Small Arms Range Berm Area

First Name	Last Name	BBP	30 Hour	Excavation Competent	Hazard Communication	Construction Quality Management	Asbestos in Buildings
<b>SES Staff</b>							
Greg	Carlson	10/17/2014	✓		✓		
Doug	Hawn	2/7/2015			✓	5/7/2014	
LeAnn	McNeal	7/26/2014	✓	4/22/2015			
Chris	Napoleon	10/17/2014	✓	✓	✓		12/15/2014
Jeff	Williams	2/7/2015	✓	4/22/2015	✓	12/9/2014	
<b>Major Drilling Staff</b>							
Kenneth	Burkhead						
Jim	Chambers						
David	Chamblee						
Brian	Ray						
<b>Sterling Staff</b>							
Peggy	Miller						
Robert	Miller						
Rickey	Rudd						
Patrick	Tatman						

Please note: Dates listed indicate expiration date.

## Certifications for Small Arms Range Berm Area

First Name	Last Name	Enhanced Nuclear Chemical Biological Response Team Training	Hazardous Materials First Responder Awareness	Decision Driving Course	Forklift Safety Certification	Unexploded Ordnance Technician Level I
<b>SES Staff</b>						
Greg	Carlson	✓	✓			
Doug	Hawn					
LeAnn	McNeal					
Chris	Napoleon					
Jeff	Williams					
<b>Major Drilling Staff</b>						
Kenneth	Burkhead			✓	12/29/2016	
Jim	Chambers				12/29/2016	
David	Chamblee			✓		
Brian	Ray			✓	12/29/2016	
<b>Sterling Staff</b>						
Peggy	Miller					✓
Robert	Miller					
Rickey	Rudd					
Patrick	Tatman					

Please note: Dates listed indicate expiration date.

## Certifications for Small Arms Range Berm Area

First Name	Last Name	Basic EOD	Surface Basic Explosive Ordnance Disposal	Explosive Ordnance Disposal Assistant	Explosive Ordnance Disposal Phase II
<b>SES Staff</b>					
Greg	Carlson				
Doug	Hawn				
LeAnn	McNeal				
Chris	Napoleon				
Jeff	Williams				
<b>Major Drilling Staff</b>					
Kenneth	Burkhead				
Jim	Chambers				
David	Chamblee				
Brian	Ray				
<b>Sterling Staff</b>					
Peggy	Miller				
Robert	Miller			✓	✓
Rickey	Rudd		✓		
Patrick	Tatman	✓			

Please note: Dates listed indicate expiration date.

# **Nonemergency Medical Providers**

**St. Joseph's/Candler  
Immediate Care Center**

**C780 East Oglethorpe  
Highway  
Hinesville, Georgia 31313  
(912) 332-7262**

**Urgent Care of Richmond  
Hill**

**60 Exchange St, Ste B-7,  
Richmond Hill, Georgia  
31324  
(912) 756-2273**

**Redicare**

**4164 Coastal Highway  
U.S. 17  
Richmond Hill, Georgia  
31324  
(912) 756-7014**

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## **Attachment 6**

### **SES S&H Manual**

**(In SES Safety and Health Manual; Copy to Be Maintained on Site)**

**Tool Box Safety meetings  
Material Handling  
Hand and Power Tools  
Hazard Communication  
Personal Protective Equipment  
Worksite Emergency Procedure**

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**Attachment 7**  
**Activity Hazards Analysis**

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Revision Date: February 10, 2014
Project: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia
Task: Mobilization/Site Preparation
Prepared By: Doug Hawn
Construction Safety Competent Person: LeAnn McNeal
SSHO: LeAnn McNeal
Reviewed By: Rich Rathnow, CIH, CSP

Overall Risk Assessment Code (RAC):

L

E = Extremely High Risk  
H = High Risk  
M = Moderate Risk  
L = Low Risk

		P r o b a b i l i t y				
		Frequent	Likely	Occasional	Seldom	Unlikely
S e v e r i t y	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L

**Site Investigation Small Arms Range Berm Area  
Fort Stewart, Georgia**

**ACTIVITY HAZARD ANALYSIS – Mobilization/Site Preparation**

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
Mobilization/ site preparation	Traversing uneven, wet, or rough terrain. Use of worn or unrated safety footwear.	<ul style="list-style-type: none"> <li>Be aware of poor footing, potential slipping/tripping hazards in the work area, such as wet/steep slopes, stumps/roots, unprotected holes, ditches, riprap, utilities, and ground protrusions. Observe and avoid areas of unprotected holes, ramps, and ground penetrations or protrusions (stumps, roots, holes curbs, utility structures etc). Use sturdy hard-toe work boots with sufficient ankle support.</li> <li>Institute and maintain good housekeeping practices.</li> </ul>	RAC - L Standard Level D PPE *
Loading and unloading / manual lifting, carrying, and/or handling of objects.	Carrying loads or objects that are heavy, bulky, hard to carry  Using improper lifting technique  Lifting objects >50 lbs. alone	<ul style="list-style-type: none"> <li>SES or subcontract personnel must notify supervisors or safety representatives of pre-existing medical conditions that may be aggravated or re-injured by lifting activities.</li> <li>Lift objects using knees, not back. For repetitive lifting tasks, consider using lifting braces/ supports. If heavy equipment isn't available, get help to lift heavy (&gt; 50 lbs.) or awkward loads. Use heavy equipment to transfer heavy or awkward loads when possible.</li> <li>Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear before lifting.</li> <li>Avoid carrying heavy objects above shoulder level.</li> </ul>	* Work clothes, ANSI Type II reflective vests/ high-visibility clothing, hard hat, safety glasses and sturdy safety-toed work boots, leather gloves and hearing protection.

**Site Investigation Small Arms Range Berm Area**  
**Fort Stewart, Georgia**  
**ACTIVITY HAZARD ANALYSIS – Mobilization/Site Preparation**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>RAC</b>
	Working in areas where noise levels exceed 85 dBA without hearing protection properly worn.	<ul style="list-style-type: none"> <li>Personnel exposed to loud working environments must wear hearing protection.</li> <li>The minimum NRR for hearing protection used on this project is 32. Hearing protection with an NRR of 32 should be adequate for noise levels up to 105 dBA using a buffer factor of 5 dBA. If noise levels consistently exceed 105 dBA, double hearing protection is required. <b>Guideline:</b> Individuals who realize that it is difficult to hear conversation-level voices at 3 feet or less don hearing protection with a minimum NRR of 32 immediately.</li> </ul>	RAC-L (see table at beginning)
	Working in temperature extremes – high temperatures	<ul style="list-style-type: none"> <li>Provide fluids to prevent worker dehydration.</li> <li>Monitor for heat stress in accordance with APP (maintain use of buddy system).</li> <li>Institute a conservative work-break regimen that complies with OSHA and ACGIH to avoid heat stress symptoms and overexertion.</li> <li>Document physiological measurements (radial pulse rates, rest times, work times, and results) in SSHO daily log book.</li> <li>Workers must minimize or avoid alcohol intake the night before working in heat stress situations.</li> <li>Shift work to early hours or evenings/nights if possible to avoid peak outdoor temperature times.</li> </ul>	Standard Level D PPE (light-colored clothing) RAC - M
	Working in temperature extremes – low temperatures	<ul style="list-style-type: none"> <li>Workers are trained to recognize cold stress and appropriate actions to take.</li> <li>Workers must watch others for signs and symptoms of cold stress (shivering, numbness, sluggishness).</li> <li>Take breaks in heated shelters.</li> <li>Drink warm liquids to reduce the susceptibility to cold stress.</li> <li>Wear layered clothing.</li> <li>Cover extremities -- such as ears, fingers, nose -- during very low temperature situations.</li> <li>Remove outer layer of clothing and loosen other layers to promote evaporation of perspiration upon entering shelter.</li> </ul>	Standard Level D PPE – layered clothing with high thermal properties RAC - M
	Working in the vicinity of heavy equipment or vehicles	<ul style="list-style-type: none"> <li>Wear ANSI Type II reflective warning vests or high-visibility clothing.</li> <li>Isolate equipment swing areas from workers, fixed objects, or other equipment.</li> <li>Make/maintain eye contact with operators before approaching equipment. Do not approach equipment from rear or from blind spot of operator.</li> <li>Understand and review hand signals. Designate one person to provide hand signals to equipment operators.</li> </ul>	Standard Level D PPE RAC - L

**Site Investigation Small Arms Range Berm Area**  
**Fort Stewart, Georgia**  
**ACTIVITY HAZARD ANALYSIS – Mobilization/Site Preparation**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>RAC</b>
	Working near untrained operators Working while under a suspended load	<ul style="list-style-type: none"> <li>• Ensure equipment has operable back-up alarms.</li> <li>• Avoid standing or walking between fixed objects and operating equipment.</li> <li>• Do not walk under or in front of suspended loads. Only tagged, load rated, and inspected rigging shall be used to lift loads. Become familiar with vertical, basket, and choker load ratings of rigging.</li> </ul>	
	Walking or working near or in biological elements native to the work environment	<ul style="list-style-type: none"> <li>• Observe ground surfaces, especially in wet or grassy areas, tree trunks, and rock piles for evidence and presence of snakes (poisonous).</li> <li>• Observe ground surfaces or surrounding vegetation or structures for presence of fire ants, spiders, bee/wasp hives, etc.</li> <li>• Observe areas for presence of stinging insects. <b>Notify supervisors of known allergies to stinging insects and location of antidotes.</b></li> <li>• Use OFF! Family Care Insect Repellent (Does not contain DEET) on exposed skin. Tape pant legs to boots. Frequently check body and clothing for ticks, chiggers, spiders. Avoid using DEET where there is potential for sample contamination.</li> <li>• Use permythrin-containing insect repellents on exterior of clothing and PPE only. Do NOT use permythrin directly on skin.</li> <li>• Use a buddy system to check for ticks.</li> <li>• Avoid potential exposure to bloodborne pathogens. Have bloodborne pathogen kit available with first aid kit.</li> <li>• Watch for snakes in tall grass. If working in tall grass or other habitat where snakes are prone to be, wear snake chaps.</li> </ul>	Standard Level D PPE RAC - L
Electrical equipment and tools operation	Working with electrical equipment in outdoor or wet locations.	<ul style="list-style-type: none"> <li>• If/when electrical extension cords are required to complete work, extension cords must be <ul style="list-style-type: none"> <li>- Equipped with third-wire grounding;</li> <li>- Covered, elevated, or protected from damage when passing through work areas;</li> <li>- Protected from pinching if routed through doorways;</li> <li>- Not fastened with staples, hung from nails, or suspended with wire; and</li> <li>- Rated to handle the voltage/amperage of equipment.</li> </ul> </li> <li>• Extension cords and electrical power tools must have ground fault circuit interrupters.</li> </ul>	Standard Level D PPE RAC - M

**Site Investigation Small Arms Range Berm Area  
Fort Stewart, Georgia  
ACTIVITY HAZARD ANALYSIS – Mobilization/Site Preparation**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>RAC</b>
Refueling equipment and motors,	Improperly storing or handling flammable liquids. Use of smoking materials in no-designated areas.	<ul style="list-style-type: none"> <li>• Use only metal safety cans to store and transfer fuel.</li> <li>• Use funnels and nozzles during fueling operations.</li> <li>• Allow warm engine parts (generator motor) to cool before refueling.</li> <li>• Appropriately sized, easily accessible ABC fire extinguisher in work area.</li> <li>• Review and be cognizant of base fire prevention procedures and requirements.</li> <li>• Designated and safe smoking areas will be established. NO SMOKING while working in wooded or brushy areas.</li> </ul>	Standard Level D PPE RAC - L
Driving vehicles	<p>Operation of vehicles too fast for conditions, disobeying traffic control devices.</p> <p>Operating during extreme weather or hazardous road conditions.</p> <p>Operating under the influence of alcohol or drugs.</p>	<ul style="list-style-type: none"> <li>• Always use a seat belt while driving. Always observe posted speed limits, traffic signs, and signals. Never use a cell phone or two-way radio while driving. No text messaging while driving. Violating these rules may result in loss of military/government facility driving privileges.</li> <li>• Operate vehicles cautiously and with regard to wet, icy, or snowy conditions.</li> <li>• Inspect vehicles before use. Perform 360 degree walk around. Adjust and check mirrors to ensure maximum visibility. Perform visual shoulder check as well as using mirror for lane changes.</li> <li>• Ensure that vehicle maintenance schedule is followed.</li> <li>• First aid kit and fire extinguisher in vehicle</li> <li>• Drive with caution where there is limited visibility because of weather, such as rain, fog, darkness, snow, or sleet. Stop vehicle at rest area if conditions are too extreme to safely continue. Consider potential weather conditions for each long-distance trip.</li> <li>• Enforce alcohol and drug testing protocol.</li> </ul>	RAC - L
• Site preparations	<p>Failure to identify underground utilities prior to the start of soil intrusive operations</p> <p>Working during extreme weather phenomenon,</p>	<ul style="list-style-type: none"> <li>• Verify underground utilities locations and ensure utilities are not in areas impacted by mobilization activities.</li> <li>• Shut down operations in heavy rain and/or lightning.</li> <li>• Buddy system maintained for all phases of work.</li> <li>• Base Emergency Dispatch numbers programmed into SES personnel cellular phones. Have hospital route maps readily available.</li> <li>• Report all unsafe conditions and acts, injury/illness, or property damage to supervisors immediately.</li> </ul>	RAC - L

Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Mobilization/Site Preparation			
Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
	Driving during Emergency situations on base		

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> <li>• Fire extinguisher (with fuel and electrical sources)</li> <li>• Eye wash (small portable type)</li> <li>• Miscellaneous power and manual hand tools.</li> <li>• Miscellaneous rigging.</li> <li>• Direct push drill rig</li> </ul>	<ul style="list-style-type: none"> <li>• Inspection of all emergency equipment (such as first aid kits, fire extinguishers)</li> <li>• Daily equipment inspections and maintenance.</li> <li>• Inspections of hand tools (power) and extension cords if used.</li> <li>• Inspect work area daily for changes in work conditions that may pose new physical hazards.</li> </ul>	<ul style="list-style-type: none"> <li>• Review AHA with all task personnel.</li> <li>• Review accident prevention plan for new site personnel.</li> <li>• Review operations/safety manuals for all equipment used.</li> <li>• CPR/first aid training for supervisors.</li> <li>• HAZWOPER supervisor training for SSHO.</li> </ul>

Task Name: Mobilization and Site Preparation

Project Name and Location: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia

PRINT

SIGNATURE

Supervisor's Name: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Safety Officer Name: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Site Personnel: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Revision Date: February 10, 2014
Project: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia
Task: Direct Push Geoprobe Drilling Activities
Prepared By: Doug Hawn
Construction Safety Competent Person: LeAnn McNeal
SSHO: LeAnn McNeal
Reviewed By: Rich Rathnow, CIH, CSP

Overall Risk Assessment Code (RAC): L

E = Extremely High Risk H = High Risk M = Moderate Risk L = Low Risk		P r o b a b i l i t y				
		Frequent	Likely	Occasional	Seldom	Unlikely
S e v e r i t y	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L

Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Direct Push Geoprobe Drilling Activities			
Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
Direct Push Geoprobe drilling activities	Traversing uneven, wet, or rough terrain. Use of worn or unrated safety footwear.	<ul style="list-style-type: none"> <li>Be aware of poor footing, potential slipping/tripping hazards in the work, such as wet/steep slopes, stumps/roots, exposed holes, ditches, riprap, utilities, and ground protrusions. Observe and avoid areas of unprotected holes, ramps, and ground penetrations or protrusions (stumps, roots, holes, curbs, utility structures, etc.). Use sturdy safety-toe work boots with sufficient ankle support.</li> <li>Institute and maintain good housekeeping practices.</li> <li>Wear sturdy leather safety-toe boots with slip-resistant soles.</li> <li>Avoid areas with extreme slope and loose soil. Emphasize personal awareness of uneven walking and working surfaces.</li> </ul>	Modified Level D *Work clothes, ANSI Type II reflective vests/ high-visibility clothing, hard hat, safety glasses and sturdy safety toed work boots, hand protection (inner and outer chemical resistant gloves), chemical resistant suit, boot covers RAC – L

Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia			
ACTIVITY HAZARD ANALYSIS – Direct Push Geoprobe Drilling Activities			
Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
	Failure to identify underground utilities prior to the start of soil intrusive operations	<ul style="list-style-type: none"> <li>• Locate underground utilities before excavating and coordinate with Installation utility locating service.</li> <li>• Where a second party or private utility locating service is used to locate Installation utilities, an SES representative shall be on site to verify locations where the accuracy of a utility mark-out is in doubt.</li> <li>• Utility mark-out locations should be photo documented in relation to the location of where penetrations to the ground surface will be made.</li> <li>• Determine if an installation excavation permit is required before performing excavation operations. Secure excavation permit if required.</li> <li>• Review available installation records, plans, or drawings for presence of underground utilities in the designated work area.</li> </ul>	Modified Level D RAC - L
Direct Push Geoprobe drilling activities refueling equipment	Drilling Rig Operation: <ul style="list-style-type: none"> <li>• Positioning and operating drill rig</li> <li>• Operating drill rig in an unauthorized manner (no training, PPE missing, ignoring established protocol)</li> <li>• Operating rig with poor communication and coordination of activities</li> <li>• Improper refueling of drill rig</li> </ul>	<ul style="list-style-type: none"> <li>• Hard hats worn at all times.</li> <li>• Protective eyewear with side shields that meet the ANSI Z-87.1 standards worn at all times.</li> <li>• Hearing protection worn when noise levels exceed 85dBA.</li> <li>• Sturdy, leather safety-toe footwear required.</li> <li>• Leather gloves worn when handling sharp, rough, or slippery materials.</li> <li>• Basic housekeeping requirements must apply to all construction sites. Cords covered or elevated when crossing pathways.</li> <li>• Only trained and authorized personnel operate and/or assist in drilling operations.</li> <li>• Drill rigs have protective guarding on all rotating shafts, belts, and pulleys.</li> <li>• No loose-fitting clothing or jewelry worn that can become entangled in machinery.</li> <li>• Long hair secured to prevent entanglement in machinery.</li> <li>• Drill rods and drill bit stabilizer transported properly either by a rack, the rig, or a utility trailer.</li> <li>• If transported on a trailer, the rods or stabilizers held securely in place.</li> <li>• Rig and wheeled equipment have chocks placed under the wheels to prevent rolling.</li> <li>• Rigs inspected daily and documented by the equipment operator.</li> <li>• Wire inspected daily, and cables with broken strands, weak spots, kinks, or mashed areas replaced prior to use.</li> <li>• Driller inspects thread connections prior to start of fieldwork and weekly thereafter.</li> <li>• The mast and cables capable of supporting all equipment and drill rods.</li> </ul>	Level D Modified RAC L

<b>Site Investigation Small Arms Range Berm Area</b> <b>Fort Stewart, Georgia</b> <b>ACTIVITY HAZARD ANALYSIS – Direct Push Geoprobe Drilling Activities</b>			
<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>RAC</b>
		<ul style="list-style-type: none"> <li>• Rigs must be maintained in good working order.</li> <li>• All rotating shafts, pulleys, or chains covered with protective guards.</li> <li>• All drill rigs equipped with an emergency kill switch, which is readily accessible to personnel at the rear of the rig. All personnel know the kill switch locations and how to use them.</li> <li>• Rig shut down during refueling operations.</li> <li>• Rig refueled using an OSHA-compliant portable fuel container.</li> <li>• Personnel performing refueling operations exercise caution to avoid spillage.</li> <li>• Fire extinguishers fully charged and inspected monthly and recorded on inspection tag.</li> <li>• Fuels stored in appropriate containers.</li> <li>• Sampling stops when rain or other weather factors interfere with the safety of the operators.</li> <li>• Activities stop during lightning, and personnel will take shelter in vehicles.</li> <li>• For work near an overhead line, caution taken to ensure when raising the mast.</li> <li>• While working near power lines, drill rods not be leaned against the mast.</li> </ul>	
	Working in areas where noise levels exceed 85 dBA without hearing protection properly worn.	<ul style="list-style-type: none"> <li>• Wear hearing protection when noise levels exceed 85 decibels.</li> <li>• The minimum NRR for hearing protection used on this project is 32. Hearing protection with an NRR of 32 should be adequate for noise levels up to 105 dBA using a buffer factor of 5 dBA. If noise levels consistently exceed 105 dBA, double hearing protection will be required.</li> </ul>	Modified Level D RAC - L
	Using utility knives or razor knives to cut materials	<ul style="list-style-type: none"> <li>• Wear cut-resistant work gloves when the sharp/cut edges or the use of hand tools could cause lacerations or other injury (for example, when splitting the sleeve).</li> <li>• Avoid use of razor knives. When cutting with knives, cut away from the body and never towards another worker.</li> </ul>	Modified Level D RAC - L
	Working with electrical equipment in outdoor or wet locations.	<ul style="list-style-type: none"> <li>• Do not set tools on/in mud, water, soil, or other surfaces that could damage tools.</li> <li>• Tools are inspected before use. Maintain all tools in a safe condition.</li> <li>• Electric cords are free from defects.</li> <li>• All required guards are in place and functional.</li> <li>• Hand-held powered tools equipped with constant pressure switch.</li> <li>• Electric power-actuated tools are double-insulated and properly grounded.</li> <li>• Hoses or cords are not used to lower or hoist tools.</li> </ul>	Modified Level D RAC - L

Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Direct Push Geoprobe Drilling Activities			
Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
		<ul style="list-style-type: none"> <li>• Disconnect tools from energy source when not in use.</li> <li>• Only personnel qualified by training or experience should use power tools.</li> </ul>	
	<p>Handling cores, drill rods or IDW during monitor well installation and abandonment</p> <p>Handling IDW using inadequate procedures</p> <p>Handling IDW without proper training</p>	<ul style="list-style-type: none"> <li>• All personnel performing this task shall be trained in accordance with 29 CFR 1910.120 and be deemed “fit for duty” by a licensed occupational physician.</li> <li>• All personnel working with potential exposure to the COCs shall have been trained on chemical properties, exposure symptoms, and hazard control measures.</li> <li>• Follow PPE task hazard analysis and air monitoring action level requirements identified in the APP and SSHP.</li> <li>• Do not allow dermal contact or incidental ingestion of impacted soil or groundwater. Skin contact with contaminated water, soils, debris, or equipment shall be avoided at all times. Do not kneel or step in potentially contaminated media (soil or groundwater). Wear uncoated Tyvek, gloves and rubber boots to avoid gross dermal contact with potentially contaminated soils.</li> <li>• Exercise good hygiene practices. Always wash hands before eating, drinking, smoking, and leaving site. Only eat, drink, smoke, or chew tobacco in designated areas.</li> <li>• After sample collection, sample container lids should be tightened securely to prevent any leaks, and the containers should be rinsed with clean water to ensure they are free of chemical constituents.</li> <li>• ANSI-approved eyewash station will be provided on site and maintained in the event there is an accidental splash of materials to the eyes</li> <li>• Use dust control methods during excavation and other soil-intrusive activities where there will be dust generation.</li> </ul>	Modified Level D RAC - L
	<p>Working in a hot environment without preparation – High temperatures</p> <p>-</p>	<ul style="list-style-type: none"> <li>• Provide adequate water with clean disposable cups and collection means to prevent worker dehydration.</li> <li>• Monitor for heat stress in accordance with APP and SSHP (maintain use of buddy system).</li> <li>• Institute a conservative work-break regimen that complies with OSHA and ACGIH to avoid heat stress symptoms and overexertion.</li> <li>• Document all physiological measurements (pulse rates, break times, work times, results of program) on Heat Stress Monitoring data sheet.</li> </ul>	Modified Level D RAC - H
	<p>Working in a cold environment</p>	<ul style="list-style-type: none"> <li>• Workers will be trained to recognize cold stress and appropriate actions to take.</li> </ul>	Standard Level D PPE – layered

Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Direct Push Geoprobe Drilling Activities			
Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
	- low temperatures without preparation	<ul style="list-style-type: none"> <li>Workers will watch others for signs and symptoms of cold stress (shivering, numbness, sluggishness).</li> <li>Take breaks in heated shelters.</li> <li>Drink warm liquids to reduce the susceptibility to cold stress.</li> <li>Wear layered clothing.</li> <li>Be certain to cover extremities -- such as ears, fingers, nose -- during very low temperature situations.</li> <li>Remove outer layer of clothing and loosen other layers to promote evaporation of perspiration upon entering shelter.</li> </ul>	clothing with high thermal properties RAC - H
	Carrying loads or objects that are heavy, bulky, hard to carry Using improper lifting technique Lifting objects >50 lbs. alone	<ul style="list-style-type: none"> <li>SES or subcontract personnel must notify supervisors or safety representatives of pre-existing medical conditions that may be aggravated or re-injured by lifting activities.</li> <li>Lift objects using knees, not back. For repetitive lifting tasks, consider using lifting braces/supports. If heavy equipment isn't available, get help to lift heavy (&gt; 50 lbs.) or awkward loads. Use heavy equipment to transfer heavy or awkward loads when possible.</li> <li>Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear before lifting.</li> <li>Avoid carrying heavy objects above shoulder level.</li> </ul>	Modified Level D RAC - L
	Improperly storing or handling flammable liquids. Use of smoking materials in no-designated areas.	<ul style="list-style-type: none"> <li>Use only metal safety cans to store and transfer of fuel.</li> <li>Use funnels and nozzles during fueling operations.</li> <li>Allow warm engine parts (generator motor) to cool 15 minutes before refueling.</li> <li>10 lb ABC fire extinguisher in work area.</li> <li>Review and be cognizant of base fire prevention procedures and requirements.</li> <li>Designated and safe smoking areas will be established. There will be NO SMOKING while working in wooded or brushy areas.</li> </ul>	Standard Level D RAC - L
	Walking or working near or in biological elements native to the work environment	<ul style="list-style-type: none"> <li>Observe ground surfaces, especially in wet or grassy areas, tree trunks, and rock piles for evidence and presence of snakes (poisonous).</li> <li>Observe ground surfaces or surrounding vegetation or structures for presence of fire ants, spiders, bee/wasp hives, etc.</li> <li>Observe areas for presence of stinging insects. <b>Notify supervisors of known allergies to stinging insects and location of antidotes.</b></li> </ul>	Modified Level D RAC - L

<b>Site Investigation Small Arms Range Berm Area</b> <b>Fort Stewart, Georgia</b> <b>ACTIVITY HAZARD ANALYSIS – Direct Push Geoprobe Drilling Activities</b>			
<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>RAC</b>
		<ul style="list-style-type: none"> <li>• Use insect repellent. Tape pant legs to boots. Frequently check body and clothing for ticks, chiggers, spiders.</li> <li>• Avoid possible exposure to bloodborne pathogens. Have a bloodborne pathogens kit available with first aid kit.</li> </ul>	
	Working with electrical equipment in outdoor or wet locations.	<ul style="list-style-type: none"> <li>• If/when electrical extension cords are required to complete work, extension cords must be               <ul style="list-style-type: none"> <li>- Equipped with third-wire grounding;</li> <li>- Covered, elevated, or protected from damage when passing through work areas;</li> <li>- Protected from pinching if routed through doorways;</li> <li>- Not fastened with staples, hung from nails, or suspended with wire; and</li> <li>- Rated to handle the voltage/amperage of equipment.</li> </ul> </li> <li>• Extension cords and electrical power tools must have ground fault circuit interrupters (GFCIs).</li> </ul>	Modified Level D RAC - M
	Generating dust while performing site operations.	<ul style="list-style-type: none"> <li>• In dust-generating activities, suppression methods will be used to avoid causing visible dust.</li> </ul>	Standard Level D RAC - L
	<p>Operation of vehicles too fast for conditions, disobeying traffic control devices</p> <p>Operating during extreme weather or hazardous road conditions</p> <p>Operating under the influence of alcohol or drugs</p>	<ul style="list-style-type: none"> <li>• Always use a seat belt while driving on military/government facilities. Always observe posted speed limits, traffic signs, and signals. Never use a cell phone or two-way radio while driving on military/government facilities. Violating these rules may result in loss of military/ government facility driving privileges.</li> <li>• Operate vehicles cautiously and with regard to wet, icy, or snowy conditions.</li> <li>• Inspect vehicles before use. Perform 360 degree walk around observation. Adjust and check mirrors to ensure maximum visibility. Perform visual shoulder check as well as using mirror for lane changes.</li> <li>• First aid kits and fire extinguishers in all vehicles.</li> <li>• Ensure that vehicle maintenance schedule is followed.</li> <li>• Drive with caution when visibility is limited because of weather, such as rain, fog, darkness, snow, or sleet. Stop vehicle at rest area if conditions are too extreme to safely continue. Plan each long-distance trip with regard for potential weather conditions.</li> </ul>	RAC - M
	Working during extreme weather phenomenon	<ul style="list-style-type: none"> <li>• Shut down operations in heavy rain and lightning.</li> <li>• Maintain buddy system for all phases of work.</li> </ul>	NA RAC - L

Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Direct Push Geoprobe Drilling Activities			
Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
	Driving during Emergency situations on base	<ul style="list-style-type: none"> <li>• Base Emergency dispatch numbers programmed into SES personnel cellular phones. Have hospital route maps readily available.</li> <li>• Report all unsafe conditions and acts, injury/illness, or property damage to supervisors immediately.</li> </ul>	
Equipment decon	Pressure washing and wiping down equipment to remove potentially contaminated material.	<ul style="list-style-type: none"> <li>• Wear chemical protective Tyvek boots, gloves, and face shield for splashes.</li> <li>• Only direct spray at object to be cleaned.</li> <li>• Collect decon water and store for disposal or collect in designated area for future remediation and transport.</li> <li>• Decon areas are part of contamination reduction zone with access to boot wash and PPE disposal containers.</li> <li>• Allow engine to cool 15 minutes before refueling.</li> <li>• Have metal gas cans with spring closing cap and flash arrestor.</li> </ul>	Modified Level D RAC - L

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> <li>• Fire extinguisher (with fuel and electrical sources)</li> <li>• Eye wash (small portable type)</li> <li>• Miscellaneous power and manual hand tools.</li> <li>• Miscellaneous rigging.</li> <li>• Direct push drill rig</li> </ul>	<ul style="list-style-type: none"> <li>• Inspection of all emergency equipment (i.e.: first aid kits, fire extinguishers)</li> <li>• Daily Equipment inspections and maintenance.</li> <li>• Inspections of hand tools (power) and extension cords if used.</li> <li>• Inspection of work area daily for changes in work conditions that may pose new physical hazards.</li> </ul>	<ul style="list-style-type: none"> <li>• Review AHA with all task personnel.</li> <li>• Review accident prevention plan for new site personnel.</li> <li>• Review operations/safety manuals for all equipment used.</li> <li>• CPR/first aid training for supervisors.</li> <li>• HAZWOPER supervisor training for SSHO.</li> </ul>

Task Name: Direct Push Geoprobe Drilling

Project Name and Location: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia

PRINT

SIGNATURE

Supervisor's Name: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Safety Officer Name: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Site Personnel: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Revision Date: February 10, 2014
Project: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia
Task: Soil and Groundwater Sampling and IDW Management
Prepared By: Doug Hawn
Construction Safety Competent Person: LeAnn McNeal
SSHO: LeAnn McNeal
Reviewed By: Rich Rathnow CIH CSP

Overall Risk Assessment Code (RAC):

L

E = Extremely High Risk H = High Risk M = Moderate Risk L = Low Risk		P r o b a b i l i t y				
		Frequent	Likely	Occasional	Seldom	Unlikely
S e v e r i t y	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L

Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia <b>ACTIVITY HAZARD ANALYSIS – Soil and Groundwater Sampling and IDW Management</b>			
Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
Soil and groundwater Sampling and IDW management	Traversing uneven, wet or rough terrain. Use of worn or unrated safety footwear.	<ul style="list-style-type: none"> <li>Be aware of poor footing, potential slipping/tripping hazards in the work, such as wet/steep slopes, stumps/roots, exposed holes, ditches, riprap, utilities, and ground protrusions. Observe and avoid areas of unprotected holes, ramps and ground penetrations or protrusions (stumps, roots, holes, curbs, utility structures, etc.). Use sturdy safety-toe work boots with sufficient ankle support.</li> <li>Institute and maintain good housekeeping practices.</li> </ul>	Modified Level D * *Work clothes, reflective vests/ high visibility clothing, hard hat, safety glasses and sturdy hard toed work boots, hand protection (inner and outer chemical resistant gloves), chemical resistant suits and boot covers RAC – L (see table at beginning)

<b>Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia</b>			
<b>ACTIVITY HAZARD ANALYSIS – Soil and Groundwater Sampling and IDW Management</b>			
<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>RAC</b>
	Performing soil and groundwater monitoring and IDW management	<ul style="list-style-type: none"> <li>• All personnel performing this task trained in accordance with 29 CFR 1910.120 and deemed “fit for duty” by a licensed occupation physician.</li> <li>• All personnel working with potential exposure to the COCs shall have been trained on chemical properties, exposure symptoms, and hazard control measures.</li> <li>• Follow PPE task hazard analysis and air monitoring action level requirements identified in the SSHP.</li> <li>• Follow PPE and action level requirements identified in the SSHP.</li> <li>• Do not allow dermal contact or incidental ingestion of impacted soil or groundwater. Skin contact with contaminated water, soils, debris, or equipment shall be avoided at all times. Do not kneel or step in potentially contaminated media (soil or groundwater).</li> <li>• Use good hygiene. Always wash hands before eating, drinking, smoking, leaving site. Only eat, drink, smoke, or chew tobacco in designated areas.</li> </ul>	Modified Level D RAC - L
	Working in a hot environment without preparation – high temperatures	<ul style="list-style-type: none"> <li>• Provide fluids to prevent worker dehydration.</li> <li>• Monitor for heat stress in accordance with APP and SSHP (maintain use of buddy system).</li> <li>• Institute a conservative work-break regimen that complies with OSHA and ACGIH to avoid heat stress symptoms and overexertion.</li> <li>• Document all physiological measurements (pulse rates, break times, work times, results of program) in SSHA daily logbook.</li> </ul>	Modified Level D Light-colored cotton clothing RAC - L
	Working in a cold environment - low temperatures without preparation	<ul style="list-style-type: none"> <li>• Workers are trained to recognize cold stress and appropriate actions to take.</li> <li>• Workers trained to watch others for signs and symptoms of cold stress (shivering, numbness, sluggishness).</li> <li>• Take breaks in heated shelters.</li> <li>• Drink warm liquids to reduce the susceptibility to cold stress.</li> <li>• Wear layered clothing.</li> <li>• Be certain to cover extremities -- such as ears, fingers, nose -- during very low temperature situations.</li> <li>• Remove outer layer of clothing and loosen other layers to promote evaporation of perspiration upon entering shelter.</li> </ul>	Standard Level D PPE – layered clothing with high thermal properties RAC - L

Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia			
ACTIVITY HAZARD ANALYSIS – Soil and Groundwater Sampling and IDW Management			
Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
	Carrying loads or objects that are heavy, bulky, hard to carry Using improper lifting technique Lifting objects >50 lbs. alone	<ul style="list-style-type: none"> <li>• SES or subcontract personnel must notify supervisors or safety representatives of pre-existing medical conditions that may be aggravated or re-injured by lifting activities.</li> <li>• Lift objects using knees, not back. For repetitive lifting tasks, consider using lifting braces/supports. If heavy equipment isn't available, get help to lift heavy (&gt; 50 lbs.) or awkward loads. Use heavy equipment to transfer heavy or awkward loads when possible.</li> <li>• Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear before lifting.</li> <li>• Avoid carrying heavy objects above shoulder level.</li> </ul>	Modified Level D RAC - L
	Walking or working near or in biological elements native to the work environment	<ul style="list-style-type: none"> <li>• Observe ground surfaces, especially in wet or grassy areas, tree trunks, and rock piles for evidence and presence of snakes (poisonous).</li> <li>• Observe ground surfaces or surrounding vegetation or structures for presence of fire ants, spiders, bee/wasp hives, etc.</li> <li>• Observe areas for presence of stinging insects. <b>Notify supervisors of known allergies to stinging insects and location of antidotes.</b></li> <li>• Use insect repellent. Tape pant legs to boots. Frequently check body and clothing for ticks, chiggers, spiders. DEET should be worn by personnel where it cannot potentially impact analytical results. Permethrin should be worn on external clothing; however, do NOT use permethrin directly on skin.</li> <li>• Avoid potential exposure to bloodborne pathogens. Have bloodborne pathogen kit available with first aid kit.</li> <li>• Avoid possible exposure to bloodborne pathogens. Have a bloodborne pathogens kit with the first aid kit.</li> </ul>	Modified Level D RAC - L
	Operation of vehicles too fast for conditions, disobeying traffic control devices.  Operating during extreme weather or hazardous road conditions.	<ul style="list-style-type: none"> <li>• Always use a seat belt while driving on military/government facilities. Always observe posted speed limits, traffic signs, and signals. Never use a cell phone or two-way radio while driving on military/government facilities. Violating these rules may result in loss of military/ government facility driving privileges.</li> <li>• Operate vehicles cautiously and with regard to wet, icy, or snowy conditions.</li> <li>• Inspect vehicles before use. Adjust and check mirrors to ensure maximum visibility. Perform visual shoulder check as well as use mirror for lane changes.</li> <li>• Ensure that vehicle maintenance schedule is followed.</li> <li>• Drive with caution when visibility is limited because of weather, such as rain, fog, darkness, snow or sleet. Stop vehicle at rest area if conditions are too</li> </ul>	RAC - M

Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Soil and Groundwater Sampling and IDW Management			
Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
		extreme to safely continue. Plan each long-distance trip with regard for potential weather conditions.	
	Working during extreme weather phenomenon  Driving during Emergency situations on base	<ul style="list-style-type: none"> <li>• Shut down operations in heavy rain and lightning.</li> <li>• Maintain buddy system for all phases of work.</li> <li>• Base Emergency Dispatch numbers programmed into SES personnel cellular phones. Have hospital route maps readily available.</li> <li>• Report all unsafe conditions and acts, injury/illness, or property damage to supervisors immediately.</li> </ul>	RAC - L

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> <li>• Fire extinguisher (with fuel and electrical sources)</li> <li>• Eye wash (small portable type)</li> <li>• Miscellaneous power and manual hand tools.</li> <li>• Miscellaneous rigging.</li> <li>• Direct push drill rig</li> </ul>	<ul style="list-style-type: none"> <li>• Inspection of all emergency equipment (such as first aid kits, fire extinguishers).</li> <li>• Daily equipment inspections and maintenance.</li> <li>• Inspections of hand tools (power) and extension cords if used.</li> <li>• Inspection of work area daily for changes in work conditions which may pose new physical hazards.</li> </ul>	<ul style="list-style-type: none"> <li>• Review AHA with all task personnel.</li> <li>• Review accident prevention plan for new site personnel.</li> <li>• Review operations/safety manuals for all equipment used.</li> <li>• CPR/first aid training for supervisors.</li> <li>• HAZWOPER supervisor training for SSHO.</li> </ul>

Task Name: Soil and Groundwater Sampling and IDW Management

Project Name and Location: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia

PRINT

SIGNATURE

Supervisor's Name: \_\_\_\_\_

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Date/Time: \_\_\_\_\_

Safety Officer Name: \_\_\_\_\_

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Date/Time: \_\_\_\_\_

Site Personnel: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Revision Date: February 10, 2014
Project: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia
Task: Well Abandonment
Prepared By: Doug Hawn
Construction Safety Competent Person: LeAnn McNeal
SSHO: LeAnn McNeal
Reviewed By: Rich Rathnow CIH CSP

Overall Risk Assessment Code (RAC):

L

E = Extremely High Risk H = High Risk M = Moderate Risk L = Low Risk		P r o b a b i l i t y				
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S e v e r i t y	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L

**Site Investigation Small Arms Range Berm Area  
Fort Stewart, Georgia**

**ACTIVITY HAZARD ANALYSIS –Well Abandonment**

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
Well Abandonment  • Mixing bentonite and grout with water to backfill well.	<ul style="list-style-type: none"> <li>• Dropping bag of bentonite or grout/cement with silica content.</li> <li>• Tearing bag of bentonite or grout/cement with silica content</li> <li>• Failure to wear or properly wear required PPE while handling materials with silica content.</li> <li>• Lifting or twisting while handling material bags</li> </ul>	<ul style="list-style-type: none"> <li>• Administrative and engineering controls are to be used as priority control measures.</li> <li>• Avoid generation of any airborne dust from bags of bentonite or grout/cement</li> <li>• Water and water spray used in mixing process for airborne dust suppression</li> <li>• Have portable eye wash station and washing facility in the direct vicinity.</li> <li>• All non-essential personnel for the mixing process will remain upwind of mixing operations and at least 20 feet away.</li> <li>• Keep all mixing operations a minimum of 50 ft. from pedestrian traffic areas.</li> <li>• Avoid bending or twisting while handling heavy bags of materials. Get assistance for material or objects weighing more than 50 lbs.</li> <li>• Stage material bags so that transporting them manually is minimized and that lifting is avoided by placing materials close to waist height.</li> </ul>	NIOSH-Approved P100 Rated Particulate Filtering Face piece Respirator, ANSI approved safety-toe boots, ANSI-approved safety glasses with side shields with face shield, safety goggles, hearing protection, chemical protective gloves (Neoprene, Nitrile), long sleeves, and hard hat  RAC - L

<b>Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS –Well Abandonment</b>			
<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>RAC</b>
<ul style="list-style-type: none"> <li>• Over-drill top 5 feet of well</li> </ul>	<p>Drilling Rig Operation:</p> <ul style="list-style-type: none"> <li>• Positioning and operating drill rig</li> <li>• Operation of drill rig in an unauthorized manner (no training, PPE missing, ignoring established protocol)</li> <li>• Operating rig with poor communication and coordination of activities</li> <li>• Improper refueling of drill rig</li> </ul>	<ul style="list-style-type: none"> <li>• Equipment shall only be operated by personnel qualified by prior training or experience.</li> <li>• Inspect equipment daily.</li> <li>• Maintain eye contact with operator.</li> <li>• Use water spray for over drilling to suppress dust.</li> <li>• Do not wear loose fitting clothing or jewelry near drill operations.</li> <li>• Wear ANSI Type II safety vest when working in vicinity of heavy equipment.</li> <li>• Avoid operator blind spots.</li> <li>• Wear hearing protection when noise levels exceed 85 decibels and in identified noise exclusion area.</li> <li>• The minimum NRR for hearing protection used on this project will be 32. Hearing protection with an NRR of 32 should be adequate for noise levels up to 105 dBA using a buffer factor of 5 dBA. If noise levels consistently exceed 105 dBA, double hearing protection will be required.</li> <li>• Discuss details of operation and worker roles in the daily Pre-Task Safety Plan.</li> <li>• Allow equipment to cool for 15 minutes prior to refueling.</li> <li>• Bond all containers of flammable liquids to the grounded tank system prior to transfer of liquids.</li> <li>• No smoking in any work areas. No spark producing equipment or other potential ignition sources in immediate vicinity of flammable liquid transfer.</li> </ul>	<p>NIOSH Approved P100 Rated Particulate Filtering Face piece Respirator, impact resistant goggles, hearing protection, hard hat, and safety toed boots.</p> <p>RAC – L</p>
<ul style="list-style-type: none"> <li>• Pour concrete into top of well.</li> </ul>	<ul style="list-style-type: none"> <li>• Dropping bag of bentonite or grout/cement with silica content.</li> <li>• Tearing bag of bentonite or grout/cement with silica content</li> <li>• Failure to wear or properly wear required PPE while</li> </ul>	<ul style="list-style-type: none"> <li>• Administrative and engineering controls are to be used as priority control measures.</li> <li>• Avoid generation of any airborne dust from bags of bentonite or grout/ cement.</li> <li>• Water and water spray used in mixing process should be used for airborne dust suppression.</li> <li>• Have portable eye wash station and washing facility in the direct vicinity</li> <li>• All nonessential personnel for the mixing process will remain upwind of mixing operations and at least 20 feet away.</li> <li>• Keep all mixing operations a minimum of 50 ft. from pedestrian traffic areas.</li> </ul>	<p>NIOSH-Approved P100 Rated Particulate Filtering Face piece Respirator, ANSI approved safety toed boots, ANSI approved safety glasses with side shields with face shield, safety goggles, hearing protection, chemical protective</p>

<b>Site Investigation Small Arms Range Berm Area                      Fort Stewart, Georgia                      ACTIVITY HAZARD ANALYSIS –Well Abandonment</b>			
<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>RAC</b>
	handling materials with silica content. • Lifting or twisting while handling material bags • Splashing concrete mix while preparing or pouring	• Avoid bending or twisting while handling heavy bags of materials. Get assistance for material or objects weighing more than 50 lbs. • Stage material bags so that transporting them manually is minimized and that lifting is avoided by placing materials close to waist height.	gloves (neoprene, nitrile), long sleeves, and hardhat  RAC - L

<b>EQUIPMENT REQUIRED</b>	<b>INSPECTION REQUIREMENTS</b>	<b>TRAINING REQUIREMENTS</b>
<ul style="list-style-type: none"> <li>• Fire extinguisher (with fuel and electrical sources)</li> <li>• Eye wash (small portable type)</li> <li>• Miscellaneous power and manual hand tools</li> <li>• Miscellaneous rigging</li> <li>• Direct push drill rig</li> </ul>	<ul style="list-style-type: none"> <li>• Inspection of all emergency equipment (such as first aid kits, fire extinguishers)</li> <li>• Daily equipment inspections and maintenance</li> <li>• Inspections of hand tools (power) and extension cords if used.</li> <li>• Inspection of work area daily for changes in work conditions that may pose new physical hazards.</li> </ul>	<ul style="list-style-type: none"> <li>• Review AHA with all task personnel.</li> <li>• Review accident prevention plan for new site personnel.</li> <li>• Review operations/safety manuals for all equipment used.</li> <li>• CPR/first aid training for supervisors.</li> <li>• Hazardous waste supervisor training for SSHO.</li> </ul>

Task Name: Well Abandonment

Project Name and Location: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia

PRINT

SIGNATURE

Supervisor's Name: \_\_\_\_\_

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Date/Time: \_\_\_\_\_

Safety Officer Name: \_\_\_\_\_

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Date/Time: \_\_\_\_\_

Site Personnel: \_\_\_\_\_

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Date/Time: \_\_\_\_\_

Revision Date: February 10, 2014
Project: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia
Task: Brush Clearing
Prepared By: Henry M. Kight
Construction Safety Competent Person: LeAnn McNeal
SSHO: LeAnn McNeal
Reviewed By: Rich Rathnow CIH CSP

Overall Risk Assessment Code (RAC):

H/L
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E = Extremely High Risk H = High Risk M = Moderate Risk L = Low Risk		P r o b a b i l i t y				
		Frequent	Likely	Occasional	Seldom	Unlikely
S e v e r i t y	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L

**Site Investigation Small Arms Range Berm Area  
Fort Stewart, Georgia  
ACTIVITY HAZARD ANALYSIS – Brush Clearing**

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
<ul style="list-style-type: none"> <li>Remove brush with hand tools</li> </ul>	<ul style="list-style-type: none"> <li>MEC</li> <li>Noise</li> <li>Ergonomic hazards</li> <li>Slips, trips, and falls</li> <li>Temperature extremes</li> <li>Explosions/ fires</li> <li>Biological hazards (insects, snakes, poison oak, or poison ivy)</li> <li>Inclement weather, including high winds and lightning strikes</li> </ul>	<ul style="list-style-type: none"> <li>Avoid unnecessary contact with MEC. Only authorized personnel allowed in controlled area.</li> <li>Level D PPE required, including the following:                             <ul style="list-style-type: none"> <li>Standard light-colored work clothes except during hunting season;</li> <li>Hearing protection (ear plugs) if &gt; 85 dBA and double protection (ear plugs and ear muffs) if &gt; 105 dBA;</li> <li>Hard hats and reflective vests will be worn around operating equipment and as required by SSHO;</li> <li>Leather gloves;</li> <li>Eye protective glasses with side shield or dust goggles;</li> <li>Leather boots, ANSI-approved safety boots when within 25 feet of earth moving machinery;</li> <li>Disposable dust respirators as employee option unless required by SSHO;</li> </ul> </li> </ul>	H/L
		<ul style="list-style-type: none"> <li>PPE as required by SSHO; and</li> </ul>	M/L

**Site Investigation Small Arms Range Berm Area  
Fort Stewart, Georgia  
ACTIVITY HAZARD ANALYSIS – Brush Clearing**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>RAC</b>
		<ul style="list-style-type: none"> <li>○ Snake leggings as needed or required by SSHO.</li> <li>● Inspect the area to detect and identify poisonous snakes or insects.</li> <li>● Periodically monitor heat/cold stress, ensure ample fluids are available, and observe coworkers for signs/symptoms of heat/cold stress.</li> <li>● Equipment operators shall follow manufacturer’s operating instructions, and carefully inspect equipment and tools prior to use.</li> <li>● Wash hands as soon as practical after stopping work.</li> <li>● Use lightning meter(s) in the area to predict potential for strikes; no operation with lightning within 10 miles and/or winds greater than 20 mph.</li> </ul>	
Operate weed eater Operate bush hog	<ul style="list-style-type: none"> <li>● Cuts, burns, equipment leaks, damaged parts, and equipment malfunction</li> <li>● Injury from flying debris</li> </ul>	<ul style="list-style-type: none"> <li>● Operators shall wear hard hats with mesh screen face shields (ANSI approved).</li> <li>● The SSHO will certify workers in use of weed eater and/ or bush hog in accordance with the manufacturer’s operator manual.</li> </ul>	M/L  M/L
Fuel weed eater or bush hog	<ul style="list-style-type: none"> <li>● Fire or burns</li> <li>● Spill of fuel</li> </ul>	<ul style="list-style-type: none"> <li>● No “hot” refuels. Wait 10 minutes after equipment shutoff before refueling. Fuel 50 feet away downwind from fires or lighted cigarettes; use proper funnels, barriers, and spouts to prevent spills. Use fuel-impermeable gloves as needed to prevent skin contact. Use flash-suppressant fuel cans.</li> <li>● Use spill pan to minimize spill while fueling hand held equipment. Spill kit should be on hand.</li> </ul>	H/L  M/L

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> <li>• Weed eater</li> <li>• Bush hog</li> <li>• Hand tools</li> <li>• Noise monitor if required</li> </ul>	<ul style="list-style-type: none"> <li>• Daily maintenance.</li> <li>• SSHO inspections.</li> </ul>	<ul style="list-style-type: none"> <li>• Certification according to operator's manual.</li> <li>• Hazard communications.</li> <li>• 40-hour HAZWOPER.</li> <li>• 8-hour HAZWOPER refresher as required.</li> <li>• Heat/cold stress awareness</li> <li>• OE safety.</li> <li>• Initial Site-specific training as required.</li> <li>• Personnel must attend daily safety briefings.</li> <li>• Hearing conservation training for personnel operating weed eater or bush hog and other personnel exposed to noise greater than 85 dBA for 8 hours or more per shift.</li> <li>• Additional site-specific training in accordance with SSHP and as required by SSHO.</li> </ul>

Task Name: Brush Clearing

Project Name and Location: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia

PRINT

SIGNATURE

Supervisor's Name: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Safety Officer Name: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Site Personnel: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Revision Date: February 10, 2014
Project: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia
Task: Location Surveying and Mapping
Prepared By: David Courtney
Construction Safety Competent Person: LeAnn McNeal
SSHO: LeAnn McNeal
Reviewed By: Rich Rathnow CIH CSP

Overall Risk Assessment Code (RAC): H/L

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		Frequent	Likely	Occasional	Seldom	Unlikely
Severity	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L

Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Location Surveying and Mapping			
Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
<ul style="list-style-type: none"> <li>• Use survey equipment to map area</li> </ul>	<ul style="list-style-type: none"> <li>• MEC</li> <li>• Noise</li> <li>• Ergonomic hazards</li> <li>• Slips, trips, and falls</li> <li>• Temperature extremes</li> <li>• Explosions/ fires</li> <li>• Biological hazards (insects, snakes, poison oak, or poison ivy)</li> <li>• Inclement weather, including high winds and lightning strikes</li> </ul>	<ul style="list-style-type: none"> <li>• Level D PPE required to include the following:                             <ul style="list-style-type: none"> <li>○ Standard light-colored work clothes except during hunting season;</li> <li>○ Hearing protection (ear plugs) if &gt; 85 dBA and double protection (ear plugs and ear muffs) if &gt; 105 dBA;</li> <li>○ Hard hats and reflective vests will be worn around operating equipment and as required by SSHO;</li> <li>○ Leather gloves;</li> <li>○ Eye protective glasses with side shield or dust goggles;</li> <li>○ Leather boots, ANSI-approved safety boots when within 25 feet of earth moving machinery;</li> <li>○ Disposable dust respirators as employee option unless required by SSHO;</li> <li>○ PPE as required by SSHO</li> </ul> </li> </ul>	H/L  M/L  M/L  M/L  H/L  M/L  H/L
		<ul style="list-style-type: none"> <li>○ Snake leggings as needed or required by SSHO.</li> </ul>	

**Site Investigation Small Arms Range Berm Area**

**Fort Stewart, Georgia**

**ACTIVITY HAZARD ANALYSIS – Location Surveying and Mapping**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>RAC</b>
		<ul style="list-style-type: none"> <li>• Inspect the area to detect and identify poisonous snakes or insects.</li> <li>• Periodically monitor heat/cold stress, ensure ample fluids are available, and observe coworkers for signs/symptoms of heat/cold stress. Camelbaks® may be required during hot weather.</li> <li>• Follow manufacturer’s operating instructions, and carefully inspect equipment and tools prior to use.</li> <li>• Wash hands as soon as practical after stopping work.</li> <li>• Use lightning meter(s) in the area to predict potential for strikes; no operation with lightning within 10 miles and/or winds greater than 20 mph.</li> <li>• Use anomaly avoidance techniques. See anomaly avoidance AHA. Use UXO technician to sweep surface and subsurface area for anomalies prior to placement.</li> <li>• Ensure physical fitness through regular exams, sufficient diet, and sleep. Pace yourself during work.</li> </ul>	

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<ul style="list-style-type: none"><li>Noise monitor if required</li></ul>	<ul style="list-style-type: none"><li>Inspect prior to use using operator's manual</li></ul>	<ul style="list-style-type: none"><li>Hazard communication training on MSDS.</li><li>40-hour HAZWOPER.</li><li>8-hour HAZWOPER refresher as required.</li><li>Heat/cold stress awareness.</li><li>MEC safety.</li><li>Initial site-specific training as required.</li><li>Personnel must attend daily safety briefings.</li><li>Hearing conservation training for personnel operating weed eater or bush hog and other personnel exposed to noise greater than 85 dBA for 8 hours or more per shift.</li><li>Additional site-specific training in accordance with SSHP and as required by SSHO.</li></ul>

Task Name: Location Surveying and Mapping

Project Name and Location: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia

PRINT

SIGNATURE

Supervisor's Name: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Safety Officer Name: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Site Personnel: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Revision Date: February 10, 2014
Project: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia
Task: MEC Location and Avoidance
Prepared By: Henry M. Kight
Construction Safety Competent Person: LeAnn McNeal
SSHO: LeAnn McNeal
Reviewed By: Rich Rathnow CIH CSP

Overall Risk Assessment Code (RAC): H/L

E = Extremely High Risk H = High Risk M = Moderate Risk L = Low Risk		P r o b a b i l i t y				
		Frequent	Likely	Occasional	Seldom	Unlikely
S e v e r i t y	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L

Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Location Surveying and Mapping			
Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
<ul style="list-style-type: none"> <li>• Locate MEC</li> </ul>	<ul style="list-style-type: none"> <li>• MEC</li> <li>• Ergonomic hazards</li> <li>• Slips, trips, and falls</li> <li>• Temperature extremes</li> <li>• Explosions/ fires</li> <li>• Biological hazards (insects, snakes, poison oak, or poison ivy)</li> <li>• Inclement weather, including high winds and lightning strikes</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid unnecessary contact with MEC. Only authorized personnel are allowed in controlled areas</li> </ul>	H/L
		<ul style="list-style-type: none"> <li>• Level D PPE required to include the following:                             <ul style="list-style-type: none"> <li>○ Standard light-colored work clothes except during hunting season;</li> <li>○ Hearing protection (ear plugs) if &gt; 85 dBA and double protection (ear plugs and ear muffs) if &gt; 105 dBA;</li> <li>○ Hard hats and reflective vests will be worn around operating equipment and as required by SSHO;</li> <li>○ Leather gloves;</li> <li>○ Eye protective glasses with side shield or dust goggles;</li> <li>○ Leather boots, ANSI-approved safety boots when within 25 feet of earth moving machinery;</li> <li>○ Disposable dust respirators as employee option unless required by SSHO;</li> </ul> </li> </ul>	H/L M/L M/L M/L H/L M/L
		<ul style="list-style-type: none"> <li>○ Other PPE as required by SSHO</li> </ul>	H/L

<b>Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Location Surveying and Mapping</b>			
<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>RAC</b>
		<ul style="list-style-type: none"> <li>○ Snake leggings as needed or required by SSHO.</li> <li>● Periodically monitor heat/cold stress, ensure ample fluids are available, and observe coworkers for signs/symptoms of heat/cold stress.</li> <li>● Use lightning meter(s) in the area to predict potential for strikes; no operation with lightning within 10 miles and/or winds greater than 20 mph.</li> <li>● Do not wear steel-toe boots when performing magnetometer surveys.</li> </ul>	
● Mark MEC location	<ul style="list-style-type: none"> <li>● MEC</li> <li>● Ergonomic hazards</li> <li>● Slips, trips, and falls</li> <li>● Temperature extremes</li> <li>● Explosions/ fires</li> <li>● Biological hazards (insects, snakes, poison oak, or poison ivy)</li> <li>● Inclement weather, including high winds and lightning strikes</li> </ul>	● Avoid unnecessary contact with MEC. Only authorized personnel are allowed in controlled areas	H/L
		● Level D PPE required to include the following: <ul style="list-style-type: none"> <li>○ Standard light-colored work clothes except during hunting season;</li> <li>○ Hearing protection (ear plugs) if &gt; 85 dBA and double protection (ear plugs and ear muffs) if &gt; 105 dBA;</li> <li>○ Hard hats and reflective vests will be worn around operating equipment and as required by SSHO;</li> <li>○ Leather gloves;</li> <li>○ Eye protective glasses with side shield or dust goggles;</li> <li>○ Leather boots, ANSI-approved safety boots when within 25 feet of earth moving machinery;</li> <li>○ Disposable dust respirators as employee option unless required by SSHO;</li> </ul>	H/L M/L M/L M/L H/L M/L
		○ Other PPE as required by SSHO	
		<ul style="list-style-type: none"> <li>○ Snake leggings as needed or required by SSHO.</li> <li>● Periodically monitor heat/cold stress, ensure ample fluids are available, and observe coworkers for signs/symptoms of heat/cold stress.</li> <li>● Use lightning meter(s) in the area to predict potential for strikes; no operation with lightning within 10 miles and/or winds greater than 20 mph.</li> </ul>	H/L
● Avoid MEC	● MEC	● Avoid unnecessary contact with MEC. Only authorized personnel are allowed in controlled areas	H/L

**Site Investigation Small Arms Range Berm Area  
Fort Stewart, Georgia  
ACTIVITY HAZARD ANALYSIS – Location Surveying and Mapping**

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
	<ul style="list-style-type: none"> <li>• Ergonomic hazards</li> <li>• Slips, trips, and falls</li> <li>• Temperature extremes</li> <li>• Explosions/ fires</li> <li>• Biological hazards (insects, snakes, poison oak, or poison ivy)</li> <li>• Inclement weather, including high winds and lightning strikes</li> </ul>	<ul style="list-style-type: none"> <li>• Level D PPE required to include the following:                             <ul style="list-style-type: none"> <li>○ Standard light-colored work clothes except during hunting season;</li> <li>○ Hearing protection (ear plugs) if &gt; 85 dBA and double protection (ear plugs and ear muffs) if &gt; 105 dBA;</li> <li>○ Hard hats and reflective vests will be worn around operating equipment and as required by SSHO;</li> <li>○ Leather gloves;</li> <li>○ Eye protective glasses with side shield or dust goggles;</li> <li>○ Leather boots, ANSI-approved safety boots when within 25 feet of earth moving machinery;</li> <li>○ Disposable dust respirators as employee option unless required by SSHO;</li> <li>○ Other PPE as required by SSHO</li> <li>○ Snake leggings as needed or required by SSHO.</li> </ul> </li> <li>• Periodically monitor heat/cold stress, ensure ample fluids are available, and observe coworkers for signs/symptoms of heat/cold stress.</li> <li>• Use lightning meter(s) in the area to predict potential for strikes; no operation with lightning within 10 miles and/or winds greater than 20 mph.</li> </ul>	<p>H/L</p> <p>M/L</p> <p>M/L</p> <p>M/L</p> <p>H/L</p> <p>M/L</p> <p>H/L</p>

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
<ul style="list-style-type: none"> <li>• Hand tools</li> <li>• Hand held magnetometers</li> <li>• Flagging pins</li> <li>• Noise monitor if required</li> </ul>	<ul style="list-style-type: none"> <li>• Geophysical test plot required.</li> <li>• A magnetometer response check must be performed and recorded at the start and finish of each workday.</li> <li>• Other inspections or tests based on site work plan and/ or as required by the SSHO.</li> <li>• SSHO daily inspections.</li> </ul>	<ul style="list-style-type: none"> <li>• Hazard communication.</li> <li>• 40-hour HAZWOPER.</li> <li>• 8-hour HAZWOPER refresher as required.</li> <li>• Heat/cold stress awareness.</li> <li>• MEC safety.</li> <li>• Initial site-specific training as required.</li> <li>• Additional site-specific training in accordance with SSHP and as required by the SSHO.</li> <li>• Personnel must attend daily safety briefings.</li> </ul>

Task Name: MEC Location and Avoidance

Project Name and Location: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia

PRINT

SIGNATURE

Supervisor's Name: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Safety Officer Name: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Site Personnel: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Revision Date: February 10, 2014
Project: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia
Task: MEC Location and Avoidance
Prepared By: David Courtney
Construction Safety Competent Person: LeAnn McNeal
SSHO: LeAnn McNeal
Reviewed By: Rich Rathnow CIH CSP

Overall Risk Assessment Code (RAC):

M

		P r o b a b i l i t y				
		Frequent	Likely	Occasional	Seldom	Unlikely
S e v e r i t y	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L

E = Extremely High Risk  
H = High Risk  
M = Moderate Risk  
L = Low Risk

Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Geophysical Survey			
Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
<ul style="list-style-type: none"> <li>Mobilization of equipment to survey area</li> </ul>	<ul style="list-style-type: none"> <li>Lifting hazards</li> <li>Awkward body positions and twisting</li> <li>Trip and fall hazards from uneven ground or restricted view when carrying equipment</li> </ul>	<ul style="list-style-type: none"> <li>Use proper lifting technique. Request assistance when lifting heavy equipment. Use dolly to transport equipment as necessary.</li> <li>Plan activity to avoid twisting of body or awkward body positions. Use buddy system or job rotation to reduce exposure to conditions that cannot be avoided</li> <li>Break loads down to a manageable size that does not obstruct view of the ground. Plan route. Wear footwear with good tread and ankle support. Use buddy system for large or bulky items when carrying them.</li> </ul>	<p>M</p> <p>L</p> <p>L</p>
<ul style="list-style-type: none"> <li>Set up survey grid and control</li> </ul>	<ul style="list-style-type: none"> <li>Crush hazard or contact stress to hands/ fingers from</li> </ul>	<ul style="list-style-type: none"> <li>Wear leather gloves when inserting pins, flagging, or stakes into the ground. Do not hurry task if hammering.</li> </ul>	<p>L</p>

Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Geophysical Survey			
Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
	inserting pins or stakes		
	<ul style="list-style-type: none"> <li>• Repetitive stress from repeated bending or squatting during construction</li> </ul>	<ul style="list-style-type: none"> <li>• Use job rotation when a hazard exists.</li> <li>• Stretch before performing work activity.</li> <li>• Use paint device that allows employee to stand up while spraying.</li> </ul>	L
<ul style="list-style-type: none"> <li>• Performing survey</li> </ul>	<ul style="list-style-type: none"> <li>• Noise hazards from survey equipment using percussion devices</li> <li>• Ergonomic injury from improper or prolonged use of carried devices that are long or bulky</li> </ul>	<ul style="list-style-type: none"> <li>• Wear hearing equipment.</li> <li>• Keep unnecessary workers away from devices when activated.</li> <li>• Use proper lifting technique.</li> <li>• Request assistance when lifting heavy equipment.</li> <li>• Use job rotation to reduce potential for injury.</li> </ul>	L  L
<ul style="list-style-type: none"> <li>• Demobilization and cleanup</li> </ul>	<ul style="list-style-type: none"> <li>• Muscle strain from removing pins or stakes</li> <li>• Pinch hazards to fingers from equipment cases</li> </ul>	<ul style="list-style-type: none"> <li>• Use devices that maintain neutral body positions to remove pins when practical.</li> <li>• Do not bend at waist when removing pins or stakes.</li> <li>• Identify hazard and avoid.</li> <li>• Pack equipment properly, so no wires or cables protrude from case requiring fingers to push into case when closing.</li> </ul>	L  L
<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Lifting hazards from demobilizing equipment from work area</li> </ul>	<ul style="list-style-type: none"> <li>• Use proper lifting technique.</li> <li>• Request assistance when lifting heavy equipment.</li> <li>• Use dolly to transport equipment as necessary.</li> </ul>	M

<b>EQUIPMENT REQUIRED</b>	<b>INSPECTION REQUIREMENTS</b>	<b>TRAINING REQUIREMENTS</b>
<ul style="list-style-type: none"><li>• Geophysical survey equipment</li><li>• Level D PPE</li></ul>	<ul style="list-style-type: none"><li>• Inspect equipment daily prior to use.</li></ul>	<ul style="list-style-type: none"><li>• Certification based on operator's manual.</li><li>• Hazard communication.</li><li>• 40-hour HAZWOPER.</li><li>• 8-hour HAZWOPER refresher as required.</li><li>• Initial site-specific training as required.</li></ul>

Task Name: Geophysical Survey

Project Name and Location: Site Investigation Small Arms Range Berm Area Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia

PRINT

SIGNATURE

Supervisor's Name: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Safety Officer Name: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

Site Personnel: \_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_

**Attachment 8**  
**Site-Specific Safety and Health Plan**

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**Final  
Site-Specific Safety and Health Plan  
for Site Investigation  
at the Small Arms Range Berm Area  
Site Identification No. FTSW-006-R-01  
Fort Stewart, Georgia**

**February 2014  
(Revision 1)**

**Submitted to:  
U.S. Army Corps of Engineers  
Savannah District**

**Prepared by:  
SpecPro Environmental Services LLC  
1006 Floyd Culler Court  
Oak Ridge, Tennessee 37830  
under  
Contract No. W912HN-10-D-0001  
Delivery Order No. 0025**

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# SIGNATURE PAGE

Site-Specific Safety and Health Plan  
for  
Site Investigation at the Small Arms Range Berm Area  
Fort Stewart, Georgia

Contract No. W912HN-10-D-0001  
Delivery Order No. 0025

<b>Prepared By:</b>	 CIH CSP	2-24-14
	Richard Rathnow, CIH, CSP Corporate Safety and Health Manager SpecPro Environmental Services LLC	Date (865) 481-7837

<b>Plan Approval:</b>		2-24-14
	Jim Madaj, Senior Program Manager (company officer) SpecPro Environmental Services LLC	Date (865) 481-7837

<b>Plan Concurrence:</b>		2-24-14
	Doug Hawn, Project Manager SpecPro Environmental Services LLC	Date (865) 481-7837

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## Acronyms and Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
AHA	activity hazard analysis
ANSI	American National Standards Institute
APR	air purifying respirator
CFR	<i>Code of Federal Regulations</i>
CIH	Certified Industrial Hygienist
CPR	cardiopulmonary resuscitation
CRZ	contamination reduction zone
CSP	Certified Safety Professional
dB	decibel
dBA	A-weighted decibels
eV	electron volt
ES&H	environmental safety and health
EZ	exclusion zone
GW	groundwater
HAZWOPER	hazardous waste operations and emergency response
HTRW	hazardous, toxic, and radioactive waste
IDLH	immediately dangerous to life or health
ISEA	International Safety Equipment Association
m <sup>3</sup>	cubic meters
mg	milligrams
MEC	munitions of explosive concern
MSA	Mine Safety Appliances
MSDS	material safety data sheet
NA	not available
NRR	noise reduction ration
OSHA	Occupational Safety and Health Administration
PEL	permissible exposure limit
PIP	photoionization potential
PPE	personal protective equipment
ppm	parts per million
S&H	safety and health
SB	soil boring
SD	sediment
SDS	safety data sheet
SES	SpecPro Environmental Services LLC
SES S&H Manual	<i>SpecPro Environmental Services LLC Safety and Health Program Manual</i>
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
SW	surface water
SZ	support zone
USACE	U.S. Army Corps of Engineers
UXO	unexploded ordnance

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## 1. INTRODUCTION

### 1.1 GENERAL

SpecPro Environmental Services LLC (SES) conducts activities in accordance with its corporate Environmental Safety and Health (ES&H) Program, which is intended to ensure safe operation and regulatory compliance during all fieldwork. SES is committed to compliant operation under provisions of this program. The corporate policy states, “It is the policy of SES to take every reasonable precaution to protect the health and safety of our employees, the public, and the environment.”

The SES Safety and Health (S&H) Program, which is contained in *SpecPro Environmental Services LLC Safety and Health Program Manual* (SES, June 2009), hereinafter referred to as the SES S&H Manual, and site-specific safety and health plans (SSHPs) present the requirements for safely performing fieldwork. This SSHP sets forth the basic procedures required to protect SES and subcontractor personnel involved in the fieldwork phase of the Site Investigation at the Small Arms Range Berm Area Fort Stewart, Georgia, project.

This plan represents SES’s dedication to predicting, identifying, evaluating, and prescribing controls for the hazards that will be posed by this work. The site safety and health officer (SSHO) will perform daily safety inspections to verify that the controls in this plan are appropriate and sufficient and will revise these controls as necessary to ensure that the work is performed safely. Revisions to the SSHP will be documented, and those revisions that result in decreasing or eliminating a hazard control will be approved by the SES safety and health manager before they are implemented. SES subcontractors will be informed of the requirements of this plan and will be provided with copies of, or unrestricted access to, copies of this plan. SES’s subcontractors will be required to comply with the requirements of this plan. This plan does not relieve subcontractors of the regulatory requirement to provide a safe workplace, and SES subcontractors will be required to supplement the requirements of this plan as necessary to ensure that their employees perform their specific tasks safely.

This document is designed to satisfy the requirements of ER 385-1-92, *Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities* [U.S. Army Corps of Engineers (USACE), May 2007]; the requirements of EM-385-1-1, *Safety and Health Requirements Manual* [USACE, September 2008 (updated July 2012)]; relevant Occupational Safety and Health Administration (OSHA) regulations; and the SES S&H Manual.

This SSHP is included as an attachment to the project accident prevention plan (APP). In cases in which required information is contained in another portion of the work plan, the information will be referenced rather than repeated in this SSHP; however, some repetition is unavoidable.

SES will conduct a site investigation focused on sampling for antimony, copper, and lead. Tasks to be performed include

- Conducting the magnetometer-assisted visual survey outlined in *Final Phase 2 Confirmatory Sampling Report, Fort Stewart, Georgia* (ARCADIS/ Malcolm Pirnie, September 2011), to determine if munitions of explosive concern (MEC) are present on the site;
- Collecting a maximum of 400 soil samples from 200 direct push technology (DPT) soil borings at depths of 0 to 6 inches and 2 to 4 feet;
- Collecting soil samples from four berm areas to characterize them for potential removal or disposal;
- Having samples analyzed for lead, copper, and antimony;
- Conducting appropriate quality assurance (QA)/quality control (QC) sampling to provide legally

- defensible sampling, analysis, and data validation;
- Taking six soil samples for Synthetic Precipitation Leaching Procedure and using the analytical results to develop site-specific soil screening levels; and
- Providing further delineation of the contaminants of concern at the site, so an accurate assessment can be made using the Environmental Protection Agency Regional Residential Soil Screening Levels for Region 4 and the appropriate method selected for assessing and evaluating subsurface soil constituents leaching potential to groundwater.

The greatest hazards posed by the planned tasks are those associated with the equipment, such as the Geoprobe and excavator. Based on previous sampling results, the potential exists for exposure to site contaminants; however, this potential should be minimal and will be readily controllable with adherence to standard operating procedures and personal protective equipment (PPE) requirements. A very low probability hazard exists with subcontractors during the survey for MEC at the project site.

This project will for the most part be performed in Level D modified PPE unless one of several action levels specified in the plan is exceeded or the potential for increased risk becomes apparent during the field activities. The SSHO will upgrade protective procedures, including protective clothing, as necessary based on established action levels or judgment. A NIOSH-approved P100 rated particulate filtering face piece respirator will be worn during well abandonment activities when mixing or handling bentonite during the grout process.

Site visitors will not be allowed inside areas controlled by SES without the specific approval of the SSHO and the SES field manager. Site visitors must meet all regulatory and site health and safety requirements (such as training and medical surveillance) to be considered for entry into exclusion or contamination-reduction zones. Site visitors are requested to contact the SES project manager or field manager before visiting.

## **1.2 SITE BACKGROUND**

Fort Stewart is in portions of Long, Evans, Tattnall, Bryan, and Liberty counties, Georgia, approximately 40 miles southwest of Savannah, Georgia. The nearest city is Hinesville, approximately 1½ miles to the south. The Small Arms Range Berm Area is near 15th Street, approximately 300 feet from the rear of Building 1805 (Figure 2-1 of the APP). This range consists of approximately 287 acres used for small arms training during the 1940s and 1950s. SES will investigate approximately 190 acres of the site for this project. According to historical documents, small arms of .50 calibers or less were used on the range (ARCADIS/ Malcolm Pirnie, Inc., September 2011).

## **2. HAZARD/RISK ANALYSIS**

The site task hazard analysis identifies and assesses potential hazards that site personnel could encounter; the analysis also prescribes required controls. In general, the site tasks will consist of activities required to collect soil samples and excavate soil. Exposure to site contaminants of concern at or above their Threshold Limit Value is a very low probability based on established site history and available information.

Site tasks present some possible physical hazards, which include heavy equipment, shallow excavation work, moving equipment, vehicle accidents, and inclement weather. Health hazards such as exposure to elevated noise levels, nuisance dusts, and temperature extremes may be a concern and will be considered for this plan. No record or other indication exists of unexploded ordnance (UXO) use or disposal in this area. The potential to encounter MEC during the survey by Sterling Operations is very low probability.

Hazard control measures will be communicated to site workers relating to any potential risk if conditions warrant this action. If additional tasks or significant hazards are encountered during the work, work will stop and this document will be modified by addendum or field change order to include the additional information. Any changes to the SSHP will be submitted to the SES safety and health manager for approval before they are implemented.

## 2.1 POTENTIAL EXPOSURES

Information on the significant suspected contaminants and chemicals that will be used for the project is contained in Table 2-1. Note that this list does not include all the contaminants that have been detected. Only those contaminants with relatively low exposure limits that are present in relatively high concentrations have been listed in Table 2-1. If additional contaminants or chemicals that pose new or significantly greater hazards are identified before or during site activities, additional hazards analyses will be provided as an addendum to this document.

**Table 2-1 Potential Exposures**

Constituents	Maximum Concentration	Exposure (TLV)	IDLH ppm	Symptoms and Effects of Exposure	PIP (eV)
Antimony	SB: unknown SD: unknown SW: unknown GW: unknown	0.5 mg/m <sup>3</sup>	50 mg/m <sup>3</sup>	Irritation to eyes skin, nose, throat, mouth; coughing; dizziness; headaches; nausea, vomiting, diarrhea, stomach cramps; insomnia; cardiovascular system effect	N/A
Copper	SB: unknown SD: unknown SW: unknown GW: unknown	1 mg/m <sup>3</sup>	100 mg/m <sup>3</sup>	Irritation of eyes, respiratory system, cough, breathing difficulty, wheezing	N/A
Lead	SB: unknown SD: unknown SW: unknown GW: unknown	0.05 mg/m <sup>3</sup>	100 mg/m <sup>3</sup>	Weakness, lassitude, facial pallor, pal eye, weight loss, malnutrition, abdominal pain, constipation, anemia, gingival lead line, tremors, paralysis of wrist and ankles, encephalopathy, kidney disease, irritated eyes, hypertension	N/A

Footnotes:

Specify sample-designation and media: SB (Soil Boring), GW (Groundwater), SW (Surface Water), SD (Sediment)

eV = electron volt

IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant)

m<sup>3</sup> = cubic meters

mg = milligrams

NA = Not applicable

NL = No limit found in reference materials

PIP = photoionization potential

ppm = parts per million

TLV = American Conference of Governmental Industrial Hygienists threshold limit value

UK = Unknown

### 3. STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

In accordance with the OSHA General Duty Clause, SES is committed to providing each employee with a place of employment free from recognized hazards that cause or are likely to cause death or serious physical harm. SES and its subcontractors will comply with EM 385-1-1, *Safety and Health Requirements Manual*; OSHA regulations; and referenced standards. In turn each employee is expected to and shall be required to comply with SES rules as well as occupational safety and health standards based on the OSHA regulations.

SES has established the policies and procedures set forth in its program to

- Provide a safe and healthful work environment for all SES employees and subcontractors;
- Prevent or minimize occupational injuries and illnesses;
- Eliminate damage to equipment and property; and
- Comply with all applicable Federal, state, local, and consensus safety and health standards.

SES's General Safety Program provides steps to protect the safety and health of our employees. This program is intended to provide safety-related tools and guidance for all employees as well as provide essential elements of regulatory and internal requirements.

This program includes general safety procedures and requirements as well as specific written programs to address actual or potential workplace hazards. It may be necessary during certain circumstances to consult appropriate OSHA regulations for more specific information.

The corporate S&H Manual is one tool necessary to achieve SES's health and safety program objectives. The manual, however, cannot ensure a safe and healthy work environment by itself. *The responsibility of conducting work in a manner that ensures our well-being and that of co-workers, clients, and the general public rests with management at all levels as well as each individual employee. Managers and site supervisory personnel will be held accountable for the successful implementation of program and project safety and health requirements and results for projects under their direction. Project management and supervision personnel's annual review includes an evaluation of their administration, implementation, and compliance with the corporate safety and health program. This evaluation and their dedication to the advancement of the safety culture are factored into any annual merit increase they receive.*

This section presents the lines of authority, responsibilities, and communication procedures related to site safety and health and emergency response. It includes key SES and subcontractor personnel. All fieldwork will be under the supervision of the SES field manager. The SES field manager will oversee normal and emergency work and will perform any required emergency notification. Table 3-1 identifies the individuals who will fill key roles for the project field activities.

The key personnel assigned to the field activity positions presented in Table 3-1 represent those individuals who are expected to participate in the project. Personnel availability, however, will dictate the actual roster of individuals who will perform field activities. If personnel other than those presented in Table 3-1 are assigned to the project, SES will provide the names of those individuals to the USACE Savannah District project manager before mobilizing for fieldwork. The USACE project manager is Ana Vergara, (912) 652-5835. The technical manager is Zsolt Haverland, (912) 652-5815.

**Table 3-1 Staff Organization**

<b>Position</b>	<b>Name</b>	<b>Telephone</b>
Senior Program Manager	Jim Madaj	(865) 481-7837
Safety and Health Manager	Rich Rathnow, CIH, CSP	(865) 481-7837
Project Manager	Doug Hawn	(865) 481-7837
Field Manager	Chris Napoleon	(865) 481-7837
SSHO	LeAnn McNeal	(912) 660-4782
Alternate SSHO	Chris Napoleon	(865) 481-7837

CIH = Certified Industrial Hygienist  
 SSHO = Site Safety and Health Officer

CSP = Certified Safety Professional

***\*No work shall be performed unless a designated competent person is present on the job site.***

### **3.1 SES SENIOR PROGRAM MANAGER**

SES Senior Program Manager Jim Madaj is the primary interface with the client and has ultimate responsibility for the project. The senior program manager provides progress reports and addresses client questions and concerns. In addition, he is responsible for ensuring conformance with the SES S&H program and USACE policies and procedures. Specific responsibilities of the senior program manager include the following:

- Coordinating with USACE personnel,
- Ensuring that project managers satisfy SES and USACE health and safety requirements,
- Ensuring that project staff implement project APPs, and
- Ensuring that projects have the resources necessary to operate safely.

### **3.2 SES SAFETY AND HEALTH MANAGER**

SES Safety and Health Manager Rich Rathnow, CIH, CSP, oversees the SES S&H program. This includes establishing health and safety policies and procedures, supporting project and office activities, and verifying safe work practices and conditions. The SES safety and health manager is certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene and has more than 20 years of hazardous waste experience. The specific responsibilities of the safety and health manager include the following:

- Coordinating with USACE health and safety personnel,
- Reviewing and approving APPs,
- Approving downgrades in PPE or protective procedures, and
- Collaborating with project personnel through routine communication and audit of selected projects.

### **3.3 SES PROJECT MANAGER**

The SES project manager is responsible for overall project execution. The responsibilities of the project manager include the following:

- Coordinating with USACE personnel (including reporting accidents and incidents to the USACE Savannah District project manager immediately and submitting written reports within two working days),
- Ensuring implementation of the project APP,

- Maintaining auditable project documentation of all required records,
- Ensuring that a qualified SSHO is designated, and
- Maintaining a current copy of the project APP.

### **3.4 SES FIELD MANAGER**

The SES field manager is in charge of all SES and subcontractor field activities associated with this project. All SES and subcontractor personnel performing fieldwork on this project must report to the field manager.

The SES field manager will be responsible for site accessibility, safety, and quality assurance. The field manager is responsible for enforcing the field requirements of this APP. Specific responsibilities of the field manager are

- Enforcing compliance with the project APP;
- Coordinating on-site operations, including subcontractor activities;
- Ensuring that subcontractors follow the requirements of this APP;
- Coordinating and controlling any emergency response actions;
- Ensuring that at least two people currently certified in first aid/cardiopulmonary resuscitation (CPR) are on-site during site operations;
- Performing a daily safety inspection and documenting the inspection on the daily safety inspection form (or ensuring that this inspection is performed), and
- Maintaining current copies of the project APP; EM 385-1-1, *Safety and Health Requirements Manual* [USACE, September 2008 (updated July 2012)]; and the SES S&H Manual (SES, June 2009) on site.

### **3.5 SITE SAFETY AND HEALTH OFFICER**

SES SSHO LeAnn McNeal will serve as the appointed competent person as required by EM 385-1-1, September 2008 (updated July 2012), Section 01.A.17. The SSHO will be on site during all fieldwork activities. The SSHO is responsible for making safety and health decisions, for specific safety and health activities, and for verifying the effectiveness of the S&H program. The SSHO's qualifications include at a minimum completion of the OSHA 30 Hour Construction Safety course, five years of experience with similar projects, knowledge and understanding of the project APP, 24 hours of ongoing continued education every four years, and the ability to use required monitoring equipment. The SSHO has primary responsibility for the following:

- Implementing and verifying compliance with this APP and reporting to the project manager and safety and health manager any deviations from anticipated conditions;
- Conducting and documenting daily safety inspections;
- Stopping work or upgrading protective measures (including protective clothing) with the approval of the safety and health manager if uncontrolled health and safety hazards are encountered (Indications of uncontrolled health and safety hazards include monitoring instrument readings higher than established action limits, encountering liquids other than water, and soil staining suggestive of unexpectedly high concentrations of nonvolatile contaminants.);
- Authorizing resumption of work after correction of any adverse conditions;
- Completing the health and safety debriefing in accordance with SES S&H Manual Section 8.0, "Tool Box Safety Meetings";
- Documenting deficiencies identified in the daily inspections and identifying responsible parties, procedures, and timetables for correction;
- Ensuring that site personnel have access to this plan and are aware of its provisions;

- Conducting a site-specific pre-entry health and safety briefing covering potential chemical and physical hazards, safe work practices, and emergency procedures;
- Maintaining on-site auditable documentation of
  - Material safety data sheets (MSDSs)/ safety data sheets (SDSs) for applicable materials used at the site;
  - Training for site workers and visitors;
  - Calibration/maintenance records for field instruments, such as photoionization detectors, flame ionization detectors, or combustible gas indicators;
  - Environmental and personal exposure monitoring results; and
  - Notification of accidents/incidents.
- Confirming that all on-site personnel received the training listed in Section 4 of this SSHP; and
- Issuing respirators as necessary and ensuring all respirator users have received medical clearance.

### 3.6 SUBCONTRACTOR FIELD MANAGERS

The subcontractor field manager will oversee the field activities of the subcontractor employees. He/she is responsible for enforcing the field requirements of this APP and has the following responsibilities:

- Ensuring that subcontract personnel follow the requirements of the APP and any other applicable safety and health requirements,
- Verifying that this APP adequately addresses the hazards and controls of the subcontracted work,
- Ensuring the safe operation of subcontractor equipment,
- Coordinating the on-site operations of subcontract personnel, and
- Maintaining any required documentation specific to subcontract operations.

On-site subcontractors that will be used for this work are Major Drilling Environmental and Sterling Operations. Their points of contact are in Table 3-2.

**Table 3-2 Subcontractor Contacts**

Subcontractor	Role	Contact	Phone Number
Major Drilling Environmental LLC	Drilling	Ricky Davis	(256) 852-7000
Sterling Operations	UXO support	Jay T. Ferguson	(865) 988-6063 ext. 6048

ext. = extension

UXO = unexploded ordnance

## 4. TRAINING

Personnel who participate in field activities associated with this project or who enter areas controlled by SES are subject to the training requirements in Table 4-1. Table 4-2 lists training requirements by activity or role. Field activities include all tasks specified in Section 1 of this plan as well as any unspecified tasks that take place within the work area. Activities such as driving or walking on paved roads, performing paperwork or attending meetings inside routinely occupied buildings, and performing paperwork or similar activities inside office trailers are not subject to these training requirements. Casual visitors who access only the office or staging areas of the support zone are not subject to these training requirements.

**Table 4-1 Training Requirements**

<b>Training</b>	<b>Worker<sup>a</sup></b>	<b>Worker<sup>b</sup></b>	<b>SSHO</b>	<b>Site Visitor<sup>c</sup></b>
40-Hour HAZWOPER	N	Y	Y	N
HAZWOPER Annual Refresher (8 hours)	N	Y	Y	N
HAZWOPER Supervisor (8 hours)	N	N	Y	N
30 Hour OSHA Construction Safety	N	N	Y	N
Hazard Communication/Lead Awareness Training	N	Y	Y	N
Hearing Conservation	N/Y	Y	Y	N
Respiratory Protection	N	2 workers	Y	N
Pre-Entry Briefing	Y	Y	Y	Y
Safety Briefing	Y	Y	Y	N
PPE	N	Y	Y	N
First Aid/CPR	2 workers	2 workers	Y	N
Bloodborne Pathogens	2 workers	2 workers	Y	N
UXO Worker Related Training	N	Y <sup>d</sup>	Y <sup>d</sup>	N

Note: For the purposes of this table, the SSHO is considered a site worker.

<sup>a</sup>Workers performing nonintrusive tasks under conditions that present no possibility of exposure to hazardous waste or chemicals. This includes surveyors and USACE personnel who enter the site after closure. If workers are exposed to noise levels above 85 dBA, they must be enrolled in a hearing conservation program.

<sup>b</sup>Workers performing tasks inside SES-controlled areas under conditions that pose a potential risk of exposure to hazardous waste or chemicals. This includes all SES personnel and subcontractors performing work as part of the project, vendors, and similar personnel.

<sup>c</sup>Vendors and similar personnel

<sup>d</sup>EODT workers and SUXO

CPR = cardiopulmonary resuscitation

PPE = personal protective equipment

HAZWOPER = hazardous waste operations and emergency response

SSHO = site safety and health officer

**Table 4-2 Training Requirements by Project Activity and Role**

<b>Project Activity</b>	<b>Training/Certification/Qualifications</b>
Using machinery and mechanized equipment	Designated and qualified personnel
Using a forklift	Certified, trained, and authorized; reevaluation every three years
Vehicle Operation	Valid License for vehicle being operated
Personal Protective Equipment	Trained in PPE use according to job description including donning and doffing, limitations of use, and correct fit.
Respiratory Protection	Training and annual re-training, fit test, physicians written opinion on medical qualification for use.
SUXO	DDESB TP-18 Qualified, USN or DOD EOD school,(ER) 385-1-92 Trained,, Work Plan Trained
UXOT1, UXOT2, UXOT3	DDESB TP-18 Qualified, USN or DOD EOD school (ER) 385-1-92 Trained,, Work Plan Trained
UXOSO/UXOQCS	DDESB TP-18 Qualified, USN or DOD EOD school (ER) 385-1-92 Trained,, Work Plan Trained

DOD = Department of Defense

PPE = personal protective equipment

UXOSO = unexploded ordnance safety officer

UXOT1 = unexploded ordnance technician I

UXOT3 = unexploded ordnance technician III

EOD = explosive ordnance disposal

SUXO = senior unexploded ordnance

UXOQCS = unexploded ordnance quality control supervisor

UXOT2 = unexploded ordnance technician II

The following sections present brief summaries of the training requirements. These summaries include a course description and guidance on who should take each course.

#### **4.1 OFF-SITE TRAINING**

The 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) course is required for general site workers engaged in HTRW activities that expose or potentially expose them to hazardous substances. Three days of relevant field experience are required in conjunction with this training. The eight-hour HAZWOPER refresher is required annually to maintain currency in this course.

HAZWOPER supervisor training is required for personnel who directly supervise hazardous waste site workers. This is an eight-hour course that must be taken once. The 40-hour course is a prerequisite for this training.

Hazard communication is required for all site workers. This training is designed to inform personnel of the characteristics of chemicals with which they will work, the hazards presented by those chemicals, and methods of protection from exposure to the chemicals. This generalized training is supplemented by training on site-specific chemicals.

Hearing conservation is required annually for all employees enrolled in a hearing conservation program as mandated by 29 *Code of Federal Regulations* (CFR) 1910.95. This includes all employees exposed to occupational noise in excess of 85 A-weighted decibels (dBA) as a time-weighted average.

Respiratory protection is required for all workers who wear respirators. This training requirement is met by taking the 40-hour HAZWOPER course.

##### **4.1.1 Competent Person/SSHO Construction Safety Training**

30 Hour OSHA Construction Safety Training is required by EM 385-1-1 [September 2008 (updated July 2012)] for an individual to serve as the site construction safety competent person and as the SSHO. The training requires the following content:

- Occupational Safety and Health Act/General Duty Clause;
- 29 CFR 1904, “Record Keeping”;
- Subpart C: “General Safety and Health Provisions, Competent Person”;
- Subpart D: “Occupational Health and Environmental Controls, Citations and Safety Programs”;
- Subpart E: “PPE, Types and Requirements for Use”;
- Subpart F: “Understanding Fire Protection in the Workplace”;
- Subpart K: “Electrical”;
- Subpart M: “Fall Protection”; and
- Rigging, welding and cutting, scaffolding, excavations, concrete and masonry, demolition, health hazards in construction, materials handling, storage and disposal, hand and power tools, motor vehicles, mechanized equipment, marine operations, steel erection, stairways and ladders, confined spaces, or any others that are applicable to the work being performed.

#### **4.2 SITE-SPECIFIC TRAINING**

On-site personnel must receive site-specific training. Site workers will receive information on site hazards, hazard controls, and emergency procedures. Visitors will receive information that is relevant to the purpose of their visit. Signatures of those attending and the type of briefing must be entered into the

field logbook before site access will be granted. Site-specific training will include the following information, as appropriate:

- Names of health and safety personnel,
- Contents of the project APP,
- Hazards and symptoms of chemical exposure,
- Physical hazards on the site,
- Location and availability of the Hazard Communication Program documents,
- Site- and task-specific PPE,
- Site-specific respirator training,
- Safe work practices,
- Safe use of engineering controls and equipment,
- Medical surveillance requirements,
- Site control measures,
- Reporting requirements for spills and emergencies,
- Personnel decontamination procedures,
- Contingency plans, and
- Emergency equipment.

Pre-task safety plan safety briefings will be held daily before the start of work activities and whenever conditions at the site change. The field manager or the SSHO will conduct these, and the briefings will be required for all site workers. These briefings will address site- and task-specific safety hazards and control measures and will be used to refresh and train workers on specific procedures and controls.

### **4.3 DOCUMENTATION**

Documentation of the required training will be maintained in the on-site project files. This documentation will include copies of personnel training certificates or other verifications, copies of the first aid/CPR and bloodborne pathogen certificates, and entries in the project logbook showing the topics covered and signatures of those attending on-site training. Copies of required training documentation for those individuals expected to perform fieldwork during this project are presented in Attachment 3 of the APP.

## **5. PERSONAL PROTECTIVE EQUIPMENT**

### **5.1 PPE PROGRAM**

SES's PPE program is detailed in SES S&H Manual Section 15.0, "Personal Protective Equipment Program." This program meets the requirements of 29 CFR 191 Subpart I and EM 385-1-1 Section 5. The level and type of PPE selected for particular tasks are based on the following:

- Potential for exposure: The potential for exposure to contaminants of concern for this project is anticipated to be minimal because of the historical contaminant levels, media type, and hazard control measures to be used, including engineering PPE.
- Route of exposure: The routes of exposure for this project would traditionally be from highest to lowest primarily inhalation, secondarily skin absorption, and remotely ingestion or injection.
- Measured or anticipated concentration of contaminant can be based on several factors, including source concentration, the physical state of the contaminant, weather conditions, the phase of work being conducted, and more. For this project direct reading instruments will be used to monitor employees' breathing zones for any potential airborne contaminant levels that are expected to be negligible or undetectable.

- Toxicity, reactivity, or other measure of adverse effects: Toxicity is anticipated to not be a concern for this project because of the negligible exposure potential. Contaminants of concern for this project are anticipated to be nonreactive overall.
- Physical hazards: Exposure to physical hazards for this project (for which PPE is required) include the potential for foot and toe injuries, hand injuries, eye injuries, and head injuries.

In situations where the type of chemical and/or concentration is not known, the appropriate protection is selected based on the judgment of the SES safety and health manager until hazards can be evaluated further.

Employees must wear PPE when actual or potential hazards exist and engineering controls or administrative practices cannot adequately control those hazards.

The safety and health manager has conducted a PPE assessment based on project tasks (see PPE specifications below). Verification and certification of assigned PPE by task is completed by the safety and health manager who approved this plan. Below are items that need to be followed when using any form of PPE:

- Employees must be trained to properly wear and maintain the PPE.
- In work areas where actual or potential hazards are present at any time, PPE must be worn by employees working or walking through the area.
- Areas requiring PPE should be posted or employees must be informed of the requirements in an equivalent manner.
- PPE must be inspected prior to use and after any occurrence to identify any deterioration or damage.
- PPE must be maintained in a clean and reliable condition.
- Damaged PPE shall not be used and must either be repaired or discarded.
- PPE shall not be modified, tampered with, or repaired beyond routine maintenance

Table 5-1 outlines PPE to be used according to task based on project-specific hazard assessment. If a task other than the tasks described in this table needs to be performed, contact the safety and health manager so this table can be updated.

PPE requirements for this site are based on the site-specific physical and chemical hazards. In cases in which multiple hazards exist, a combination of protective equipment will be selected to provide adequate protection from each hazard. Task specifics are also addressed in the activity hazard analyses (AHAs) in Attachment 7 of the APP.

## **5.2 TYPES OF EQUIPMENT**

This section presents the types of protective clothing and equipment that may be used for this project. Levels of protection that will be used to protect workers against hazards anticipated at the site are contained in Table 5-1.

The SSHO may raise or lower the level of PPE worn by workers with the approval of the safety and health manager depending on the site-specific hazards encountered in the field. Before the level of PPE is lowered, the field manager and the safety and health manager will be contacted and consulted. If site conditions indicate that the level of PPE is not sufficient or work must be stopped, the SSHO will take appropriate action immediately to suspend operations and will contact the site manager and/or the safety and health manager afterward. Table 5-2 lists reasons for upgrading or downgrading PPE with the approval of the safety and health manager.

**Table 5-1 Personal Protective Equipment**

<b>Task</b>	<b>Level</b>	<b>Body</b>	<b>Head</b>	<b>Respirator</b>
Mobilization and Demobilization	D	Work clothes; safety-toe leather work boots and gloves	Hard hat Safety glasses with side shields Ear protection	None required
Drilling and sampling	Modified D	Tyvek coveralls <b>Boots:</b> Safety-toe, chemical-resistant boots OR safety-toe, leather work boots with outer rubber boot covers <b>Gloves:</b> Inner surgical-style Nitrile and outer chemical-resistant Nitrile gloves.	Hard hat Safety glasses with side shields Ear protection	None required
Excavations	Modified D	Tyvek coveralls <b>Boots:</b> Safety -toe, chemical-resistant boots OR Safety -toe, leather work boots with outer rubber boot covers <b>Gloves:</b> Inner surgical-style Nitrile and outer chemical-resistant Nitrile gloves. Kevlar gloves for sharp or jagged edged materials.	Hard hat Splash shield Safety glasses with side shields Ear protection	None required
Work near vehicular traffic ways or earth moving equipment.	All	Appropriate level of ANSI/ ISEA Type II 107-2004 high-visibility safety vests (required for workers who are near heavy machinery or near traffic between the speeds of 25 and 50 mph). For workers near traffic in excess of 50 mph ANSI/ ISEA Type III vests are required.	Work near vehicular traffic ways or earth moving equipment.	
Well Abandonment – grout mixing and handling activities	Modified D	<b>Coveralls:</b> Polycoated Tyvek® <b>Boots:</b> Safety-toe boots <b>Gloves:</b> Inner surgical-style Nitrile and outer chemical-resistant Nitrile gloves.	Hard hat, safety goggles	NIOSH-Approved P100 Rated Particulate Filtering Face piece Respirator,

**Table 5-1 Personal Protective Equipment (continued)**

<b>Task</b>	<b>Level</b>	<b>Body</b>	<b>Head</b>	<b>Respirator</b>
Equipment decontamination if using pressure washer	Modified D with splash protection	<b>Coveralls:</b> Polycoated Tyvek® <b>Boots:</b> 16-inch-high steel-toe rubber boots <b>Gloves:</b> Inner surgical-style Nitrile and outer chemical-resistant Nitrile gloves.	Hard hat Splash shield over safety glasses with side shields or splash goggles Ear protection	None required
Magnetometer Survey	D	Standard light-colored work clothes (except during hunting season.) ANSI Type II safety vests Leather gloves. Eye protective glasses with side shield or dust goggles. ANSI-approved safety boots Disposable dust respirators at employee option unless required by SSHO. Snake chaps as needed or required by SSHO.	Hard hat Hearing protection (ear plugs) if > 85 dBA and double protection (ear plugs and ear muffs) if > 105 dBA.	None required
Tasks requiring upgrade per Table 7-1	C	<b>Coveralls:</b> Polycoated Tyvek® <b>Boots:</b> Safety-toe, chemical-resistant boots OR safety-toe, leather work boots with outer rubber boot covers <b>Gloves:</b> Inner surgical-style Nitrile and outer chemical-resistant Nitrile gloves.	Hard hat Splash shield Ear protection Spectacle inserts	APR, half face, MSA Ultratwin or equivalent; with GME-H cartridges or equivalent 3M P100 respirator.
Tasks requiring upgrade per Table 7-1 and Determination by CIH	B	<b>Coveralls:</b> Polycoated Tyvek® <b>Boots:</b> Safety-toe, chemical-resistant boots OR Safety-toe, leather work boots with outer rubber boot covers <b>Gloves:</b> Inner surgical-style Nitrile and outer chemical-resistant Nitrile gloves.	Hard hat Splash shield Ear protection Spectacle inserts	Positive-pressure demand SCBA; MSA Ultralite, or equivalent.

ANSI = American National Standards Institute  
CIH = Certified Industrial Hygienist  
MSA = Mine Safety Appliances

APR =air-purifying respirator  
ISEA =International Safety Equipment Association  
SCBA = self-contained breathing apparatus

**Table 5-2 Reasons for Upgrading or Downgrading Personal Protective Equipment  
with Approval of Safety and Health Manager**

Upgrade	Downgrade
<ul style="list-style-type: none"> <li>• Request from individual performing tasks.</li> <li>• Change in work tasks that will increase contact or potential contact with hazardous materials.</li> <li>• Occurrence or likely occurrence of gas or vapor emission.</li> <li>• Known or suspected presence of dermal hazards.</li> <li>• Instrument action levels in Section 7 exceeded.</li> </ul>	<ul style="list-style-type: none"> <li>• New information indicating that situation is less hazardous than originally thought.</li> <li>• Change in site conditions that decrease the hazard.</li> <li>• Change in work task that will reduce contact with hazardous materials.</li> </ul>

Note:

Performing a task that requires an upgrade to a higher level of protection (such as Level D to Level C) is permitted only when the PPE requirements have been approved by the safety and health manager and an SSHO qualified at that level is present.

### 5.3 CLEANING AND STORAGE

If site tasks require the use of chemical protective clothing, all reusable articles (typically outer rubber boots, hard hats, earmuffs, safety goggles, and glasses) will be properly decontaminated by scrubbing, washing, and disinfecting before they are reused. Disposable equipment (typically Tyvek and gloves) will be discarded in sealed containers and handled as contaminated waste. Unused chemical protective clothing will be stored in clean staging areas until needed. Specific decontamination measures for PPE are detailed in Sections 11 and 13 of this SSHP.

### 5.4 RESPIRATORY PROTECTION

- The only potential need for respiratory protection during this project is for well abandonment tasks when mixing or handling grout with the potential for airborne grout dust. In this case, a NIOSH-approved P100 rated particulate filtering face piece respirator will be used by workers with potential for exposure.
- If it is determined through air monitoring or other circumstances that additional respirator use is required, an addendum to this plan will be submitted for review. Two individuals who are qualified to wear respiratory protection will be on site with respirators available for use in the event of an emergency only. Respirator users must complete the respirator medical monitoring protocol and be approved for the specific type of respirator to be used.
- Air purifying respirator use shall be limited to emergency use only for this project. If site conditions change warranting the use of specified respiratory protection, the safety and health manager shall be notified to amend the written plan and submit the amended plan to the GDA for review.

## 6. MEDICAL SURVEILLANCE

All employees performing on-site hazardous waste activities will be enrolled in a medical surveillance program in accordance with 29 CFR 1910.120(f) and 1910.134. The purpose of the medical surveillance program is to monitor and assess the workers' health and fitness. Copies of required medical clearances and current fit tests for those employees expected to perform fieldwork during this project are in Attachment 3 of the APP. Employees are provided with summaries of the medical examination results following each exam. The frequency of employee medical exams shall occur as follows:

- Before assignment,
- Annually for every covered employee,

- At termination of employment or reassignment, and
- As soon as possible after the employee reports he/she has developed signs or symptoms of exposure to a hazardous substance.

## 7. EXPOSURE MONITORING

Table 7-1 lists the exposure monitoring requirements.

**Table 7-1 Exposure Monitoring**

<b>Instrument</b>	<b>Tasks</b>	<b>Action Levels<sup>a</sup></b>		<b>Frequency<sup>b</sup></b>	<b>Calibration</b>
<b>Dust Monitor:</b> Dataram or equivalent	During any work in potentially contaminated soils	< 1.0 mg/m <sup>3</sup>  ≥ 1.0 mg/m <sup>3</sup>	Continue operations and use wet dust suppression methods  Shut down and implement wetting/dust suppression methods until total airborne dust levels decrease and are maintained below 1.0 mg/m <sup>3</sup> . If dust suppression does not succeed in maintaining dust levels to below 1.0 mg/m <sup>3</sup> , stop work and contact Rich Rathnow, SES safety and health manager.	Continuous during work in contaminated soils	Zero daily
<b>Noise-Level Monitor<sup>c</sup>:</b>	As necessary per the SSHO and Section 9.g.1 of the APP	<85 dB(A) 85-105 dB(A)  >105 dB(A)	No action required Hearing protection required (NRR 32) Stop; re-evaluate periodically Establish the use of administrative controls in the form of noise control barriers and zones for controlling noise exposures as described in Section 9.g.1 above. In addition double hearing protection (ear plugs with NRR 32 plus ear muffs) will be worn for noise exposures >105 db(A). Ear plugs with a minimum NRR of 32 will be worn for all exposures > 85 db(A)	Initially and periodically during task	Daily

<sup>a</sup> Action levels apply to sustained breathing-zone measurements above background.

<sup>b</sup> The exact frequency of monitoring depends on field conditions and is to be determined by the SSHO; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time, measurement results, personnel monitored, and place/location where measurement is taken (e.g., “Breathing Zone/MW-3”, “at surface/SB-2”, etc.).

<sup>c</sup> Noise monitoring and audiometric testing also required.

Dust suppression by wetting methods and control measures will be used to avoid worker, client, and community exposure to nuisance and other potential airborne constituents.

### 7.1 CALIBRATION SPECIFICATIONS

Air monitoring equipment calibration specifications are listed in Table 7-2.

**Table 7-2 Air Monitoring Equipment Calibration Specifications**

<b>Instrument</b>	<b>Gas</b>	<b>Span</b>	<b>Reading</b>	<b>Method</b>
<b>Dust Monitor:</b> Dataram-PDM3	Dust-free air	Not applicable	0.00 mg/m <sup>3</sup> in “Measure” mode	Dust-free area OR Z-bag with HEPA filter

### 7.2 AIR MONITORING

Personal air sampling/monitoring is not anticipated to be necessary for this project. Direct reading exposure monitoring for airborne dust levels in the breathing zone will be performed during operations. Dust suppression and control measures will be used during any tasks that could result in airborne dust generation. If dust levels cannot be controlled below 1 mg/m<sup>3</sup> in the worker breathing zone using dust suppression measures, then respiratory protection will be considered for personal protection to continue project work. Direct reading instrumentation will continue to be used to measure dust in air concentrations to ensure worker safety.

### 7.3 NOISE MONITORING

Hearing protection with a noise reduction rating (NRR) sufficient to reduce worker exposure below 85 dBA will be used. The minimum NRR for hearing protection on this project will be 32, which will be adequate for noise levels up to 105 dBA. If noise levels are suspected of exceeding 105 dBA, double-layer hearing protection will be required.

SES’s priority is to establish the use of administrative controls for controlling noise exposures. A sound level survey will be performed using a noise dosimeter for Geoprobe operation at startup. Sound levels will be identified at the source and then again at intervals of every 10 feet concentrically. Using the results of the sound level survey along with the premise that every doubling of distance from the noise source reduces noise 6 dB, boundary barrier zones will be established identifying

1. The zone where noise levels exceed 105 dB and double hearing protection is mandatory;
2. The zone where noise levels exceed 85 dB but do not exceed 105 dB and single-layer hearing protection with a minimum NRR of 32 is required; and
3. The preferred worker location zone, where noise exposures are controlled to less than 85 dB(A) by distance from the source and the use of double hearing protection.

Signs will be posted and enforced at these barrier zones alerting personnel and visitors/ public to the hearing protection requirements. Personnel operating heavy equipment or other machinery will wear hearing protection.

In addition, hearing protection with an NRR sufficient to reduce worker exposure below 85 dBA will be used. The minimum NRR for hearing protection on this project will be 32, which will be adequate for noise levels up to 105 dBA. OSHA requires the subtraction of 7 dB(A) from the product listed NRR to estimate the NRR, which would then be 25 dB(A). If noise levels are suspected of exceeding 105 dBA, double-layer hearing protection will be required. Double-layer hearing protection will add 5 dB(A) to the NRR property, establishing an effective NRR of 30 dB(A).

When double hearing protection is required (noise greater than 105 dBA), affected employees will switch from ANSI 87.1-2010 standard safety glasses with side shields to safety goggles that meet the requirements of ANSI 87.1-2010 where the elastic strap can be worn over the exterior of the earmuff rather than the stem of the safety glasses breaking the seal of the earmuffs.

Personnel operating heavy equipment or other machinery will wear hearing protection.

## **8. INCLEMENT WEATHER AND HEAT/COLD STRESS MANAGEMENT**

### **8.1 INCLEMENT WEATHER**

Sudden inclement weather can rapidly encroach upon field personnel. Field crew members performing work outdoors should carry clothing appropriate for bad weather. In severe weather conditions (such as tornadoes, high wind, or electrical storms) the field crews should leave the area and find safe shelter until the weather abates and until a decision is made to resume the field activities. When there are warnings or indications of impending severe weather, the SSHO shall monitor the weather conditions using a weather station that is part of the National Oceanic and Atmospheric Administration weather radio all hazards network or similar notification system.

Severe weather triggers to alert the SSHO to monitor weather conditions:

- Storm on horizon,
- Tornadoes,
- High winds,
- Driving rain,
- Lightning when thunder sounds within 30 seconds after the flash,
- Funnel clouds/tornadoes, or
- Communication from base authorities.

The site manager or SSHO shall monitor weather forecasts for predictions of storms in the area. At first sight of lightning, operations shall be stopped and only resumed when conditions permit. The site manager or SSHO shall monitor weather conditions to determine when it is appropriate to resume work. The lightning safety recommendation is 30-30: Seek refuge when thunder sounds within 30 seconds after a lightning flash, and do not resume activity until 30 minutes after the last thunder clap.

#### **8.1.1 Training on Severe Weather Precautions and Actions**

The SSHO will be knowledgeable about extreme weather conditions typically experienced in the region for the project. The SSHO will train site workers about what conditions to expect during the various seasons when work is being completed. This training will describe conditions that might occur, what can be expected, and the actions that personnel are to take in the event of each identified condition. Depending on the location of the current work site, the SSHO shall assess the nearest buildings for sheltering ability. This information shall be communicated during the project startup emergency training session and again daily at pre-task safety plan sessions.

#### **8.1.2 Identified Area of Retreat**

The site evacuation assembly area and route are identified in Figure 9-1 of the APP. Field vehicles will be used as areas of retreat for the project. The SSHO will communicate this again at the project onset.

The SSHO shall assess nearby buildings for their sheltering capability in the event of tornadoes or similar storm situations. All workers will be made aware of actions to take during a weather emergency. These plans are further discussed in the Emergency Evacuation Section of the APP.

The following are some general precautions.

- The inclination to see trees as enormous umbrellas is the most frequent and most deadly mistake. Do not go under a large tree that is standing alone. Likewise, avoid poles, antennae, and towers.
- Stay away from lakes, streams, pools, or any water.
- Stay away from railroad tracks, which can carry lightning charges for long distances.
- If the area is wide open, go to a valley or ravine, but be aware of flash flooding. Do not stand on top of a hill.
- If you are caught in a level open area during an electrical storm and you feel your hair stand on end, drop to your knees, bend forward, and put your hands on your knees or crouch. The idea is to make your body less vulnerable by being as low to the ground as possible and taking up as little ground space as possible. Lying down is dangerous because the wet earth can conduct electricity. Do not touch the ground with your hands.
- Do not use telephones during electrical storms except in an emergency.

## **8.2 HEAT/COLD STRESS MONITORING PLAN**

### **8.2.1 Heat-Related Exposures**

Heat-related illnesses are caused by more than just temperature and humidity factors. SES has implemented a heat-related exposure safety program that includes the exposure thresholds found in the American Conference of Governmental Industrial Hygienists' (ACGIH) "Threshold Limit Values and Biological Exposure Indices" as guidance as well as other references, including the U.S. Army (wind-chill index), and the National Safety Council.

In hot environments, the following guidelines will be followed to prevent heat-related injury.

- Drinking water shall be made available to employees and employees encouraged to drink one cup every 15-20 minutes; the water shall be kept cool.
- Tool box training in hot environments shall include training on the symptoms of heat-related problems, contributing factors to heat-related injuries, and prevention techniques.
- When possible, work should be scheduled for cooler periods during the day.
- SES employees shall be encouraged to take breaks in a cooler location and use cooling devices as necessary, such as cooling vests, to prevent heat-related injury. A buddy system shall be established to encourage fluid intake and watch for symptoms of heat-related injury.
- The SSHO shall monitor those individuals who have had a previous heat-related injury, are known to be on medication, or exhibit signs of possibly having consumed large amounts of alcohol in the previous 24 hours for signs or indicating symptoms of heat-related injuries.
- Individuals who are not acclimatized shall be allowed additional breaks. The SSHO will determine the period and number and provide them to the supervisor and employee.

**In situations where heat stress may impact employee safety and health, employee acclimatization and workloads shall be assessed and work/rest regimens shall be established.**

- For employees in permeable work clothing, Wet Bulb Globe Temperature Index or physiological monitoring shall be conducted and work/rest regimens established. The SSHO in coordination with the SES safety and health manager will assess the condition of the employees, specific weather conditions, work tasks, and other environmental factors and conditions to determine when to begin monitoring.

- For employees in impermeable work clothing, only physiological monitoring will be conducted, and work/rest regimens with fluid replacement schedules shall be established.
- Where employees are exposed to solar radiation for short periods and there is the potential for sunburn or exposure for prolonged periods where long-term exposure could lead to health effects such as skin cancer, SES will provide sunscreen with a sun protection factor (SPF) appropriate for their skin type and exposure. Sunscreens shall be used only in accordance with the manufacturer's recommendations.

### 8.2.2 Cold-Related Exposures

- Employees working in air temperatures of minus 15 degrees Fahrenheit (minus 26 degrees Celsius) or less shall use the work-/warm-up regimen specified in the ACGIH's "Threshold Limit Values and Biological Exposure Indices."
- At air temperatures of 36 degrees Fahrenheit (2 degrees Celsius) or less, employees who become immersed in water or whose clothing becomes wet shall immediately change into dry clothing/blankets and be treated for hypothermia. Blankets shall be included as part of the first aid equipment on such activities, and employees shall ensure they have a change of clothing.
- When manual dexterity is not required, employees shall wear thermally protective gloves when exposed to the following temperatures.
  - For light work, 40 degrees Fahrenheit (4 degrees Celsius) and below and
  - For moderate and heavy work, 20 degrees Fahrenheit (minus 6.6 degrees Celsius) and below.
- When fine work is required to be performed with bare hands for more than 10-20 minutes in an environment below 50 degrees Fahrenheit (10 degrees Celsius), procedures will be established for keeping employees' hands warm.
- Metal handles and control bars will be covered by thermal insulating material at temperatures below 30 degrees Fahrenheit (minus 1 degree Celsius).
- Cold weather sheltering and clothing requirements:
  - If wind chill is a factor at a work location, the cooling effect of the wind shall be reduced by shielding the work area, or SES employees will wear an outer windbreak layer garment. The project AHAs will include details for specific controls to minimize employee exposure to extreme cold.
  - Extremities, ears, toes, and nose shall be protected from extreme cold by proper clothing, such as hats, gloves, masks, etc.
  - Employees whose clothing may become wet will wear an outer layer of clothing that is impermeable to water.
  - Outer garments must provide for ventilation to prevent wetting of inner clothing by sweat.
  - If clothing is wet, the employee shall change into dry clothes before entering a cold environment.
  - Employees will change socks and removable felt insoles at regular daily intervals or use vapor barrier boots.
  - Because of the added danger of cold injury from evaporative cooling, employees handling evaporative liquid (such as gasoline, alcohol, or cleaning fluids) at air temperatures below 40 degrees Fahrenheit (4 degrees Celsius) will be trained in precautions to avoid soaking of clothing or contact with skin.
  - Eyewear providing protection against ultraviolet light, glare, and blowing ice crystals shall be provided to employees in snow and/ or ice-covered terrain.
- Environmental monitoring shall be conducted as follows:

- At air temperatures below 45 degrees Fahrenheit (7 degrees Celsius) the temperature shall be monitored a minimum of every eight hours or as warranted.
- At temperatures below 45 degrees Fahrenheit (7 degrees Celsius) and above 30 degrees Fahrenheit (minus 1 degree Celsius) the temperature and wind speed shall be monitored every four hours or as warranted.
- At air temperatures below 30 degrees Fahrenheit (minus 1 degree Celsius) the temperature and wind speed shall be measured and recorded at least every four hours or more frequently if it begins to lower.
- The equivalent chill temperature and frostbite precautions shall be determined by using Figure 8-1.
- SES employees who express concern about their ability to work in a cold environment shall provide medical documentation on their ability to work in cold weather [30 degrees Fahrenheit (minus 1 degree Celsius) or below]. If medical documentation is provided that shows they are suffering from diseases or taking medication that interferes with normal body temperature regulation or reduces tolerance to work in cold environments, they will be excluded from the cold weather tasks.

## **9. STANDARD OPERATING PROCEDURES**

This section contains general safety rules that apply to all operations conducted by SES and its subcontractors. These requirements apply to all SES projects in general; therefore, some portions may not apply to this project specifically. The provisions of this plan are mandatory for all on-site employees and visitors.

### **9.1 SITE RULES/PROHIBITIONS AND GENERAL SAFETY RULES**

- The SSHO or field manager will conduct daily safety meetings/ briefings, and all field workers are required to attend.
- The SSHO, field manager, or other SES management personnel are responsible for suspending or stopping work in the event of
  - Inadequate safety and health precautions on the part of any site personnel or
  - Potential significant environmental impact from planned activities.
- Personnel will perform only those tasks they believe they can do safely.

### Wind Chill Temperature Table

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

LITTLE DANGER                      INCREASED DANGER                      GREAT DANGER

RISK OF FROSTBITE (see times on chart below)

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)

#### Wind Chill Category

Work Intensity	Little Danger	Increased Danger	Great Danger
<b>High</b> Digging foxhole, running, marching with rucksack, making or breaking bivouac	Increased surveillance by small unit leaders; Black gloves optional - mandatory below 0°F (-18°C);	ECWCS or equivalent; Mittens with liners; No facial camouflage; Exposed skin covered and kept dry; Rest in warm, sheltered area; Vapor barrier boots below 0°F (-18°C) Provide warming facilities	Postpone non-essential training; Essential tasks only with <15 minute exposure; Work groups of no less than 2; Cover all exposed skin, Provide warming facilities
<b>Low</b> Walking, marching without rucksack, drill and ceremony	Increased surveillance; Cover exposed flesh when possible; Mittens with liner and no facial camouflage below 10°F (-12°C); Full head cover below 0°F (-18°C). Keep skin dry - especially around nose and mouth.	Restrict Non-essential training; 30-40 minute work cycles with frequent supervisory surveillance for essential tasks. See above.	Cancel Outdoor Training
<b>Sedentary</b> Sentry duty, eating, resting, sleeping, clerical work	See above; Full head cover and no facial camouflage below 10°F (-12°C); Cold-weather boots (VB) below 0°F (-18°C); Shorten duty cycles; Provide warming facilities	Postpone non-essential training; 15-20 minute work cycles for essential tasks; Work groups of no less than 2 personnel; No exposed skin	Cancel Outdoor Training

**These guidelines are generalized for worldwide use. Commanders of units with extensive extreme cold-weather training and specialized equipment may opt to use less conservative guidelines.**

Source: USARIEM Technical Note "SUSTAINING HEALTH & PERFORMANCE IN COLD WEATHER OPERATIONS," October 2001

**Figure 8-1 Wind Chill Temperature and Frostbite Precautions**

- Personnel will notify the SSHO of any medical conditions that require special consideration.
- Proper workplace housekeeping will be maintained at all times.
- Contact with potentially contaminated materials will be avoided unless directly related to a planned work task.
- All injuries and/ or accidents will be reported to the SSHO or field manager immediately.
- All site workers will adhere to a buddy system whenever in the exclusion zone (EZ) or when otherwise engaged in field activities.
- Horseplay is strictly prohibited on the project site.

## **9.2 WORK PERMIT REQUIREMENTS**

SES will obtain or coordinate with the USACE project representative to obtain all necessary permits to safely execute this project. At a minimum, these will include excavation permits before any Geoprobe<sup>®</sup> boring and other intrusive activities.

## **9.3 MATERIAL HANDLING PROCEDURES**

- Never approach operating equipment from the rear. Always maintain eye contact with the operator, and confirm that the operator has stopped the motion of the equipment.
- Never approach the side of operating equipment; remain outside the swing and turning radius.
- Maintain distance from pinch points of operating equipment.
- Because heavy equipment may not be equipped with properly functioning reverse signal alarms, never turn your back on any operating equipment.
- Never climb onto operating equipment or operate contractor/ subcontractor equipment.
- Never ride contractor/ subcontractor equipment unless it is designed to accommodate passengers and equipped with a firmly attached passenger seat.
- Never work or walk under a suspended load.
- Never use equipment to lift personnel; do not ride excavator buckets or crane hooks.
- Always stay alert and maintain a safe distance from operating equipment, especially equipment on cross slopes and unstable terrain.

## **9.4 DRUM CONTAINER AND/OR TANK HANDLING**

- Minimize transportation of drums.
- Individuals manually handling drums shall wear ANSI-approved safety-toe boots with metatarsal guards.
- Ensure that drums are secured to avoid tipping, falling, or spilling of contents.
- Use mechanical means for handling drums, including material handling equipment or a drum dolly.
- Transfer the content of drums using a method that minimizes contact with the material.
- Spill-containment and PPE procedures must be appropriate for the material to be handled.
- Ensure that all drums are properly labeled and stored in identified appropriate waste storage areas.

## **9.5 COMPREHENSIVE AHA OF TREATMENT TECHNOLOGIES EMPLOYED AT THE SITE**

No treatment technologies will be used in this phase of work; therefore, this section does not apply to this project.

## **9.6 PROJECT HAZARD CONTROLS**

### **9.6.1 Confined Space Entry**

Entry into a confined space is not expected during this project; however, if confined space entry becomes necessary, it will be performed in accordance with 29 CFR 1910.146, EM 385-1-1, and SES S&H Manual Section 14.0, “Confined Space Entry.”

### **9.6.2 Hot Work and Fire Protection**

No hot work activities are expected during this project.

### **9.6.3 Electrical Safety**

All electrical work will be conducted in accordance with 29 CFR 1910, Subpart S, EM 385-1-1, Section 11, and SES S&H Manual Section 5.0, “Electrical Safety Program and Lockout/Tagout.”

- All portable electrical equipment will be double-insulated or grounded and connected through a ground fault circuit interrupter.
- Conductive materials will be kept clear of energized power lines.
- Access to areas where high voltage is present will be restricted to authorized personnel.

### **9.6.4 Drilling Safety**

- The drill rig is not to be operated in inclement weather.
- The driller is to verify that the rig is properly leveled and stabilized before raising the mast.
- Personnel should be cleared from the sides and rear of the rig before the mast is raised.
- The driller is not to drive the rig with the mast in the raised position.
- The driller must check for overhead power lines before raising the mast. A minimum distance of 15 feet between the mast and overhead lines (<50kV) is recommended. Increased separation may be required for lines greater than 50kV.
- Personnel should stand clear before rig startup.
- The driller is to verify that the rig is in neutral when the operator is not at the controls.
- Become familiar with the hazards associated with the drilling method used (cable tool, air rotary, hollow-stem auger, etc.).
- Do not wear loose-fitting clothing, watches, etc., that could get caught in moving parts.
- Do not smoke or permit other spark-producing equipment around the drill rig.
- The drill rig must be equipped with a kill wire or switch, and personnel are to be informed of its location.
- Be aware and stand clear of heavy objects that are hoisted overhead.
- The driller is to verify that the rig is properly maintained in accordance with the drilling company’s maintenance program.
- The driller is to verify that all machine guards are in place while the rig is in operation.
- The driller is responsible for housekeeping (maintaining a clean work area).
- The drill rig should be equipped with at least one fire extinguisher.
- If the drill rig comes into contact with electrical wires and becomes electrically energized, do not touch any part of the rig or any person in contact with the rig, and stay as far away as possible. Notify emergency personnel immediately.

- If any hoisting and rigging activities are necessitated during the course of work, the AHAs, EM 385-1-1 Sections 15 and 16 (2012 version) and 29 CFR 1926.251 and 1926.550 shall be consulted. A qualified rigger must be present to conduct rigging activities.

### **9.6.5 Machine Guarding**

All equipment will be operated with all guards and safety devices provided by the manufacturer in place and in compliance with 29 CFR 1910, Subpart O, and EM 385-1-1, Section 16B. If a guard or device must be removed for servicing or repair, the equipment will be disabled to prevent movement or unexpected energization.

### **9.6.6 Lockout/ Tagout**

No lockout/ tagout activities are expected during this project; however, any nonroutine service and maintenance of equipment will be conducted in accordance with 29 CFR 1910.147 and SES S&H Manual Section 5.0, "Electrical Safety Program and Lockout/Tagout." The requirements of 1910.147, including locks (where possible) and tag systems, will be applied to all site equipment when maintenance and/or repair actions are required. All sources of energy, including hydraulic and pneumatic as well as electrical and kinetic, will be secured and locked (where possible) and tagged during performance of these activities to prevent inadvertent movement during the course of maintenance or other related work.

### **9.6.7 Fall Protection**

Workers conducting activities subject to a fall of greater than 4 feet shall comply with the requirements of the SES Fall Protection Program found in Section 4.0 of the SES S&H Manual. Workers shall be protected by a standard rail or the use of a fall protection device. A standard rail consists of a top rail (42 inches nominal from the working surface), a mid-rail, and supporting posts at least 8 feet apart. The rail shall be capable of safely supporting a force of 200 pounds in any direction. Fall protection devices shall consist of a full-body harness and a lanyard attached to an anchorage point capable of withstanding a shock force of 5,400 pounds.

### **9.6.8 Unknown or Unanticipated Buried Objects**

If unknown or unanticipated buried objects or site conditions [such as drums, tanks, cylinders, munitions of explosive concern (MEC)] are encountered during site operations, ongoing activities shall be immediately suspended. SES or subcontractor personnel encountering unknown or unanticipated buried objects shall

1. Secure equipment to the extent possible without causing bodily injury,
2. Evacuate the work area,
3. Immediately notify the person responsible for site operations of the encountered condition, and
4. Avoid generating any additional disturbance of the unknown condition or otherwise handling the buried object.

The SES individual responsible for site operations shall contact the SES project manager (overall) and SES SSHO to evaluate potential hazards associated with the specific situation encountered. The project team will then address the need for special procedures, engineering controls, PPE, or specialized subcontract personnel to safely mitigate the situation.

### 9.6.9 Unexploded Ordnance/ Munitions of Explosive Concern (Avoidance)

UXO/ MEC are a safety hazard that may constitute an imminent and substantial danger to the personnel performing environmental investigation and removal action activities and the public in general. UXO contamination must be considered a possibility on all formerly used defense sites and active military installations. In general, all non-UXO qualified personnel will follow the safe work practices listed below:

- **Stop all work.** Under no circumstances should work continue near the item(s).
- Retreat a safe distance from the object (minimum 25 yards).
- Non-UXO qualified personnel will not touch or disturb any object that could potentially be UXO or MEC-related and will immediately notify the resident officer in charge or the commanding officer.
- Mark the general location of the item for reference. Do not place anything on or near the item where it may come in contact with the item.
- If possible, take a picture of the item for reporting purposes.
- DO NOT attempt to move the item for any reason.
- DO NOT take items for souvenirs regardless of what you may think they are. UXO/ MEC items can be very deceiving by outward appearances.
- If project personnel have any questions or concerns about UXO/ MEC hazards, contact the safety and health manager.

### 9.6.10 Hazard Communication

Hazard communication will be governed by 29 CFR 1910.1200, EM 385-1-1, Section 8, and SES S&H Manual Section 13.0, "Hazard Communication." At a minimum, the following actions will be taken.

- All hazardous material containers will be labeled. Labels will include
  - Contents of the container;
  - Designation of health, flammability, and reactivity hazards; and
  - Name and address of the manufacturer.
- MSDSs/ SDSs for all hazardous materials that are present will be maintained on site.
- Site-specific training will include hazards posed by the materials, protective measures, and emergency procedures.

### 9.6.11 Illumination

All fieldwork will be conducted during daylight hours. Special requests for work during nondaylight hours along with additional hazard controls must be submitted to the contracting officer. Fieldwork conducted during nondaylight hours will be identified in the hazard assessment table. Artificial illumination will be used to ensure general work areas are illuminated to a level of at least 10 foot candles.

### 9.6.12 Sanitation

- Means for washing hands and faces will be provided at the work site through the use of a standalone portable sink station with soap and paper towels.
- Potable drinking water will be provided in labeled, sanitary dispensers.
- An adequate number of toilet facilities will be provided based on the number of workers through the use of a "porta potty" standard portable restroom.

## 10. SITE CONTROL MEASURES

The SSHO will be responsible for establishing the site perimeter protection zones around SES-controlled areas that present physical or chemical hazards. SES and subcontractors will establish a perimeter using portable temporary safety fencing, cones, and signs to secure the area from inadvertent entry by personnel not associated with the project.

Implementation of control zones will minimize the number of workers potentially exposed to hazards and will minimize the spread of possible contamination from the site. The SSHO will monitor the implementation of the site control work rules and will report any deviations from prescribed practice to the field manager or stop work as appropriate.

SES will attempt to exclude all unauthorized personnel from exclusion and contamination reduction zones. If unauthorized personnel enter and refuse to leave the SES-controlled control zones, work will be stopped and the USACE technical manager will be notified.

Figure 10-1 shows anticipated control zones. To prevent both exposure of unprotected personnel and migration of contamination, work areas and PPE requirements will be clearly identified when operations that fall under the requirements of 29 CFR 1910.120/ 29 CFR 19126.65 are executed. This SSHP requires that the area surrounding each work area be divided into three distinct zones: EZ, the contamination reduction zone (CRZ), and the support zone (SZ).

### 10.1 EXCLUSION ZONE

The EZ is that area where the greatest potential for exposure to contamination exists. Access to the EZ will be restricted to authorized SES and subcontractor personnel. The perimeter of the EZ will be marked by barricade tape, rope, or similar marking. The entry and exit locations for the EZ will be appropriately identified.

The standard rules below will apply to all entry into the EZ:

- The SSHO or field manager will approve and log entry into the EZ.
- All personnel entering the EZ will wear the prescribed level of protective clothing.
- All hand-to-mouth contact (food, drink, tobacco, etc.) is prohibited in the EZ.
- All personnel in the EZ will follow the buddy system.
- A sound level survey will be performed for Geoprobe operation at startup. Sound levels will be identified at the source and then again at intervals of every 10 feet concentrically. Depending on the results of the sound level survey and using the premise that for every doubling of distance from the noise source there is a 6 dB reduction in noise, a boundary/barrier zone will be established identifying
  1. The zone where noise levels exceed 105 dB and double-layer hearing protection is mandatory;
  2. The zone where noise levels exceed 85 dB but do not exceed 105 dB and single-layer hearing protection with a minimum NRR of 32 is required; and
  3. The preferred worker location zone, where noise exposures are controlled administratively to less than 85 db(A) by distance from the source.

When double hearing protection is required (noise greater than 105 dBA), affected employees will switch from ANSI Z87.1-2010 standard safety glasses with side shields to safety goggles that meet the requirements of ANSI Z87.1-2010, where the elastic strap can be worn over the exterior of the earmuff rather than the stem of the safety glasses breaking the seal of the earmuffs.

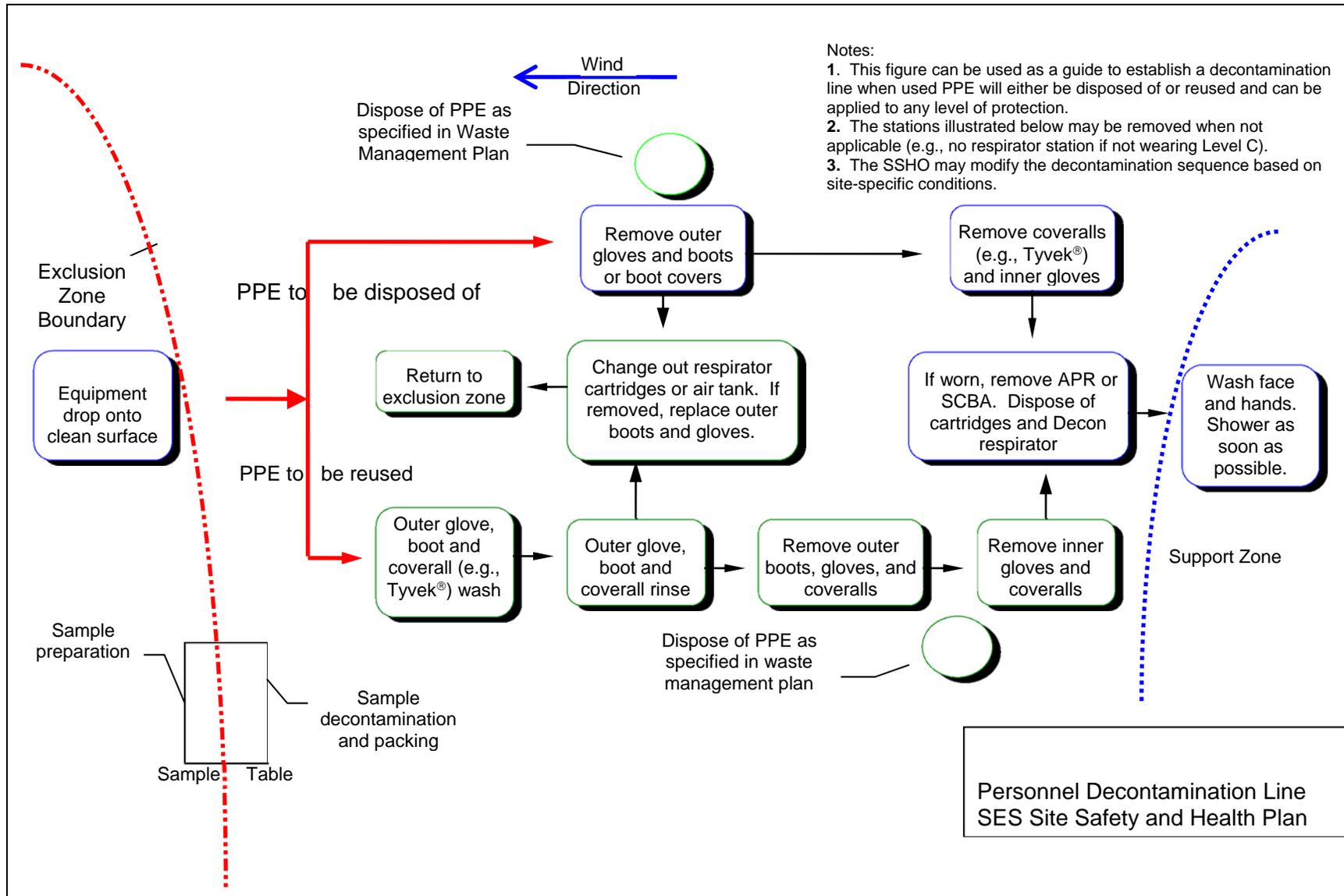


Figure 10-1 Representative Exclusion Zone/Contamination-Reduction Zone)/Support Zone

- A minimum distance of 30 feet will be maintained as the EZ around the Geoprobe as shown in Figure 10-2.

EZs will be established around all drill rigs, areas of heavy equipment use, and all activities where contamination is a potential hazard. **The EZs will be a minimum of 10 feet; the actual distances will be based on the results of the sound level meter survey.**

## 10.2 CONTAMINATION REDUCTION ZONE

Each CRZ will be a clearly marked corridor between the EZ and the SZ. The CRZ for each area will be immediately next to the EZ. This area will be identified with yellow tape, high-visibility construction fencing, or other suitable barriers.

The CRZ is where personnel will begin the sequential decontamination process when exiting the EZ. To prevent cross-contamination and for accountability, all personnel must enter and leave the EZ through the CRZ.

Contaminated personnel and equipment will exit the EZ directly to the CRZ. Each CRZ will contain constructed decontamination stations for personnel and equipment. If possible, the CRZ will be upwind of each EZ; however, because of site constraints, this may not be possible. Temporary SZs for each work area will be adjacent to the CRZs.

All personnel entering the CRZ will wear the prescribed level of protection, and hand-to-mouth activities will be prohibited.

## 10.3 SUPPORT ZONE

The SZ is the clean and relatively safe area surrounding the EZ and CRZ. The SZ is limited to the areas of the site associated with the project and generally does not include such areas as office trailers, roads, and buildings accessible to the public. The primary functions of the SZ are

- As staging areas for clean equipment and supplies and
- A location for support services.

Temporary SZs and staging areas will be established at the entrance of each control area. Potable water, an eye wash, and first aid supplies will be at each temporary SZ. No hazardous or potentially hazardous materials will be allowed in the SZ unless they are in a properly labeled container with no external contamination. Eating, drinking, and smoking will only be allowed at designated locations in this area.

Portable bathroom facilities will be near the work areas. In addition, potable water and water and soap for hand washing, containers for solid waste for use by site personnel, first aid stations, and administrative information will be available in the SZ.

## 10.4 SITE COMMUNICATIONS

Field personnel will be able to contact other field personnel and outside agencies. Communication on site may be accomplished verbally, using hand signals, or by hand held radios. If the size of the site dictates, portable air horns may be used to signal other site personnel. If telephone service is not readily available, project personnel may be equipped with cellular phones.

## **11. PERSONAL HYGIENE AND DECONTAMINATION**

Specific procedures will be used to control the spread of contamination from the EZ and ensure that workers are sufficiently free of contamination to avoid adverse health effects. These procedures will include the doffing of PPE and personnel decontamination. The SSHO will ensure the construction of decontamination stations as necessary and ensure that site personnel follow acceptable decontamination processes. The following sections present the basic requirements for personnel. The SSHO may modify these procedures if improvements are needed.

### **11.1 LEVEL D MODIFIED DECONTAMINATION**

#### **STEP 1: Remove disposable gloves and boot covers**

Gloves and boot covers will be turned inside out and deposited in a designated container.

#### **STEP 2: Field Wash**

Wash face and hands with soap and water.

## **12. EQUIPMENT DECONTAMINATION**

Any heavy equipment that has entered the EZ and made contact with potentially contaminated media shall be decontaminated prior to leaving the CRZ. Generally, decontamination will consist of steam cleaning or pressure washing affected equipment. Sampling equipment may undergo a dilute nitric acid rinse or methanol wash depending on the sampling being performed. All decontamination liquids or solids shall be contained and disposed in accordance with Federal, state, and local regulations.

## **13. PERSONAL PROTECTIVE EQUIPMENT DECONTAMINATION**

Where and whenever possible, single-use, external protective clothing shall be used for work within the EZ or CRZ. This protective clothing shall be disposed of in marked containers. Depending upon subsequent analysis, this protective clothing may require disposal as hazardous waste.

Reusable protective clothing will be rinsed at the site with detergent and water. The rinseate will be collected for possible disposal as hazardous waste. The MSDS/ SDS for Alconox, which will be used for decontamination of PPE and equipment, will be present on site and is available in Attachment 2 of the APP.

## **14. EMERGENCY EQUIPMENT AND FIRST AID**

Emergency equipment and first aid requirements can be found in Section 9.b.6 of the APP.

## **15. EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES**

Emergency response and contingency procedures can be found in Section 9 of the APP.

## 16. LOGS, REPORTS, AND RECORD KEEPING

A system of logs and reports will be used to document activities related to site safety and health. The SSHO will generate a brief weekly summary of safety and health issues and resolutions. The report will include all injuries, accidents, near-misses, and interpretations of the APP.

In addition to the weekly reports, the following documents will be generated and submitted to the USACE Savannah District project manager.

- Certification records, including copies of the safety and health training, medical clearances, and respirator fit test records for on-site personnel. These records are included in Attachment 3 of the APP and will be kept on site;
- On-site training logs with the signatures of the trainer and all attendees. They also will include documentation of pre-entry briefings, safety meetings, and visitor training;
- Safety inspection logs with the dates of the inspection, the identity of the person conducting the inspection, the areas inspected, findings, and corrective actions;
- Sign-in log for all employees and visitors. It will contain the names of persons who perform on-site work or visit the site; and
- Environmental and personal exposure monitoring/ sampling results will be maintained in a log with the monitoring data, location and time, types of work being done, calibration records, and identity of person conducting the monitoring.

## 17. REFERENCES

American Conference of Government Industrial Hygienists, 2013. "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices."

ARCADIS/ Malcolm Pirnie, September 2011. *Final Phase 2 Confirmatory Sampling Report, Fort Stewart, Georgia.*

National Institute of Occupational Safety and Health, September 2007. *NIOSH Pocket Guide to Chemical Hazards.*

SpecPro Environmental Services LLC, June 2009. *SpecPro Environmental Services LLC Safety and Health Program Manual.*

U.S. Army Corps of Engineers (USACE), May 2007. *Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities (ER 385-1-92).*

USACE, September 2008 (updated July 2012). *Safety and Health Requirements Manual (EM-385-1-1).*

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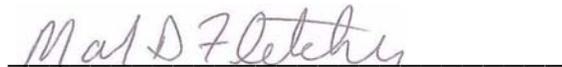
**Attachment 9**  
**Sterling Operations Standard Operating Procedures**

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**STANDARD OPERATING PROCEDURE 120-I  
MUNITIONS AND EXPLOSIVE OF CONCERN RESPONSE ACTIONS OPERATIONS  
for ANOMALY AVOIDANCE**

**Approval Page**

**This Standard Operating Procedure (SOP) has been reviewed by the Sterling's Project Management Office, and is found to be within Sterling directives. Implementation of the procedures contained within this document is required during all Sterling munitions response operations. These procedures become effective on 18 November 2013. Deviation from these procedures requires prior approval of the Sterling Director, Program Management Office.**

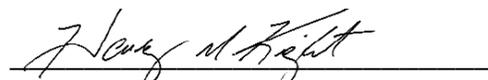


Mark Fletcher  
Director, Project Management Office  
Sterling Global Operations, Inc.

## STANDARD OPERATING PROCEDURE 122 MOTOR VEHICLE OPERATION

### Approval Page

This Standard Operating Procedure (SOP) has been reviewed by the Sterling Corporate Director of Safety and is found to be within Sterling's Corporate Environmental Safety and Health Program directives. Implementation of the procedures contained within this document is required during all Sterling site operations. These procedures become effective on 12 February 2014. Deviation from these procedures requires prior approval of the Sterling Corporate Director of Safety.

  
Henry Kight  
Director, Safety  
Sterling Global Operations

## STANDARD OPERATING PROCEDURE 123 PERSONAL PROTECTIVE EQUIPMENT PROGRAM

### Approval Page

This Standard Operating Procedure (SOP) has been reviewed by the Sterling Corporate Safety Director and is found to be within Sterling's Corporate Environmental Safety and Health Program directives. Implementation of the procedures contained within this document is required during all Sterling site operations. These procedures become effective on 10 February 2014. Deviation from these procedures requires prior approval of the Sterling Corporate Safety Director.

A handwritten signature in black ink, appearing to read "Henry Kight", is written over a horizontal line.

**Henry Kight**  
**Director, Safety**  
**Sterling Global Operations**

## **1.0 PURPOSE**

The purpose of this program is to provide Sterling personnel with general guidelines and procedures for the selection and use of personal protective equipment (PPE). In accordance with (IAW) OSHA standards, Sterling will, whenever possible, use engineering controls or other means to control personnel exposures to chemical and physical hazards encountered during operations conducted on hazardous waste and unexploded ordnance (UXO) sites. Whenever engineering controls or other protective measures are not feasible or adequate, this program will be used to select the PPE necessary to ensure the health and safety of site personnel.

## **2.0 SCOPE**

This program will be applicable to Sterling projects conducted on hazardous waste or UXO sites where PPE is required and used. The provisions of this program apply to all Sterling and subcontractor personnel who perform operations where PPE is required by the Site-Specific Safety and Health Plan (SSHP).

## **3.0 RESPONSIBILITIES**

### **3.1 DIRECTOR OF SAFETY**

The Director of Safety is responsible for the overall implementation of the program, and for management of the Sterling resources needed for its implementation. The Director of Safety is also responsible for the final review and approval of this program.

### **3.2 CORPORATE SAFETY MANAGER (CSM)**

The CSM is responsible for the continued development and review of this program, and for providing consultation to the Site Safety and Health Officer (SSHO) regarding the PPE to be used for protecting personnel from the chemical and physical hazards found on site. The OSHM is also responsible for the following:

1. Reviewing newly developed or improved PPE, in order to identify products that may afford a higher degree of protection or provide a level of protection not previously available,
2. Conducting a task hazard assessment for each task conducted on site, and identifying the chemical and physical hazards from which site personnel will require protection,
3. Completing the Certification of Task Hazard Assessment form for each task conducted on site,

4. Creating, and incorporating into the SSHP, a Personal Protective Equipment Plan (PPEP) that outlines the PPE to be used for each task conducted on site, and
5. Periodically inspecting the Sterling project sites, in order to ensure that the provisions of this program and the PPEP are being implemented.

### **3.3 SITE SAFETY AND HEALTH OFFICER (SSHO)**

The SSHO is responsible for the on-site implementation of this program. To this effect, the SSHO will be responsible for the following:

1. Providing initial training, as specified in Paragraph 5.0 of this program, to inform site personnel of the selection, use, limitations, and maintenance of PPE used on site,
2. Issuing PPE IAW the provisions of the SSHP,
3. Assisting site personnel with the inspection and maintenance of PPE,
4. Consulting with the OSHM to determine the levels and types of PPE to be used for tasks not previously addressed in the SSHP,
5. Completing the Certification of Task Hazard Assessment form for any new tasks which were not previously addressed in the SSHP, and
6. Conducting daily inspections and weekly audits of the site, in order to ensure that site workers are complying with this program and the PPEP.

## **4.0 SELECTION OF PPE**

### **4.1 INTRODUCTION**

**4.1.1** Each task outlined in the Statement of Work (SOW) will be assessed prior to its initiation to determine the risk of personnel exposure to safety and health hazards which may be encountered during its conduct. The hazard assessment will be based on available information pertaining to the historical use of the site, site contaminant characterization data, and the anticipated operational hazards. This information will either be provided by the client or collected by Sterling site personnel. The PPE assigned as a result of the hazard assessment represents the minimum PPE to be used during initial site activities. Since hazard/risk assessment is a continuing process, changes in the initial types and levels of PPE will be made IAW information obtained from the actual implementation of site operations and data derived from the site

monitoring. As a general rule, the levels of PPE will need to be reassessed if any of the following occur:

1. Commencement of a new work phase, such as the start of drum sampling or work that begins on a different portion of the site,
2. Change in job tasks during a work phase,
3. Change of season/weather,
4. Temperature extremes or individual medical considerations that limit the effectiveness of PPE,
5. Encountering of contaminants other than those previously identified
6. Change in ambient levels of contaminants, and
7. Change in work scope that affects the degree of contact with contaminants.

**4.1.2** If work tasks are added or amended after completion and approval of the SSHP, the SSHO will conduct the task hazard assessment and consult with the CSM. The level and type of PPE to be used will be identified, and the SSHO will complete the Certificate of Task Hazard Assessment form. Any changes in PPE that involve downgrading the level of PPE will be allowed only after review by the CSM.

## **4.2 SELECTION CRITERIA**

**4.2.1** The CSM and SSHO will utilize the general chemical resistance information found in Table 1 and Appendix B, the manufacturer's permeation and breakthrough specifications, the requirements outlined in Appendix A, and the anticipated chemical and physical hazards, to select the level and types of PPE to be used for each task.

**4.2.2** During the selection of PPE, the CSM and SSHO will also take into consideration the following factors:

1. Limitations of the equipment.
2. Work mission duration.
3. Temperature extremes.
4. Material flexibility.
5. Durability/integrity of the equipment.

**4.2.3** Once the specific types of PPE have been selected for each task, the SSHO and CSM will ensure that the items purchased will properly fit each employee designated to wear PPE.

**4.2.4** Selection of respiratory protection will be conducted IAW [Sterling Corporate Safety SOP 125 - Respiratory Protection Program](#).

**4.2.5** Specific limitations of the PPE selected for site use will be outlined in the PPEP found in each SSHP.

## **5.0 TRAINING**

### **5.1 TRAINING SCHEDULE**

**5.1.1** All Sterling, contractor, or subcontractor site personnel will be given initial PPE-specific training that complies with this section. This training will be given by the SSHO prior to personnel participating in site operations where PPE is required. This, and all other subsequent PPE training, will include the relevant topics outlined in Paragraph 5.2 of this program.

**5.1.2.** Site personnel will be given additional PPE training whenever any of the following occur:

1. The SSHO has reason to believe that a previously trained employee's knowledge or use of assigned PPE indicates that the employee has not retained the requisite skill or understanding needed to properly use the PPE in question.
2. Changes in the work place render previous training obsolete.
3. Changes in the types of PPE to be used render previous training obsolete.

### **5.2 REQUIRED TRAINING TOPICS**

**5.2.1** Sterling will provide all affected site personnel with PPE training that covers the following topics:

1. The decisions and justifications used to select each piece of PPE.
2. The nature of the hazards, and the consequences of not using PPE.
3. What PPE will be required for the conduct of each task.
4. When PPE will be required during the performance of each task.
5. How to properly don, doff, adjust, and wear each piece of PPE.
6. The proper inspection, cleaning, decontaminating, maintenance, and storage of each PPE item used.
7. The limitations of the PPE.

**5.2.2** All personnel receiving PPE training will be required to demonstrate an understanding of the training topics and the ability to correctly use the PPE. This will be

accomplished through the SSHO supervising and visually inspecting each individual's ability to properly don and use the PPE during its initial use.

**5.2.3** Upon completion of the training, and after each employee has successfully demonstrated the requisite understanding, the SSHO will complete the [Personal Protective Equipment Training Log](#) (DC # 14188) which identifies: the employees who attended the training course and successfully demonstrated the required knowledge, the date(s) of the training and demonstration session(s), and the PPE covered by the training session.

## **6.0 LEVELS OF PPE**

The following paragraphs outline the different levels of PPE that may be used by Sterling personnel during the conduct of site activities. The levels described do not identify specific makes, types, or brands of PPE, since that information is site-specific and directly related to the nature and degree of hazards and contaminants which may be encountered at each site. These levels of PPE provide a general guideline, and may be modified to address site-specific hazards and contaminants. Information related to the OSHA mandated requirements for different types of PPE is outlined in Appendix A of this procedure, and may be referenced when selecting specific PPE required for each level, described below.

### **6.1 SPECIAL CONSIDERATIONS**

The following special considerations shall be observed in the selection of PPE for the levels discussed below:

1. Hard hats are not required unless working around heavy equipment, or an overhead hazard exists.
2. Steel toe/shank boots are not required during surface/subsurface location of UXO unless a serious toe hazard exists, in which case a fiber safety toe will be used.
3. Safety glasses, goggles, and face shields will be required only when an eye hazard exists, such as the potential for flying objects, chemical splash, or contact with sharp objects.
4. When required, eye protection will be selected which provide site personnel with the best protection from not only physical hazards, but also ultra-violet radiation.
5. The OSHA standards for PPE selection are vague concerning selection of some types of specific PPE; therefore, Sterling will continually evaluate site tasks to identify hazards, and will provide

any PPE necessary to ensure the safety and health of site personnel, regardless of the activity they perform.

## **6.2 LEVEL D PPE**

This level of PPE is not allowed in areas of the site where atmospheric hazards are known or expected to exist. Level D should be worn only if the activity in which personnel are engaged does not have the potential for splash, immersion, or any other contact with hazardous substances. Level D involves the use of the following PPE:

1. Work clothes or coveralls (cotton).
2. Leather work gloves (optional unless hand hazards exist).
3. Leather work boots with safety toe.
4. Hard hat (when working around heavy equipment or overhead hazards).
5. Safety glasses (optional unless eye hazards exist).

## **6.3 MODIFIED LEVEL D PPE**

Modified Level D affords protection from casual contact with contaminated soils and materials, but should be worn whenever there is a potential for overexposure to airborne hazardous substances. Modified Level D involves the use of the following PPE:

1. Chemical-resistant suit with attached booties.
2. Five-minute escape mask (if the potential for airborne exposure exists).
3. Chemical-resistant boot covers.
4. Gloves – cotton lined inner, latex inner, and chemical-resistant outer.
5. Boots – leather work, with safety toe.
6. Hard hat (when working around heavy equipment or overhead hazards).
7. Eye protection – safety glasses or goggles.

## **6.4 LEVEL C PPE**

Level C affords moderate protection from airborne hazards, and should be worn during site activities where the potential exposure to hazardous substances may exceed the OSHA PEL or other published exposure limits. If, however, this level of PPE is used on a known or suspect chemical warfare materiel (CWM) site, this level of protection is not acceptable, since there are no air-purifying respirator cartridges approved for use against CWM. Level C with an air-purifying respirator can only be used for protection

against chemicals for which NIOSH/MSHA approved cartridges exist. Level C will involve the use of the following PPE:

1. Chemical-resistant suit with attached booties and hood.
2. Full-face air-purifying respirator with appropriate filters (NIOSH/MSHA approved).
3. Chemical-resistant boot covers.
4. Gloves – cotton liner inner, latex inner, and chemical-resistant outer.
5. Boots – leather work, with safety toe.
6. Hard hat (when working around heavy equipment or overhead hazards).

### **6.5 LEVEL B PPE**

Level B PPE offers superior protection against the inhalation of airborne contaminants. This is due to the fact that supplied-air or Self Contained Breathing Apparatus (SCBA) respirators are used as the respiratory protection for this level. However, the type of protective suit used with this level of protection is not air-tight, and skin exposure to hazardous vapors is possible. Therefore, this level of protection is not acceptable for use where contact with liquids or vapors which are extremely toxic or corrosive to the skin is anticipated. This level should not be used if the site contains CWM agents, which present a serious safety or health threat via dermal contact. Level B can, however, be used at CWM sites under conditions where: 1) the CWM and other chemical hazards of concern are not acutely skin-toxic; 2) there is no potential for liquid contact, and vapor levels are being continuously monitored; and 3) it is needed to protect site workers from non-CWM hazardous wastes. Level B will involve the use of the following PPE:

1. Chemical-resistant encapsulating or non-encapsulating suit.
2. SCBA or Supplied Air (NIOSH/MSHA approved).
3. Coveralls or scrubs – cotton.
4. Chemical-resistant boot covers.
5. Gloves – cotton lined inner, latex inner, and chemical-resistant outer.
6. Hard hat (when working around heavy equipment or overhead hazards).
7. Boots – leather work, with safety toe.

## 6.6 LEVEL A PPE

Level A PPE provides the highest available level of protection against both inhalation and skin contact of extremely hazardous materials. The Level A suit is fully-encapsulating; but unlike the Level B encapsulating suit, the Level A suit is air-tight and must be tested prior to use in order to ensure that hazardous gases and vapors do not leak into the suit. Since the Level A suit is usually worn in areas where highly toxic and corrosive materials are known to exist, it must be constructed of materials capable of resisting degradation and permeation by the chemicals of concern, including CWM agents. Permeation and breakthrough data for the Level A suit to be used must show that it is capable of resisting the chemicals expected to be found at the site. Since the Level A suit affords the greatest level of protection to dermal hazards, it will be worn in all instances where potential for contact with liquid CWM exists, or when the nature and degree of potential exposure are unknown. Level A will also be worn in the event that site personnel are exposed to and overcome by CWM or other materials, and require rescue. Level A will involve the use of the following PPE:

1. SCBA, Supplied Air, or a combination of both (NIOSH/MSHA approved).
2. Fully-encapsulating chemical protective suit with attached boots and gloves.
3. Coveralls or scrubs – cotton.
4. Gloves – cotton lined inner, latex inner, and chemical-resistant outer.
5. Boots – leather work, with safety toe.
6. Chemical-resistant boot covers (optional).
7. Disposable protective suit worn over fully-encapsulating suit (optional).
8. Hard hat (when working around heavy equipment or overhead hazards).

**Note:** Level A suits are to be worn only when the known chemicals/vapors are highly toxic to skin contact, or when the nature and level of exposure is unknown or unmeasurable. Therefore, the structural integrity and air-tightness of the suit and its seams, zippers, and glove seals are extremely important. To ensure air-tightness of the suit, it should be tested IAW the manufacturer's requirements and the requirements found in Appendix A of 29 CFR 1910.120.

## **7.0 PPE DONNING PROCEDURES**

### **7.1 INTRODUCTION**

The purpose of the PPE donning procedures outlined in this section is to ensure that site personnel don the required PPE in a manner that will afford the greatest degree of protection. Failure to adhere to these procedures may result in the clothing and/or PPE being ineffective against potential contamination. The general donning procedures are given as a guide, and may be altered by the SSHO if the improvements are warranted by site operations and approved by the CSM.

### **7.2 GENERAL REQUIREMENTS**

This paragraph contains general procedures and requirements for donning all levels of PPE. Specific procedures for donning each level of PPE are discussed in the paragraph immediately following the description of the PPE level. The general procedures/requirements are as follows:

1. Prior to donning, gather the PPE required for performing the task specified for the day's operations.
2. Issuance of respiratory equipment will be through the SSHO or his designated representative only.
3. Always inspect protective gloves, boots and boot covers, outer garment, and respiratory protective equipment for proper fit, integrity (i.e., rips, tears, holes), and function.
4. If wearing a level of PPE other than Level A, and a small tear/rip is noticed during initial inspection or while engaged in site activities, it may be repaired using a small piece of tape.
5. If a tear/rip in protective clothing cannot be repaired with a small piece of tape, or if the tear/rip compromises the structural integrity of the clothing, that article of clothing will be replaced, even if this involves leaving the EZ to do so.
6. Whenever protective boots and boot covers or gloves are not part of the outer garment, use duct tape (or an equivalent) to connect the clothing to the gloves at the wrist and to the boots at the leg.
7. When taping boots or gloves to the suit, do not wrap the tape too tightly, as this can cut off circulation and restrict movement. The goal is to simply attach the two, to eliminate a route of entry for chemicals into the suit or gloves.
8. Whenever using tape, always leave a folded tab, placed where it is visible and accessible for ease of removal.

9. If planned site activities will require walking, arm movement, or bending, it is best to place tape over the zipper and over seams at the stress points in the crotch, armpits, and back (where the shoulder seam and hood seam meet).
10. If kneeling will be necessary during site activities, avoid kneeling on any contaminated surfaces, and place tape over the knee areas to reduce the possibility of tearing or wearing out the knees.
11. Consult with the SSHO for any other improvements that would make the suit sturdier and/or improve the comfort of the suit.

### **7.3 DONNING PROCEDURES FOR MODIFIED LEVEL D**

To don Modified Level D, keep in mind the general recommendations above, and put on the PPE utilizing the steps listed below:

1. Put on chemical/splash resistant protective suit (suit should have attached booties).
2. Put chemical-resistant boots on over the booties, and tape the boots to the suit.
3. Make any strengthening modifications to the suit, as deemed necessary by the planned site activities.
4. Assemble and adjust all other PPE (hard hat, safety glasses, splash shield, etc.), and proceed toward the CRZ access point.
5. If ear plugs are to be worn, insert them before putting on inner and outer gloves, or any other PPE that might obstruct the proper insertion of the plugs.
6. Don all other PPE (hard hat, safety glasses, splash shield, etc.), saving the inner and outer gloves for last.
7. Put on inner and outer glove of one hand and have buddy tape that hand, then tape one of the buddy's gloved hands, and so on, until both hands are gloved and taped.
8. Proceed to the EZ access control point to be checked by the EZ access control attendant prior to being cleared for entry.

### **7.4 DONNING PROCEDURE FOR LEVEL C PPE**

To don Level C, follow the general consideration listed in Paragraph 7.2, then follow the steps listed below:

1. Put on chemical/splash resistant protective suit (suit should have attached booties and hood).

2. Put chemical-resistant boots on over the booties, and tape the boots to the suit.
3. Make any strengthening modifications to the suit, as deemed necessary by the planned site activities.
4. Report to the SSHO, or the designated representative, to check out the proper respirator and cartridge assembly.
5. Assemble and adjust all other PPE (hard hat, safety glasses, splash shield, etc.), and proceed toward the CRZ access point.
6. If ear plugs are to be worn, insert them before putting on inner and outer gloves, respirator, or any other PPE that might obstruct the proper insertion of the plugs.
7. Assemble respirator and cartridges, and inspect the assembly for proper cleanliness and function.
8. Don the respirator, and conduct negative and positive pressure fit tests to ensure that the mask is not leaking.
9. Don all other PPE (hard hat, safety glasses, splash shield, etc.), saving the inner and outer gloves for last.
10. Put on inner and outer glove of one hand and have buddy tape that hand, then tape one of the buddy's gloved hands, and so on, until both hands are gloved and taped.
11. Proceed to the EZ access control point to be checked by the EZ access control attendant prior to being cleared for entry.

## **7.5 DONNING PROCEDURES FOR LEVEL B PPE WITHOUT ENCAPSULATING SUIT**

The donning procedure outlined in this paragraph applies to Level B with a non-encapsulating suit. The donning procedures to be followed for Level B with a fully-encapsulating suit are the same as those outlined for Level A in Paragraph 7.6. To don Level B with a non-encapsulating suit, follow the general considerations listed in Paragraph 7.2, and then follow the steps listed below:

1. Report to the SSHO, or the designated representative, to check out the proper SCBA respirator assembly.
2. Assemble and inspect the SCBA system for cleanliness and function.
3. Make sure that all required PPE have been assembled at the location where it is to be donned, and make any adjustments to the equipment prior to starting the donning process.

4. While sitting, insert one leg after the other into the encapsulating suit, stand, and don the suit (suit should have attached booties and gloves).
5. While sitting again, put chemical-resistant boots on over the booties, and tape the boots to the suit.
6. Put on the air tank/harness assembly, adjust for a comfortable, snug fit, and turn on the air at the tank, after first making sure the regulator valve is closed.
7. If ear plugs are to be worn, insert them now, before putting on the respirator face piece or any other PPE that might obstruct the proper insertion of the plugs.
8. Don the SCBA face piece (do not connect the air line at this time), and conduct negative- and positive-pressure fit tests to ensure that the mask is not leaking.
9. Put on glove liners, inner gloves, and outer gloves, and tape gloves to suit.
10. While connecting SCBA to the face piece, turn on the regulator valve and check air flow and breathing usability of the unit.
11. Once the suit and SCBA are situated and assistant has checked to ensure that the wearer is breathing freely, the assistant will put the hard hat on wearer.
12. Proceed to the EZ access control point to be checked by the EZ access control attendant prior to being cleared for entry.

## **7.6 DONNING PROCEDURE FOR LEVEL A AND FULLY-ENCAPSULATING LEVEL B PPE**

To don Level A or Level B with an encapsulating suit, follow the general considerations listed in Paragraph 7.2, then follow steps listed below:

1. Report to the SSHO, or the designated representative, to check out the proper SCBA respirator assembly.
2. Assemble and inspect the SCBA system for cleanliness and function.
3. Make sure that all required PPE have been assembled at the location where it is to be donned, and make any adjustments to the equipment prior to starting the donning process.
4. While sitting, insert one leg after the other into the encapsulating suit, stand, and pull it up to the waist (suit should have attached booties and gloves).

5. While sitting again, put chemical-resistant boots on over the booties, and tape the boots to the suit.
6. Put on the air tank/harness assembly, adjust for a comfortable, snug fit, and turn on the air at the tank, after first making sure the regulator valve is closed.
7. If ear plugs are to be worn, insert them now before putting on the respirator face piece or any other PPE that might obstruct the proper insertion of the plugs.
8. Don the SCBA face piece (do not connect the air line at this time), and conduct negative- and positive-pressure fit tests to ensure that the mask is not leaking.
9. Put on glove liners and inner gloves, and then put on hard hat.
10. While connecting SCBA to the face piece, turn on the regulator valve and check air flow and breathing usability of the unit.
11. Insert the arms into the sleeves, being sure hands fit into the gloves properly, and have the assistant “work” the suit over the SCBA, face piece, and hard hat.
12. Once the suit is situated and the assistant checks to ensure that the wearer is breathing freely, the assistant will zip the suit and check all closures and valves.
13. Proceed to the EZ access control point to be checked by the EZ access control attendant prior to being cleared for entry.

## **8.0 INSPECTION PROGRAM**

### **8.1 INSPECTING INCOMING SHIPMENTS OF PPE**

The SSHO, or a designated appointee, will inspect all incoming shipments of PPE received from the Sterling home office, the manufacturer, or the distributor. This inspection will include checking the shipment for correctness of size, quantity, material, and quality. Any deficiencies should be noted, and defective material returned to the supplier.

### **8.2 PRE-DONNING INSPECTION**

Prior to donning PPE, site personnel will thoroughly inspect each piece of PPE to determine if it is in proper working order, and to ensure that the item will be capable of protecting the employee from site hazards. As applicable, site personnel will check the following when pre-donning inspections are conducted:

1. Chemical-Resistant Clothing (suits, gloves, boots, etc.)
  - a. Check that clothing is made of proper material.

- b. Visually check seams, coating, and zippers, and look for tears.
  - c. Check gloves and boots for pin holes.
  - d. Stretch material to check flexibility and to look for cracks.
2. Eye, Face, and Head PPE
- a. Ensure that equipment is ANSI-approved.
  - b. Check that hard hats are in good condition, with no cracks or chemical/material buildup visible.
  - c. Check hard hat head band for proper function and completeness.
  - d. Ensure that all eye/face/head PPE fits comfortably and securely.
  - e. Check safety glasses and face shields for cracks or scratches that could impair vision or compromise structural integrity.
  - f. Check safety glasses for side shields.
3. Fully-Encapsulating Suits
- a. Check operation of pressure relief valves and fitting of suit.
  - b. Check face shield for cracks, glazing, or fogging.
  - c. Ensure that suit passes pressure test.
  - d. Visually check seams, coating, and zippers, and look for tears.
  - e. Check gloves and boots for pin holes.
  - f. Stretch material to check flexibility, and to look for cracks.
4. Respirators
- a. Inspect IAW [Sterling Corporate Safety SOP 125 - Respiratory Protection Program](#).

### 8.3 PERIODIC INSPECTIONS

During the work task, buddy teams should periodically inspect each other's PPE for evidence of chemical attack, such as discoloration, swelling, stiffening, or softening. Also check for closure failure, tears, punctures, and seam discontinuities. If defective or deficient PPE is identified, it will be repaired or replaced immediately.

## **9.0 CLEANING AND DECONTAMINATION**

The SSHO will be responsible for ensuring that PPE is in good, clean, working order prior to issuing the PPE the first time. Once issued, site personnel will ensure that reusable articles of PPE are maintained in a clean, sanitary fashion. For items used inside an EZ, site personnel will follow the requirements of the Site-Specific Decontamination Plan, and ensure that the PPE is properly decontaminated before removing the item from the EZ or CRZ.

## **10.0 MAINTENANCE**

Maintenance of PPE can vary greatly, based upon the complexity of the PPE and the intricacy of the repair involved. The SSHO will become familiar with the manufacturer's recommended maintenance and, when possible, repair defective PPE. If unable or unauthorized to conduct the repair, the SSHO will return the item to the manufacturer for repair, or to procure a replacement.

## **11.0 STORAGE**

PPE will be stored in a location which is protected from the harmful effects of sunlight, damaging chemicals, moisture, extreme temperatures, impact, or crushing. If needed, the SSHO will designate a specified area for the storage of PPE.

## **12.0 FORMS / ATTACHMENTS**

- 12.1 [PERSONAL PROTECTIVE EQUIPMENT \(PPE\) TRAINING LOG](#) (DC# 14188)**
- 12.2 APPENDIX A – COMPARATIVE CHEMICAL RESISTANCE**
- 12.3 APPENDIX B – SPECIFICATONS FOR INDIVIDUAL TYPES OF PPE**
- 12.4 APPENDIX C – PROTECTIVE CLOTHING MATERIAL GUIDE**

## **APPENDIX A**

### **Comparative Chemical Resistance**

Key: E-Excellent; G-Good; F-Fair; P-Poor; NR-Non Recommended; \*-Limited Service

CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
A. *Acetaldehyde	E	G	G	E
Acetate	G	F	P	G
Acetic acid	E	E	E	E
*Acetone	G	E	P	E
Acetylene gas	E	E	E	E
Acetylene tetrachloride	F	NR	F	F
Acrylonitrile	G	F	F	G
Amidol	G	E	F	E
Amine hardeners	F	F	G	G
Ammonium hydroxide	E	E	E	E
*Amyl acetate	F	P	P	F
Amyl alcohol	E	E	E	E
Anhydrous ammonia	G	E	E	E
Aniline	G	F	P	F
Aniline hydrochloride	F	G	P	F
Aniline oil	F	G	P	F
Animal fats	E	P	E	G
Animal oils	E	F	E	G
Anodex	G	E		E
Anthracene	F	P	F	P
*Aromatic fuels	P	NR	F	NR
Arsine	E	E	E	E
Asbestos	E	E	E	E
Asphalt	G	F	E	F

CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
B. Banana oil	F	P	P	F
*Benzaldehyde	F	F	G	G
*Benzene	P	NR	F	NR
Benzol	P	NR	F	NR
Benzyl alcohol	E	E	E	E
Benzyl benzoate	G	F	G	F
*Benzyl chloride	F	P	F	G
Blacosolve	G	P	G	P
Boron tribromide	G	P	P	P
Bromine	G	P	P	P
Bromoterm	G	P	P	P
Butane	E	F	E	F
2-Butanone	G	G	F	G
Butyl acetate	G	F	P	F
Butyl alcohol	E	E	E	E
*Butylaldehyde	G	G	E	G
Butylene	E	G	E	G

CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
C. *Cadmium oxide fume		E	E	E
Calcium hydroxide	E	E	E	E
Carbolic acid	E	E	F	E
Carbon dioxide	E	E	E	E
Carbon disulfide	F	F	F	F
*Carbon tetrachloride	F	P	G	P
Castor oil	F	P	E	F
Cellosolve	F	G	G	G
Cellosolve acetate	G	F	G	G
Chlordane	G	F	G	F
Chlorine	G	F	F	G
Chlorine gas	G	F	F	G
*Chlorobenzene	F	P	P	F
*Chloroacetone	F	F	P	E
Chlorobromomethane	F	P	F	P
*Chloroform	G	P	E	P
Chloronaphthalene	F	P	F	F
Chlorophenylene diamine	P	P	P	F
Chloropicrin	P	NR	F	NR
*Chlorothene	F	P	F	F
Chromic acid	G	G	G	G
Chromotex	E	E	E	E
Citric acid	F	P	F	
Coal tar pitch volatiles	G	G	E	F
Cottonseed oil	E	E	E	E
Cotton dust (raw)	G	G	F	G
Creosole	G	G	F	G
Cresol	G	G	E	E
Cupric nitrate	G	G	G	G
Cyanide	G	F	G	F
Cyclohexane	G	F	E	G
Cyclohexanol	G	E	F	G
*Cyclohexanone				

CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
D. Decaborane		P	F	F
Degreasing fluids		P	G	P
Diacetone alcohol		E	E	E
Diborane		P	F	F
*Dibetyl ether		G	F	G
*Dibutyl phthalate		P	G	G
Dichloroethane		NR	F	NR
Dichloropropene		P	F	F
Diesel fuel		P	E	P
Diethanolamine		G	E	E
Diethylamine		G	E	G
Diethyltriamine		F	E	G
Diisobutyl ketone		F	P	G
Diisocyanate		P	G	E
Dimethylformamide		F	G	G
Diocetyl phthalate		P	E	F
Dioxane		G	G	G

CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
E. Emulsifying agent	G	F	E	E
Emulthogene	G	F	G	E
Epichlorohydrin	G	P	F	G
Epoxy resins dry	E	E	E	E
*Esters	F	P	P	F
Ethane gas	E	G	E	E
Ethanol	E	E	E	E
Ethers	E	G	G	G
*Ethyl acetate	G	F	F	G
Ethyl alcohol	E	E	E	E
Ethyl bromide			P	
Ethyl ether	E	G	G	E
Ethyl butyl ketone			P	
Ethyl formate	G	F	G	G
Ethylaniline	F	F	P	G
Ethylenediamine	E	G	E	G
Ethylene dichloride	F	P	P	F
Ethylene gas	E	G	E	E
Ethylene glycol	E	E	E	E
Ethylene oxide	G	F	G	
Ethylene trichloride	F	P	G	P
F. Fatty acids	E	P	E	F
Ferrocyanide	F	G	G	E
Fluoric acid	E	G	E	E
Fluorine	G	F	F	G
Fluorine gas	G	F	F	G
Formaldehyde	E	E	E	E
Formic acid	E	E	E	E
Freon 11	G	P	G	F
Freon 12	G	P	G	F
Freon 21	G	P	G	F
Freon 22	G	P	G	F
*Furfural	G	G	G	G

CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
G. Gasoline - leaded	G	P	E	F
Gasoline - unleaded	G	P	E	F
Glycerine	E	E	E	E
Glycerol	E	E	E	E
Glycol	E	E	E	E
Gold fluoride	G	E	E	E
Grain alcohol	E	E	E	E
H. Halogens	G	F	F	G
Hexamethylenetetramine	F	G	F	G
Hexane	F	P	G	P
Hexyl acetate	F	P	P	F
Hydraulic oil ester base	E	P	F	G
petroleum base	G	P	E	P
Hydrazine	F	G	G	G
Hydrochloric acid	E	G	G	G
Hydrofluoric acid	E	G	G	G
Hydrogen gas	E	E	E	E
Hydrogen peroxide--30%	G	G	G	G
Hydrofluosilicic acid	F	G	G	G
Hydroquinone	G	G	F	G
I. Inorganic salts	E	E	E	E
Iodine	G	F	G	G
Isooctane	F	P	E	P
Isopropanol	E	E	E	E
Isopropyl alcohol	E	E	E	E
K. Kerosene	E	F	E	F
Ketoners	G	E	P	E
L. Lacquer thinners	G	F	P	F
Lactic acid	E	E	E	E
Lauric acid	E	F	E	E
Lineoleic acid	E	P	E	F
Linseed oil	E	P	E	F

CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
M. Maleic acid	E	E	E	E
Mercuric chloride	G	E	G	E
Mercury	G	G	G	E
Methane gas	E	E	E	E
Methanol	E	E	E	E
Methyl acetate	G	F	P	G
Methyl alcohol	E	E	E	E
Methylamine	F	F	G	G
Methyl bromide	G	F	F	G
Methyl celiosolve	G	G	G	G
*Methyl chloride	NR	NR	NR	NR
*Methyl ethyl ketone	G	G	NR	E
Methyl formate	G	F	F	G
Methylene bromide	G	G	F	G
Methylene chloride	G	F	F	G
*Methyl isobutyl kelone	F	F	P	E
Methyl methacrylate	G	G	F	E
Mineral oils	E	F	E	F
*Monochlorobenzene	F	P	P	F
Monoethanolamine	E	G	E	E
Morpholine	E	E	G	E
Muriatic acid	E	G	G	E
N. Naphthalene	G	F	G	F
Naphthas aliphatic	E	F	E	F
Naphthas, aromatic	G	P	G	P
*Nitric acid	G	F	F	F
*Nitric acid, red and white fuming	P	P	P	P
*Nitrobenzene	F	P	F	F
*Nitroethane	E	E	E	E
Nitrogen gas	F	P	F	F
*Nitromethane	F	P	F	F
*Nitropropane	G	Q	G	G
Nitrous oxide				

CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
O. Octyl alcohol	E	E	E	E
Oleic acid	E	F	E	G
Oxalic acid	E	E	E	E
Oxygen liquid	F	P	NR	F
Ozone	G	P	P	G
P. Paint thinners	G	F	G	F
Paint and varnish removers	G	F	F	F
Palmitic acid	E	E	E	E
*Paradichlorobenzene	E	F	E	E
Parathion	P	F	F	F
Parathion	F	P	F	F
Pentaborane	F	G	G	G
Pentachlorophenol	F	G	E	G
Pentane	E	F	G	G
Perchloric acid	E	NR	G	NR
Perchloroethylene	F	NR	G	NR
Perklene	E	F	E	NR
Permachlor	G	P	E	
Petroleum distillates (naphtha)	E	F	E	F
Petroleum spirits	E	F	F	G
Phenol	G	P	G	G
Phenylenediamine	G	G	G	G
Phenylhydrazine	E	F	E	G
Phil-sotv	E	G	E	E
Phosphoric acid	E	G	G	E
Pickling solution	G	G	E	G
Picric acid	E	P	E	F
Pine oil	E	P	E	F
Pitch	E	E	E	E
Plating solutions	G	G	G	E
Potassium alum	G	G	G	E
Potassium bromide	G	G	G	E
Potassium chrome alum	F	F	F	E
Potassium dichromate	G	G	G	E

CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
Potassium ferrocyanide	E	E	E	E
Potassium hydroxide	E	G	G	G
Printing inks	E	E	E	E
Propane gas	E	E	E	E
Propanol (iso)	G	F	F	G
Propyl acetate	E	E	E	E
Propyl alcohol	E	E	E	E
Propyl alcohol (iso)	E	F	E	E
Propylene gas	E	F	E	E
Propyne gas	E	E	E	E
Pyrethrum				
R. *Red fuming nitric acid	P	P	P	P
Rhodium fumes and dust	E	E	E	E
S. Silver nitrate	E	G	E	E
Skydrol 500	P	G	P	G
Sodium carbonate metal	G	G	G	E
Sodium hydroxide	E	E	E	E
Sodium sulfite	G	G	E	E
Sodium thiosulfide	G	G	E	E
Solvarsol	E	F	E	F
Solvessos	P	P	G	P
Stearic acid	E	E	E	E
Stoddard solvent	E	F	E	G
Styrene	P	P	F	P
Styrene 100%	P	P	F	P
Sulfuric acid	G	G	G	G

CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
T. Tannic acid	E	E	E	E
Tetrahydroborane	F	P	F	F
Tetraethyl lead	E	F	E	G
Tetrahydroluran	P	F	F	F
*Toluene	F	P	F	NR
Toluene diisocyanate	F	G	F	G
*Toluol	F	P	F	NR
Trichlor	F	P	G	P
*Trichloroethylene	F	F	G	P
*Trichloroethane	P	P	F	P
Tricresyl phosphate	G	F	E	F
Tridecyl alcohol	G	F	E	F
Triethanolamine	E	G	E	G
Trinitrotoluene	G	P	G	F
Trinitrotoluol	G	P	G	F
Triptane	E	P	E	F
Tung oil	E	P	E	F
Turco No. 2996	P	P		F
Turpentine	G	F	E	F
U. Unsymmetrical Dimethylhydrazine	F	P	F	P
V. Varnoline gas	E	F	E	F
Vanadium fume and dust	E	E	E	E
	G	F	G	F
Varsol	E	G	E	G
Vegetable oils				
W. Wood alcohol	E	E	E	E
Wood preservatives	G	F	G	G
*Woodyouth	F	P	F	G
X. *Xylene	P	P	F	P
*Xyiol	P	P	F	P
*Xylidine	E	F	F	F
Z. Zinc Chloride	E	E	E	E

## APPENDIX B

### SPECIFICATONS FOR INDIVIDUAL TYPES OF PPE

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## **SPECIFICATIONS FOR INDIVIDUAL TYPES OF PPE**

### **1.0 INTRODUCTION**

The following information will be utilized during the task hazard assessment, and when determining which products will be used to fulfill the PPE requirements outlined in this program and the PPEP. This appendix contains the OSHA requirements for eye, face, head, hand, body, and foot protection.

### **2.0 GENERAL REQUIREMENTS**

Whenever process, environmental, chemical, radiological, or mechanical hazards exist on site, Sterling will ensure that all affected personnel utilize appropriate PPE. When individual personnel provide their own PPE, Sterling will assure its adequacy and compliance, including proper maintenance and sanitation of said equipment.

### **3.0 EYE AND FACE PROTECTION**

Each affected employee shall use appropriate eye or face protection when exposed to hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially harmful light radiation. When eye and face protection is required, the following shall apply:

1. Side shields will, as a minimum, be used when there is a hazard from flying objects.
2. For personnel who wear prescription lenses, the eye protection will either incorporate the prescription in its design, or will be worn over the prescription glasses, without disturbing the position or comfort of the prescription glasses.
3. Eye and face protection will be clearly marked with the manufacturer's name.
4. Eye and face protection will be selected and worn that protects personnel from the type of eye/face hazard encountered during a given operation.
5. If there is a potential for exposure to blood or other infectious fluids, personnel will be required to wear eye and face PPE capable of preventing fluid contact with the eye and face mucous membranes.
6. Eye and face protection devices shall be reasonably comfortable, fit snugly, be durable, be easily cleaned and disinfected, and stored in a clean, sanitary location.

7. Personnel involved in operations emitting hazardous light levels will wear appropriate filtered lenses.
8. Protective eye and face devices will be clearly marked, indicating that they comply with the provisions of ANSI Z87.1-1989.

#### **4.0 HEAD PROTECTION**

Each employee who is exposed to operations involving a potential for injury to the head from falling objects, or other forms of head injury, will wear appropriate head protection. Selection and use of head protection devices will comply with the following;

1. Head protection devices will comply with ANSI Z89.1-1986, and be stamped accordingly.
2. Head protection devices will be maintained and inspected to ensure that they are in working order and that their structural integrity has not been compromised through exposure to chemicals, physical abuse, or improper storage.
3. Head protection devices will be selected IAW the type and degree of head hazard anticipated for site activities.

#### **5.0 FOOT PROTECTION**

Each employee exposed to operations where there is a danger of foot injury due to falling or rolling objects, objects capable of piercing the sole, or other identifiable hazards, will be required to wear appropriate foot protection. Selection and use of foot protection will comply with the following:

1. Foot wear used on site will comply with ANSI Z41-1991.
2. The degree of foot protection will be consistent with the degree of hazard anticipated for each site operation.
3. At a minimum, foot wear will be leather work boots.

#### **6.0 HAND PROTECTION**

Each employee exposed to operations where there is danger of hand injury due to skin absorption or contact with hazardous substances, cuts, lacerations, abrasions, punctures, thermal burns, electrocution, temperature extremes, or pinching will be required to wear appropriate hand protection. Selection and use of hand protection will comply with the following:

1. Sterling will select hand protection based upon an evaluation of the performance characteristics of the protection device

relative to the task to be performed, conditions present, duration of use, and the known or potential hazards identified.

2. If site personnel have the potential of contact with blood or other infectious materials, they will, as a minimum, wear surgical type latex gloves at the time of potential contact.
3. Chemical resistant gloves which come in contact with known contaminated materials will be discarded after each use.

## **7.0 BODY PROTECTION**

Each employee exposed to operations where injury to the body trunk or limbs could occur will be required to wear appropriate protective devices. Operations typically conducted by Sterling personnel that may require use of body/limb protection devices include:

1. Working in hot environments – cooling vest or other temperature-reducing device.
2. Working in cold environments – insulated coveralls, long underwear.
3. Brush/tree clearing with a bladed weed eater – steel toed boots or toe guards, and Kevlar leg chaps.
4. Tree/limb removal with a chain saw – steel-toed boots or toe guards, and Kevlar leg chaps.
5. Lifting heavy objects – lumbar/back support belts, knee support devices.
6. Rendering first aid – body apron.

## **APPENDIX C**

### **PROTECTIVE CLOTHING MATERIAL GUIDE**

## PROTECTIVE CLOTHING MATERIAL GUIDE

- Tyvek®:** Product of Dupont. Spun-bounded non-woven polyethylene fibers. Has reasonable tear, puncture, and abrasion resistance. Provides excellent protection against particulate contaminants, with very limited chemical resistance. Inexpensive and suitable for disposable garments.
- Polyethylene:** Used as a coating on polyolefin material such as Tyvek®, increasing resistance to acids, bases, pesticides, and salts.
- Saranex®:** Made of Saran, a Dow product. Coated on Tyvek®. Very good general-purpose disposable material. Better overall protection than Polyethylene. Resistant to PCB's and chlorinated hydrocarbons.
- Barricade®:** A Dupont material with better general chemical resistance than Saranex®. Barricade is a thick, tightly seamed material that may be suitable for re-use, depending upon contaminant type and level. Provides excellent protection from a large variety of acids, caustics, organic solvents, and salts.
- Responder®:** One of the strongest limited-use materials, with a multi-layer construction. Responder® is one of the few materials with no breakthrough times less than eight hours for the ASTM F1001 test chemicals. It is also the only commercially available material that has been actively tested against CWM.
- Butyl rubber:** Resists degradation by many contaminants except halogenated hydrocarbons and petroleum compounds, a common deficiency of most protective materials. Especially resistant to permeation by toxic vapors and gases. Expensive material used in boots, gloves, splash suits, aprons, and fully-encapsulating suits.
- Natural rubber:** This is also synthetic latex. Resists degradation by alcohols and caustics. Used in boots and gloves.

- Neoprene:** Resists degradation by caustics, acids, and alcohols. Used in boots, gloves, and respirator face pieces and breathing hoses. Commonly available and inexpensive.
- Nitrile:** Also referred to as Buna-N, milled Nitrile, Nitrile latex, NBR, acrylonitrile. Resists degradation by petroleum compounds, alcohols, acids, and caustics. Used in boots and gloves. Commonly available and inexpensive.
- PVA™:** Polyvinyl alcohol. Resists degradation and permeation by aromatic and chlorinated hydrocarbons and petroleum compounds. Major drawback is its solubility in water. Used in gloves.
- PVC:** Polyvinyl chloride. Resists degradation by acids and caustics.
- Viton®:** Product of Dupont. Fluoroelastomer similar to Teflon. Excellent resistance to degradation and permeation by aromatic and chlorinated hydrocarbons and petroleum compounds. Very resistant to oxidizers. Extremely expensive material used in gloves and fully-encapsulating suits.
- SilverShield®:** Lightweight, flexible Norfoil™ laminate with excellent chemical resistance. Suggested for vinyl chloride, acetone, ethyl ether, and a large variety of other toxic solvents and caustics. Often used as an over glove for haz-mat situations. Flexible material, but not stretchable, may tear at the seams if overly stressed.
- 4H:** Five layer patented plastic laminate material intended to provide at least four hours of protection form over 280 chemicals and mixtures. Excellent protection against epoxy, organic solvents, acids, bases, paints, degreasers, and adhesives. Flexible material, but not stretchable, may tear at the seams if overly stressed.
- Chloropel®:** Also referred to as CPE or chlorinated polyethylene. ILC Dover product. Used in splash suits and fully-encapsulating suits. No data on permeability. Considered to be a good all-around protective material.

## **PROTECTIVE CLOTHING MATERIAL GUIDE (cont.)**

Nomex®: Product of Dupont. Aromatic polyamide fiber. Non-combustible and flame resistant up to 220°C, thus providing good thermal protection. Very durable and acid resistant. Used in firefighters' turnout gear and some fully encapsulating suits as a base for the rubber.

## **1.0 PURPOSE**

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of on-and off-road motor vehicles.

## **2.0 SCOPE**

This SOP applies to all site personnel, to include contractor and subcontractor personnel, involved in the conduct of operations involving motor vehicle operation. This SOP is not intended to contain all requirements needed to ensure regulatory compliance. Consult the documents listed in Section 3.0 of this SOP for additional compliance issues.

## **3.0 REGULATORY 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:

1. Applicable sections of OSHA Construction Industry Standard 29 CFR, Part 1926.601.
2. Applicable sections of Department of Transportation 49 CFR, Parts 100-199 and 571.
3. USACE EM 385-1-1, Section 18.

## **4.0 RESPONSIBILITIES**

### **4.1 PROJECT MANAGER (PM)**

The Project Manager (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 (SUXOS)/Site Manager**

The Senior UXO Supervisor (SUXOS) or Site Manager (SM) will ensure that this SOP is implemented for motor vehicle operations. The SUXOS or SM 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 Manager/SUXOS logbook.

#### **4.3 UXO SUPERVISOR (UXOT3)**

The UXO Supervisor (UXOT3) shall be responsible for the field implementation of this SOP, and for implementing the safety and health requirements outlined in Section 5.0 of this SOP. In the absence of a SUXOS, the UXOT3 shall be responsible for implementing the SUXOS's responsibilities, outlined in Paragraph 4.2.

#### **4.4 SITE SAFETY/HEALTH OFFICER (SSHO)**

The Site Safety/Health Officer (SSHO) will be responsible for ensuring that the safety hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily tailgate safety briefings. The SSHO 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 motor vehicle operations shall be familiar with the potential safety 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.

#### **5.1 GENERAL REQUIREMENTS**

"Motor Vehicle" shall mean any vehicle propelled by a self-contained power unit, or equipment designed for use on paved roads. All-purpose utility vehicle (APUV) shall mean any four-wheel, or greater, vehicle propelled by a self-contained power unit, designed for off-road use. Every person regularly or occasionally operating a motor vehicle shall possess, at all times while operating such vehicle, a permit valid for the equipment being operated. No motor vehicle shall be placed in service until it has been inspected and found to be in safe operating condition.

All motor vehicles shall be inspected and maintained IAW this program. Motor vehicles being used shall be inspected upon entering service, before transporting explosives, and on a weekly basis. These inspections will be documented on the Vehicle Inspection Checklist DC# 19026 and will be turned into the SSHO. Additionally, motor vehicles will be checked at the beginning of each day to assure that the all parts, equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use. The parts, equipment, and accessories of concern include service brakes, including trailer brake connections; parking system (hand brake); emergency-stopping system (brakes); tires; horn; steering mechanism; coupling

devices; seat belts; operating controls; and safety devices. These requirements also apply to equipment such as lights, reflectors, windshield wipers, defrosters, and fire extinguishers, where such equipment is necessary. Vehicles not meeting safe operating conditions shall be removed from service, repaired or replaced, and re-inspected before being placed back in service.

All motor vehicles operated between sunset and sunrise shall have the following lights:

1. Two (2) headlights, one (1) on each side.
2. At least one (1) red taillight and one (1) red or amber stop light on each side.
3. Directional signal lights, both front and rear.

All motor vehicles, except APUVs, trailers or semi-trailers, having a gross weight of 5,000 pounds or less, shall be equipped with service brakes and manually-operated parking brakes. Service and parking brakes shall be adequate to control the movement of, to stop, and to hold the vehicle under all conditions of service. Service brakes on trailers and semi-trailers shall be controlled from the driver's seat of the prime mover.

Braking systems on every motor vehicle shall be so designed as to be in approximate synchronization on all wheels and develop the required braking effort on the rearmost wheels first, unless the vehicle is equipped with an "Anti-lock Braking System" (ABS). The design shall also provide for application of the brakes by the driver's seat of the prime mover. Exceptions to this are vehicles in tow by an approved tow bar hitch.

Every motor vehicle shall be equipped with the following:

1. A working speedometer.
2. A fuel gauge.
3. An audible warning device.
4. A windshield equipped with an adequately powered windshield wiper.
5. An operable defrosting and defogging device.
6. Adequate rear view mirror, or mirrors.
7. Cabs, cab shields, and other protection to protect the driver from the hazards of falling or shifting materials.
8. Non-slip surfaces on steps.
9. Safety glass in windshields, windows, and doors.
10. No cracked or broken glass.

11. All towing devices that are structurally adequate for the weight drawn, and properly mounted.
12. A power-operated starting device.

All trailers will be equipped as follows:

1. A locking device, or double safety system, shall be provided on every fifth wheel mechanism and tow bar arrangement, which will prevent the accidental separation of towed and towing vehicles.
2. Every trailer shall be coupled with safety chains or cables to the towing vehicle. Such chain or cable shall prevent the separation of the vehicles in the event of failure of the tow bar.

All buses, trucks, and combinations of vehicles with a carrying capacity of 12 tons or greater, when operated on public highways, shall be equipped with emergency equipment required by state laws but not less than those listed below:

1. One (1) red flag, not less than 12 inches square, and three (3) reflective markers, which shall be available for immediate use, in case of emergency stops.
2. Two (2) wheel chocks for each vehicle, or each unit of a combination of vehicles.
3. At least one (1) fire extinguisher rated at 20 BC units, with at least two (2) such rated fire extinguishers being required for flammable cargoes, including UXO/OE.
4. Vehicle exhaust control, so as to present no hazards to the operator, passengers, or other personnel.
5. Records of tests and safety inspections that are maintained at the site and available upon request.
6. All rubber-tired motor vehicles equipped with fenders. Mud flaps may be used in lieu of fenders, whenever motor vehicle equipment is not designed for fenders.

## 5.2 OPERATING RULES

No motor vehicle shall be driven at a speed greater than the posted speed limit, with due regard for weather, traffic, intersections, width, and character of the roadway, type of motor vehicle, and any other existing condition. The operator must, at all times and under all conditions, have the vehicle under such control as to be able to bring it to a

complete stop within the assured clear distance ahead. To accomplish this, the operator shall follow the safe operating rules presented below:

1. Head lights shall be lighted from sunset to sunrise, during fog, rain, or other unfavorable atmospheric conditions, and at any other time when there is not sufficient light for the vehicle to be seen or the operator to see on the highway at a distance of 500ft (150.4m), unless local regulations prohibit.
2. Headlights shall be switched to low beam when approaching other vehicles.
3. No motor vehicle shall be driven on a downgrade with gears in neutral or with clutch disengaged.
4. Every motor vehicle, upon approaching an unguarded railroad crossing or drawbridge, shall be driven at such a speed as to permit stopping before reaching the nearest track or the edge of the draw and shall proceed only if the course is clear.
5. No motor vehicle shall be stopped, parked, or left standing on any road, or adjacent thereto, or in any area in such a manner, as to endanger the vehicle, other vehicles, equipment, or personnel using or passing that road or area.
6. No motor vehicle shall be left unattended until the motor has been shut off, the key removed (unless site regulations prohibit), the parking brake set, and the gear engaged in low, reverse, or park.
7. If stopped on a hill or grade, front wheels shall be turned or hooked into the curb or the wheels securely chocked.
8. Personnel shall not be permitted to get between a towed and towing vehicle, except when hooking or unhooking.
9. No motor vehicle, or combination of vehicles, hauling unusually heavy loads or equipment shall be moved until the driver has been provided with required permits, the correct weights of the vehicles and load, and a designated route to be followed.
10. When backing or maneuvering, operators will take the applicable precautions and, whenever possible, use a backing guide.
11. Operators of motor vehicles transporting personnel, explosives, or flammable or toxic substances shall stop at

railroad crossings or drawbridges, and shall not proceed until the course is determined to be clear. A stop shall be required at a crossing within a business or residential district that is protected by a watch person, traffic officer, or by a traffic signal giving a positive indication to approaching vehicles.

12. When a bus, truck, or truck/trailer combination is disabled or parked on the traveled portion of a highway or the shoulder adjacent thereto, red flags shall be displayed during the daytime and reflector, flares, or electric lights at night. (An exception may be made in residential or business sections or municipalities.)
13. The principles of defensive driving shall be practiced.
14. Seat belts will be installed and worn IAW 49 CFR 571 (DOT).
15. If the windshield wipers are in use due to rain, headlights will be activated.
16. Motor vehicle operators may only use cellular telephones with hands-free devices while the vehicle is in motion. Prior to using a hand-held cellular phone, drivers shall find a safe place to bring their vehicle to a stop. Text messaging is strictly prohibited while operating motor vehicles. This requirement does NOT preclude passenger(s) from using cellular phones while the vehicle is in motion.
17. The use of headphones, earphones, or other listening devices (except for hands-free cellular phones) while operating a motor vehicle is prohibited.
18. Operators of motor vehicles shall not eat, drink, or smoke while the vehicle is in motion.
19. GPS systems shall be mounted within a vehicle so that they do not create a sight hazard to the operator.
20. Programming of dashboard GPS systems while operating a motor vehicle is prohibited.

### **5.3 TRANSPORTATION OF PERSONNEL**

The number of passengers in passenger-type vehicles shall not exceed the number of seats equipped with approved seat belts. Trucks used to transport personnel shall be equipped with a seating arrangement that is securely anchored, a rear gate, a guardrail,

and steps or ladders for mounting and dismounting. The beds of trucks which are not equipped with appropriate safety devices, as described in this paragraph, will not be used to transport personnel unless absolutely necessary, and never on a public highway, unless it is an emergency. Additional personnel transportation requirements are listed below:

1. All tools and equipment shall be guarded, stowed, and secured when transported with personnel.
2. No person will be permitted to ride with arms or legs outside of the truck's body, in a standing position on the body, on running boards, or seated on side fenders, cabs, cab shields, rear of truck, or on the load.
3. All motor vehicles transporting personnel during cold or inclement weather shall be enclosed.
4. No explosives, flammable materials (except normal fuel supply), or toxic substances shall be transported in vehicles being used to transport personnel.
5. No motor vehicle transporting personnel shall be moved until the driver has ascertained that all persons are seated, the guardrail and rear gate are in place, and/or doors are closed.
6. Getting on or off any vehicle while it is in motion is prohibited.

#### **5.4 FUELING**

All motor vehicles shall be shut off during fueling operations, and no smoking or open flames will be permitted within 50 feet of fueling operations. Care should be taken not to spill fuel, and only that fuel recommended by the manufacturer shall be used. During fueling, when there is a potential for fuel contact with the skin, especially during cold weather, personnel will wear protective gloves, as specified in the SSHP.

#### **5.5 LOADING**

Drivers of trucks and similar vehicles shall leave the cab, if the cab of the vehicle being loaded is exposed to danger from suspended or overhead loading operations, unless the cab is adequately protected. No motor vehicle shall be loaded so as to obscure the driver's view ahead or to either side, or to interfere with the safe operation of such vehicle. All motor vehicles carrying loads which project more than four (4) feet beyond the rear of the vehicle shall carry a red light at or near the end of the projection at night, or when atmospheric conditions restrict visibility. During daylight periods, or other non-

restricted conditions, a red flag not less than 12 inches square shall be used. The load shall be distributed, chocked, tied down, or secured.

## **5.6 ALL-TERRAIN VEHICLES**

During the operation of APUVs, every operator shall possess a valid state driver's license and have completed, as a minimum, an on-site APUV training course prior to operation of the vehicle. The operation of APUVs shall be conducted according to the procedures listed below:

1. The manufacturer's recommended payload shall not be exceeded at any time.
2. Gloves and an approved motorcycle helmet with full-face shield or goggles, or a hard hat and safety glasses, shall be worn at all times while operating an APUV.
3. APUVs are to be used on off-road terrain and gravel roads only. (APUVs shall not be used on paved roads.)
4. APUVs shall be driven during daylight hours only.
5. Only four-wheel, or greater, APUVs shall be used.
6. Passengers are prohibited on APUVs, unless they are designed to carry them.
7. All APUVs shall be equipped with warning signal devices (i.e., horn and backup alarm).

## **5.7 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS**

Except for the personal protective equipment (PPE) requirements identified previously, no special PPE requirements apply to this SOP.

## **6.0 FORMS / ATTACHMENTS**

### **6.1 [VEHICLE INSPECTION CHECKLIST](#) DC# 19026**

## **1.0 PURPOSE**

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to anomaly avoidance operations on sites contaminated or suspected to be contaminated with munitions and explosive of concern (MEC).

## **2.0 SCOPE**

This SOP applies to all site personnel, including subcontractors, involved in operations on a site with MEC contamination or suspected MEC contamination. This SOP is not intended to contain all requirements needed to ensure compliance. Consult the documents listed in Section 3.0 of this SOP for additional compliance issues.

## **3.0 REGULATORY REFERENCES**

The following Occupational Safety and Health Administration (OSHA) standards and U.S. Army Corps of Engineers (USACE) requirements 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 with other SOP's and regulatory references may be needed:

1. 29 CFR 1910 Occupational Safety and Health Standards (applicable sections)
2. Department of the Army Pamphlet (DAPAM) 385-10, Army Safety Program
3. Department of Defense Explosive Safety Board (DDESB) Technical Paper (TP) 18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel
4. USACE, Engineer Regulation (ER) 1110-1-8153, Ordnance and Explosives Response
5. USACE, Engineer Pamphlet (EP) 75-1-2, Munitions and Explosives of Concern (MEC) Support During Hazardous, Toxic and Radioactive Waste (HTRW) and Construction Activities
6. USACE Engineer Manual (EM) 385-1-97 Safety and Health Requirements Manual
7. USACE, Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual.

## **4.0 RESPONSIBILITIES**

### **4.1 PROJECT MANAGER**

The Project Manager (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 UNEXPLODED ORDNANCE SUPERVISOR**

The Senior Unexploded Ordnance Supervisor (SUXOS) will ensure that this SOP is implemented for all sites where MEC contamination is suspected or present. The SUXOS will also ensure that relevant sections of this SOP are discussed in the tailgate and daily safety briefings, and that information related to its daily implementation is documented in the SUXOS logbook.

#### **4.3 TEAM LEADER**

The Team Leader (TL), a UXO Technician III, will be responsible for the field implementation of this SOP and for implementing the safety and health requirements outlined in Section 5.0 of this SOP. In the absence of a SUXOS, the TL will be responsible for implementing the SUXOS's responsibilities outlined in Paragraph 4.2.

#### **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 and 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. In the absence of a UXOSO the TL will conduct safety briefings and inspections.

### **5.0 PROCEDURE**

All personnel, including subcontractors, involved in anomaly avoidance operations on sites with MEC contamination or suspected MEC contamination will be familiar with the potential safety and health hazards associated with MEC operations, and with the work practices and control techniques used to reduce or eliminate these hazards.

#### **5.1 TRAINING**

All UXO personnel and other personnel assigned work at an MEC/MC site, including subcontracted personnel, will receive training on the site-specific hazards associated with their project site. They will also receive any supplemental training needed to support specific types of MEC/MC operations, as necessary, based on the nature and hazards related to the work. For MEC/MC avoidance activities, this supplemental

training may include a discussion of procedures for operation of specialized equipment and any special instructions for work with drill rigs or heavy equipment.

## **5.2 DAILY BRIEFING**

At the beginning of each work day, the UXO Lead will hold a daily briefing for the project. At a minimum, this briefing will include the following:

- Review of emergency procedures
- Review of ordnance safety
- Review of communications procedures and equipment
- Review of any site-specific hazards (physical or biological) and the measures that will be used to mitigate those hazards
- A description of any known utilities in work areas
- Procedures for coordination of MEC/MC avoidance work with personnel performing non-UXO activities.

Other issues will be discussed during the briefing as necessary to support safe and efficient operations. The UXO Lead will document the daily briefing in his/her log book and will obtain the signatures of those attending the briefing either in the log book or on a daily briefing attendance sheet. Construction personnel performing activities that require MEC/MC avoidance are required to attend the daily briefings.

## **5.3 TAIL-GATE BRIEFING**

The daily briefing may serve as the tail-gate briefing if the content covers those additional issues normally reserved for discussion during the tail-gate briefing. If the daily briefing is combined with the tail-gate meeting it will include:

- Review of task assignments for the day
- Review of instrument function test procedures/requirements
- Review of task-specific hazards
- Review of any other task or location specific information needed to safely complete the assigned daily work

## **5.4 EQUIPMENT FUNCTION TESTING**

All equipment used by the UXO personnel will be verified to be working properly prior to use each day. The functionality of metal detectors and other handheld locators will be verified and documented by the UXO Lead. This will be accomplished by passing the instrument detection heads over one or more selected metallic items on the ground surface. If any detection equipment requires repair, is new equipment, or is spare

equipment, it must be inspected and confirmed to be operational by the UXO Lead. The UXO Lead will inspect the remaining equipment to be used each day to ensure that the required tools and equipment are available and in proper working order.

## 5.5 GENERAL REQUIREMENTS

The following sections contain the specific procedures that will be used to conduct MEC/MC avoidance.

1. MEC/MC avoidance activities will not be conducted until the required training (both general and site-specific) and proper equipment checks have been completed.
2. Avoidance activities may be conducted at any given location on site by a UXO Team. The UXO Team will consist of a minimum of two personnel one of whom will be a qualified UXO Technician III. The UXO Team may include additional UXO qualified personnel, geophysicists, sampling personnel or other essential personnel.
3. The UXO Lead will be notified immediately of all MEC finds.
4. UXO personnel must remain on site at all times when non-UXO personnel are conducting intrusive operations or activities are conducted in known or suspected ordnance use areas.
5. UXO personnel will not conduct disposal operations for MEC discovered during avoidance operations until a proper Work Plan and Health and Safety Plans are approved and the proper number of staff, having the required training and qualifications, are present on site.

## 5.6 AVOIDANCE FOR DRILLING

For drilling work the following activities are required. UXO technicians equipped with down-hole metal detectors will observe all drilling activities and perform monitoring at the specified intervals. These individuals are charged with identification of MEC/MC items that may be disturbed during the planned activities. In addition to the basic requirements outlined in previous sections, the following procedures are specific to MEC avoidance for drilling operations:

1. Work sites (including drilling locations) and access lanes will initially be cleared (if required) using a geophysical instrument capable of detecting MEC to a depth of at least two feet.
2. Once the initial survey has been conducted, incremental drilling may be initiated at the planned well locations. During this process, all non-essential personnel will withdraw to a distance at least equal

- to the fragmentation distance of the most probable munition (MPM) for the work site.
3. A geophysical instrument capable of down-hole monitoring will be used to evaluate the borehole after each specified increment of depth has been augured.
  4. As long as no anomalies are detected the borehole will be advanced in the approved increments until the terminal point is reached.
  5. It is not necessary for UXO personnel to observe well installation.
  6. If an anomaly is detected at any point during the installation of boreholes, the borehole in question will be back filled and an alternate drilling location will be selected.

In order to safeguard UXO personnel and others working on site from non-ordnance related hazards, the following requirements will apply to all drilling operations, unless otherwise approved:

1. Only trained and qualified personnel will be allowed to operate the drilling equipment. The drill rig will be operated in accordance with the manufacturer's guidelines and maintenance manual.
2. Exposed gears and pulleys on the equipment will be guarded.
3. Personnel will be instructed to stay clear of moving parts and rigging lines on the drill rig.
4. The drill bit (auger) will be withdrawn from the boring and secured. The drill rig may have to be moved before UXO personnel move in to evaluate the boring with downhole geophysical equipment.
5. Hand signals for communication between the operator and spotter will be established. The operator and spotter will always be in visual contact.
6. Workers will not assume that the drill rig operator is aware of their exact location. Workers will make eye contact and use predetermined hand signals to communicate with the rig operator before approaching the area where the equipment is being operated.
7. When an operator must maneuver equipment in tight quarters, the presence of a second person (spotter) is required to ensure adequate clearance.
8. Equipment must have an audible alarm that sounds when the equipment is moving in reverse.

9. During maintenance operations, the maintenance worker will shut down the equipment and retain the key. The operator will ensure that all mechanical components, particularly those that are hydraulically driven, are de-energized or brought to their lowest energy state (i.e., the operator will ensure that stored energy has been dissipated and that the components have been mechanically locked in place).

## **5.7 ANOMALIES/ITEMS OTHER THAN MEC/MC**

Material other than munitions may be located during the MEC/MC avoidance operations, including metal debris, underground utilities, chemicals, and other hazards. This section provides general guidelines for dealing with some of these anomalies.

### **5.7.1 Metal Debris**

Metal debris located during MEC/MC avoidance will be inspected to ensure that it is not munitions-related. It will then be either left in place or placed in a 55-gallon drum or other suitable container with like items for future disposal or recycling.

### **5.7.2 Underground Utilities**

The detectors used during MEC/MC avoidance operations may provide data indicating that a utility line is potentially present. If there are any indications that a near-surface utility line is present (such as a signal from the locator or discovery of a marking tape), the UXO Lead will be notified immediately. This is particularly important if intrusive construction work is planned.

### **5.7.3 Chemicals**

Locating industrial-type chemicals is a remote possibility during MEC/MC avoidance operations. If any evidence of chemical contamination is detected (stained soil, chemical odors, powders, or other substances resembling chemicals), all activities will cease, and the UXO Lead will make the required notifications. Work will not continue until the MR Safety Manager has determined that it is safe to do so.

### **5.7.4 Other Hazards**

If sealed drums or other suspect materials or conditions that would indicate a potential health or safety hazard are encountered during the investigation, all activities will cease, and the specific notification procedures will be implemented. Work will not continue until the MR Safety Manager has determined that it is safe to do so.

## **5.8 DOCUMENTATION**

The results of MEC/MC avoidance will be recorded in the Team Leader or UXO Lead log book(s) performing this activity. If MEC is found, the appropriate data will be recorded on the MEC Accountability Form. A photograph will be taken of each piece of MEC recovered to document the item. At the end of the day the UXO technicians will ensure that field notes are complete and will submit those notes to the Team Leader. The Team Leader will review the notes for accuracy and completeness before submitting copies to the PM for review and inclusion in the project files.

## **5.9 SAFETY HAZARDS AND OPERATIONAL CONTROL TECHNIQUES**

### **5.9.1 MEC Hazards**

Due to the nature of their design and components, MEC presents unique hazards that may cause catastrophic affects involving personal injury or death and property damage. MEC hazards include explosion, fire, burns, over pressurization, excessive noise, and fragmentation.

### **5.9.2 General Precautions for MEC**

If MEC is present and may be located during site activities, only UXO qualified personnel shall be allowed to perform MEC related operations. These personnel will follow the procedures and requirements of this SOP, the applicable references listed in paragraph 3.0 and other ordnance safety procedures found in the Work Plan (WP) when performing anomaly avoidance operations. UXO qualified personnel will also follow all applicable site-specific MEC SOP's presented in the site-specific WP.

### **5.9.3 Requirements for UXO Qualified Personnel**

In order to ensure the safety and health of all site personnel during anomaly avoidance operations a UXO team consisting of a minimum of two personnel, one of whom will be a UXO Technician III. This individual will be the UXO Team Leader. The UXO team must be on site during anomaly avoidance operations. The UXO team may include additional UXO qualified personnel, geophysicists, sampling personnel or other essential personnel. If other UXO Teams are on site readily available and reliable communications will be established in case of emergency.

### **5.9.4 Requirements for Non UXO Qualified Personnel**

In order to ensure the safety and health of site personnel, non UXO qualified personnel will be prohibited from conducting tasks or operations in MEC contaminated areas until authorized by a UXO qualified person. This requirement applies to both general site

personnel and site visitors. Furthermore, the safe work practices and procedures listed below will be, (if applicable), followed:

1. Non UXO qualified personnel shall receive site specific MEC recognition training prior to participation in site activities.
2. If multiple teams are utilized each team will maintain a team separation distance (TSD) of 200'.
3. No operations will be conducted until such time as the area is first surveyed by UXO qualified personnel. Operations may be conducted once the area has been surveyed and anomalies marked.
4. Non UXO personnel may enter the work zone with proper escorts and authorization as essential personnel by the SUXOS, UXOSO or TL, whomever is the senior UXO Technician on site.
5. Non UXO qualified personnel shall be escorted in known, or potentially MEC contaminated areas at all times by UXO qualified personnel.
6. Once an area has been surveyed and anomalies marked, the boundaries of the work area will be identified through the use of flagging, and only then may non-UXO qualified personnel perform duties in the area unescorted.
7. At no time shall non UXO qualified personnel leave the cleared area unescorted.
8. Non UXO qualified personnel shall not touch or disturb any object which could potentially be MEC or MEC related, and shall immediately notify the nearest UXO qualified person of the presence of the object.

## **5.10 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS**

The following safety measures and personal protective equipment (PPE) shall be used in preventing or reducing exposure to the hazards associated with anomaly avoidance operations. These requirements will be implemented, unless superseded by site-specific requirements in the SSHP.

1. Hard hats are required when working around heavy equipment or when an overhead or head impact hazard exists.
2. Composite safety toed boots are required.
3. Safety glasses will be worn.
4. Leather work gloves.

## **6.0 ATTACHMENTS**

None