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

U.S. Army

IMA

December 2015
(Revision 3)

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
100 West Oglethorpe Avenue
Savannah, Georgia 31401-3604

Prepared by:

SpecPro Environmental Services LLC
1006 Floyd Culler Court
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under
Contract No. W912HN-10-D-0001
Delivery Order No. 0025

DOCUMENT 9

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SIGNATURE PAGE

Site Investigation at the Small Arms Range Berm Area
Fort Stewart, Georgia

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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.

12/21/15

Jeffrey C. Williams, PE — Date
Senior Project Manager

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.

12/21/2015

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

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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
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 Fort Stewart's background levels. 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. A surface sample will be obtained from 0 to 1 foot, and a subsurface sample will be obtained between 1 foot and the top of the water table. 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. A surface sample will be obtained from 0 to 1 foot, and a subsurface sample will be obtained between 1 foot and top of the water table;
- 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 Fort Stewart's background levels 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. A surface soil will be collected from each boring at 0 to 1 foot, and a subsurface soil sample will be collected at 1 foot to the top of the water table. 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 subcontract Brown and Caldwell and 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).

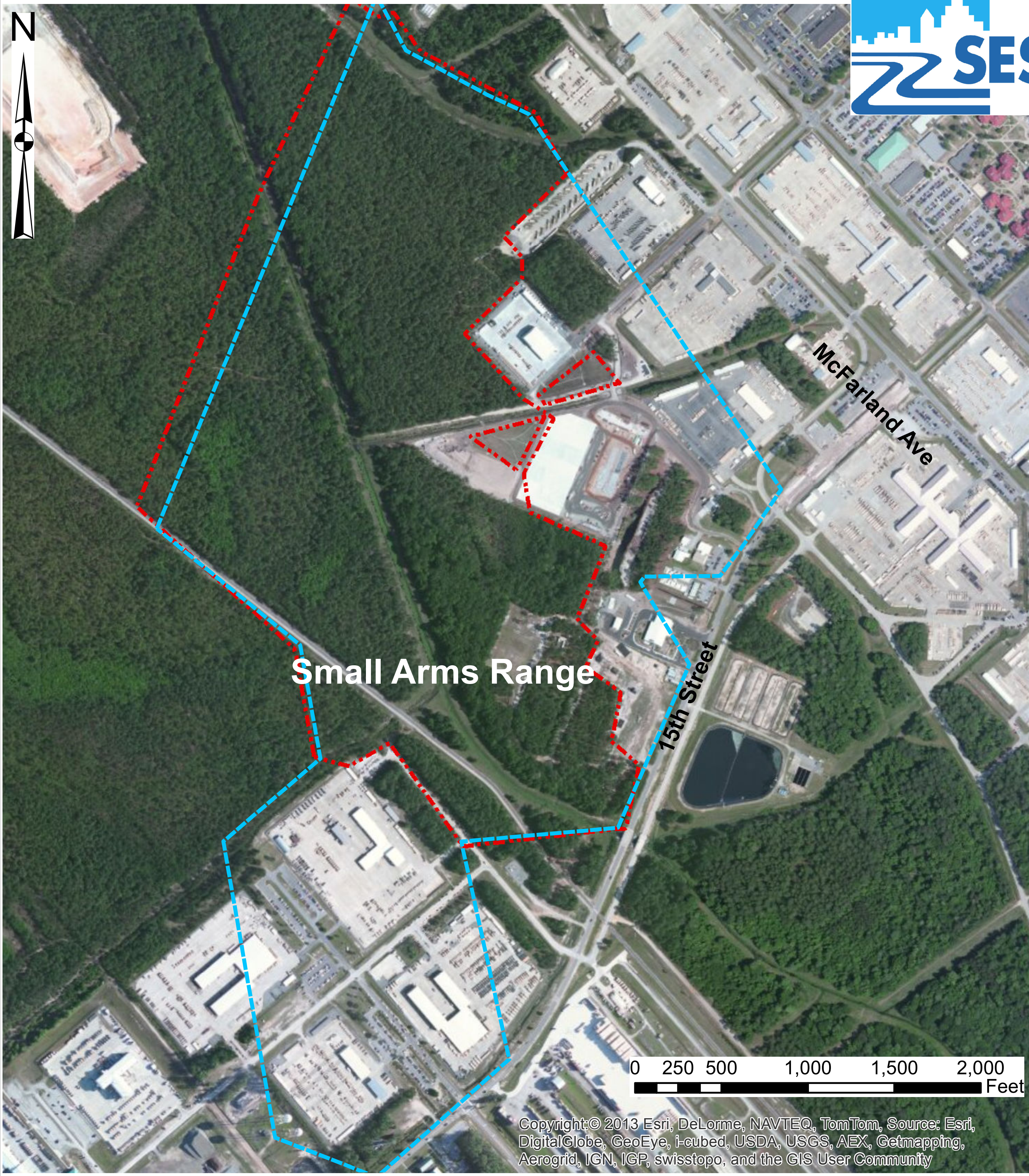
1.5 SITE HISTORY AND PREVIOUS INVESTIGATIONS

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).



Legend

Site investigation boundary

Small Arms Range boundary

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at the Small Arms Range Berm Area
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Fort Stewart, Georgia

Figure 1-1 Site Location Map

R:\Projects\E0209\E0209.0025\Fig 1-1 small arms range site location map Rev7-26-14.mxd (7/23/2014)WP

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).

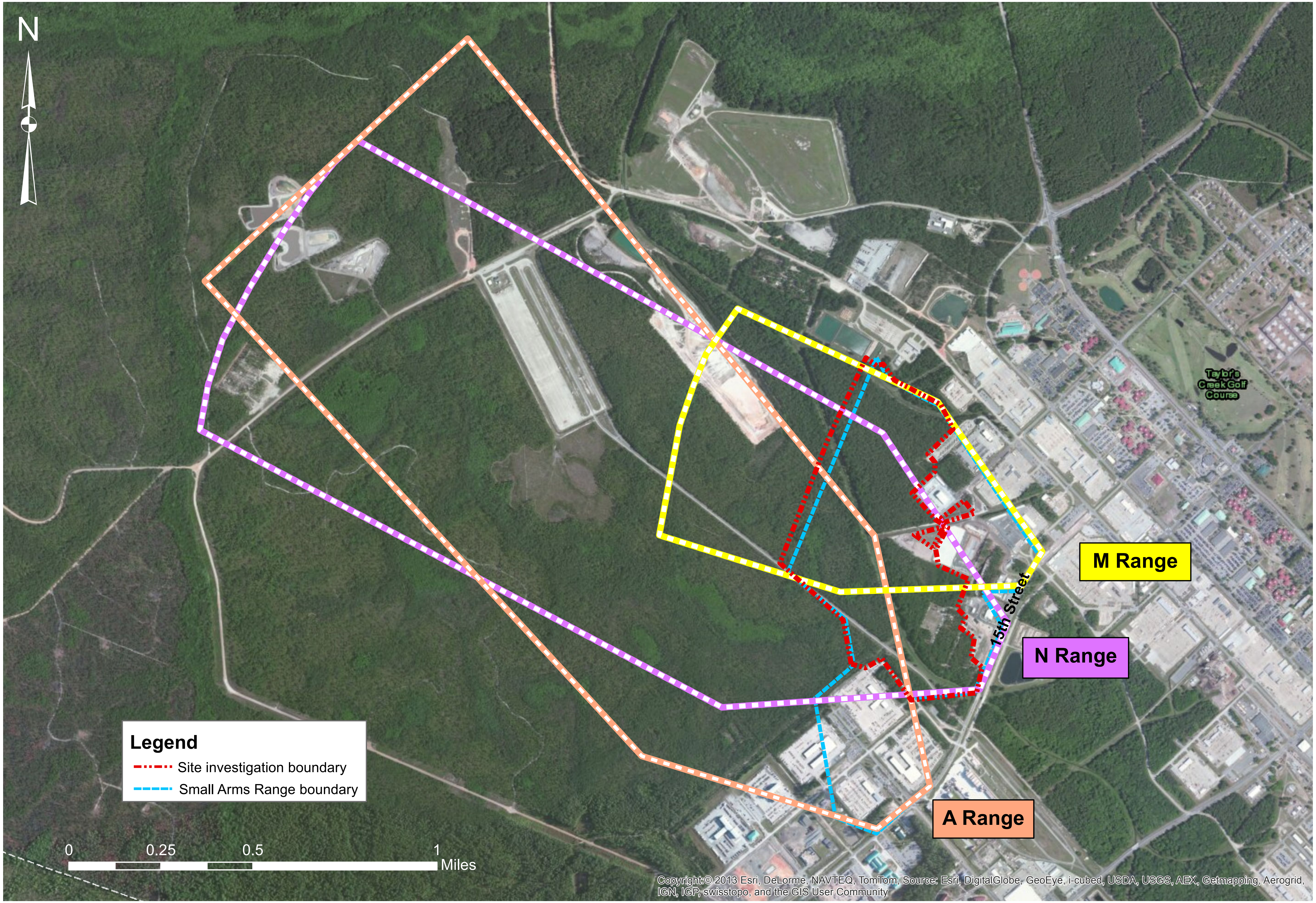

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Figure 1-2 Range Map

R:\Projects\E0209\E0209.0025 Small Arms Range\Graphics\SAR Ranges A N and M.mxd (07/23/2014)\WP

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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 Fort Stewart's background levels. 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.

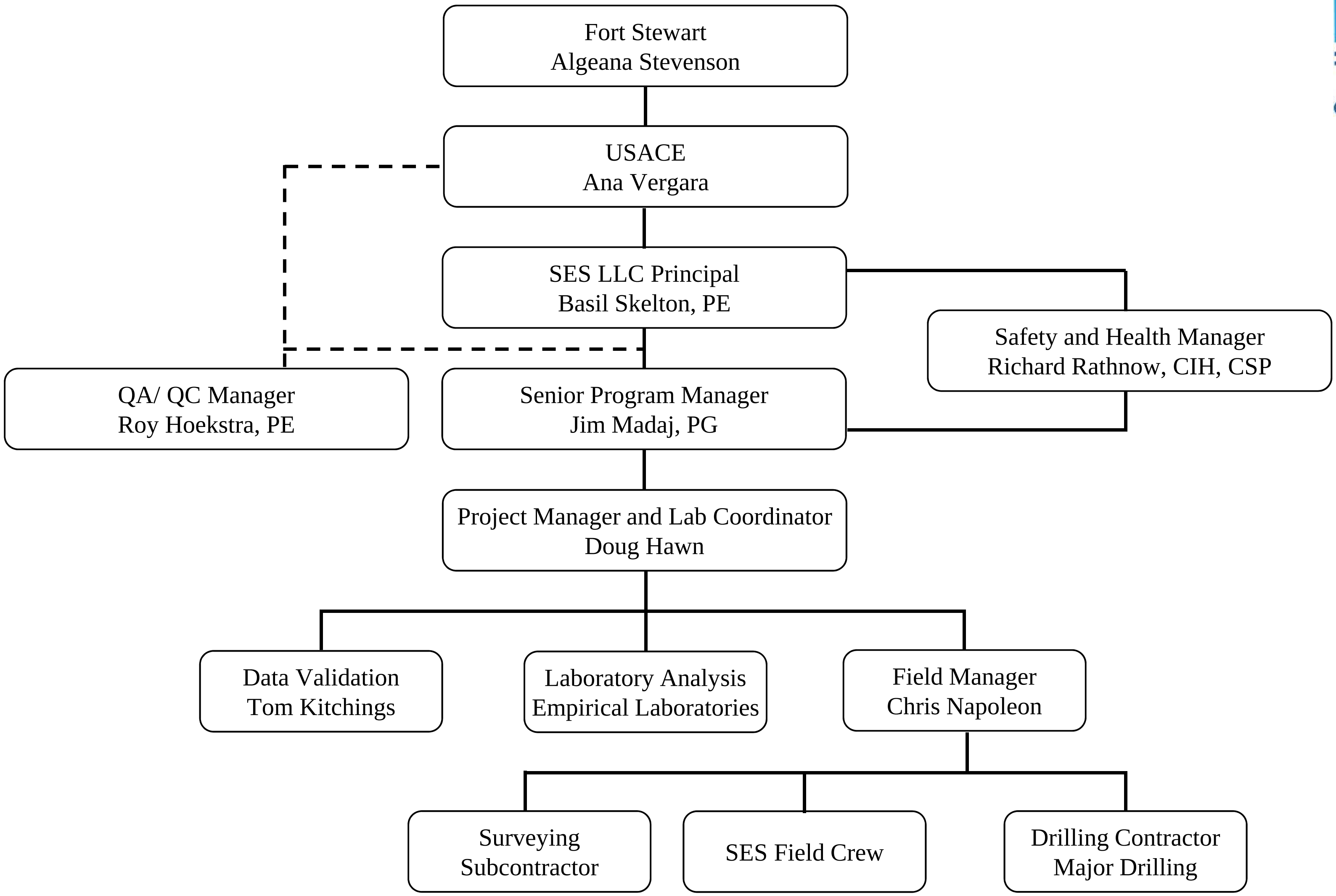
2.2.2 SpecPro Environmental Services

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.



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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.

	Copies of Reports (Hard Copies and Compact Discs)		
Addresses	Draft	Final	Revised Final
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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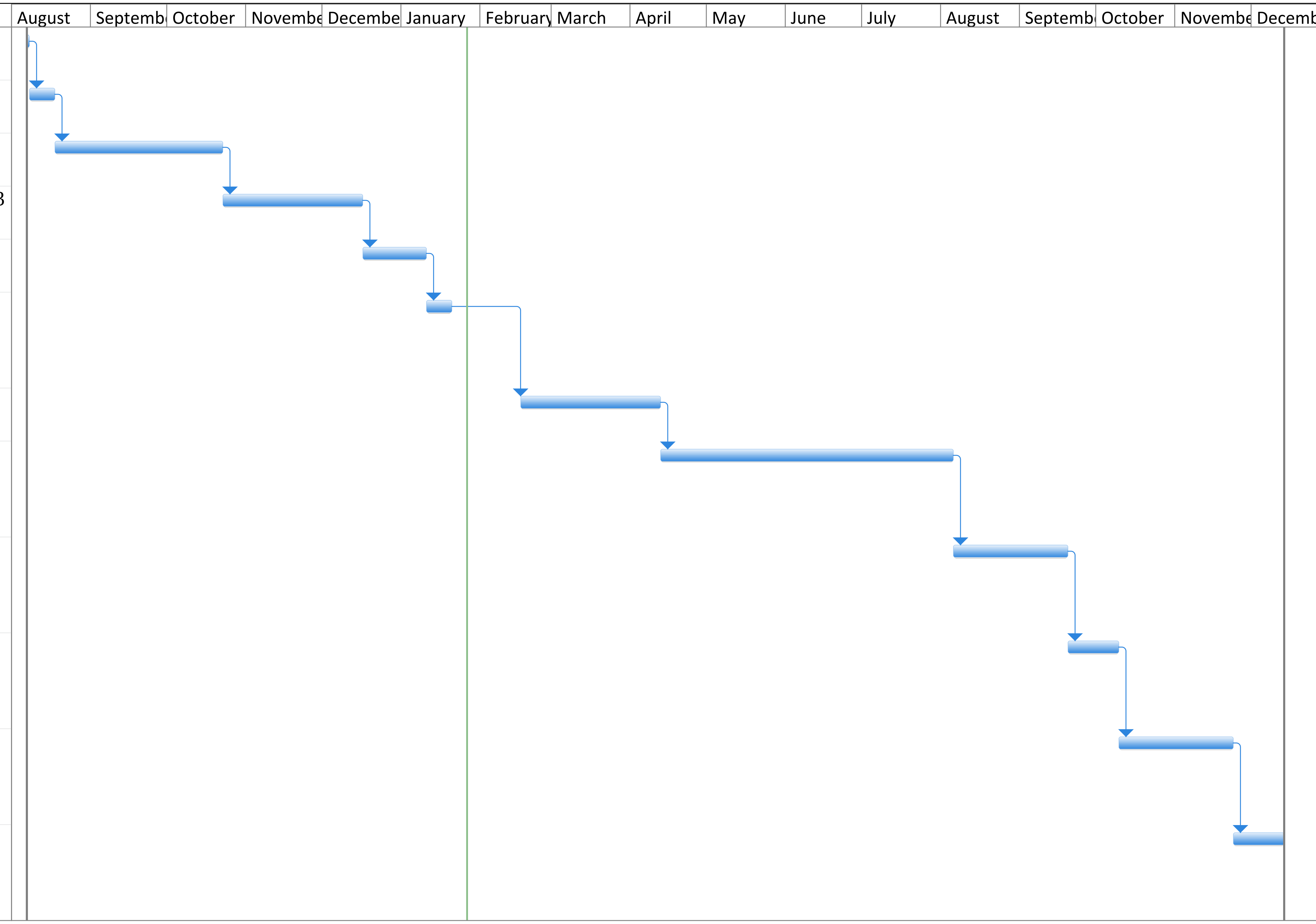
Site Investigation
Small Arms Range Berm Area
Site Identification No. FTSW-006-R-01
Fort Stewart, Georgia

ID	Task Name	Duration	Start	Finish
1	Notice to proceed	1 day	Wed 8/7/13	Wed 8/7/13
2	Progress chart	10 days	Thu 8/8/13	Sat 8/17/13
3	Final RFI work plan	66 days	Sun 8/18/13	Tue 10/22/13
4	Final RFI work plan review	55 days	Wed 10/23/13	Mon 12/16/13
5	Revised final RFI work plan	25 days	Tue 12/17/13	Fri 1/10/14
6	Review and approval of revised final RFI work plan	10 days	Sat 1/11/14	Mon 1/20/14
7	Fieldwork	55 days	Mon 2/17/14	Sat 4/12/14
8	Draft RFI/ risk assessment report	115 days	Sun 4/13/14	Tue 8/5/14
9	Draft RFI/ risk assessment report review	45 days	Wed 8/6/14	Fri 9/19/14
10	Final RFI/ risk assessment report	20 days	Sat 9/20/14	Thu 10/9/14
11	Final RFI/ risk assessment report review	45 days	Fri 10/10/14	Sun 11/23/14
12	Revised final RFI/ risk assessment report	20 days	Mon 11/24/14	Sat 12/13/14



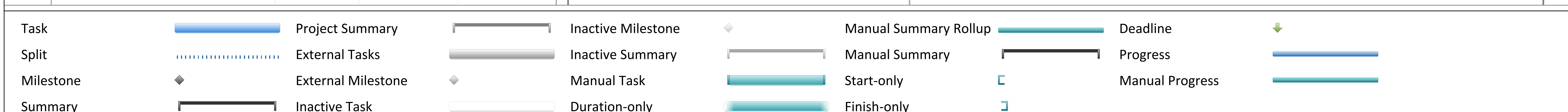


Figure 2-2 Project Schedule

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.

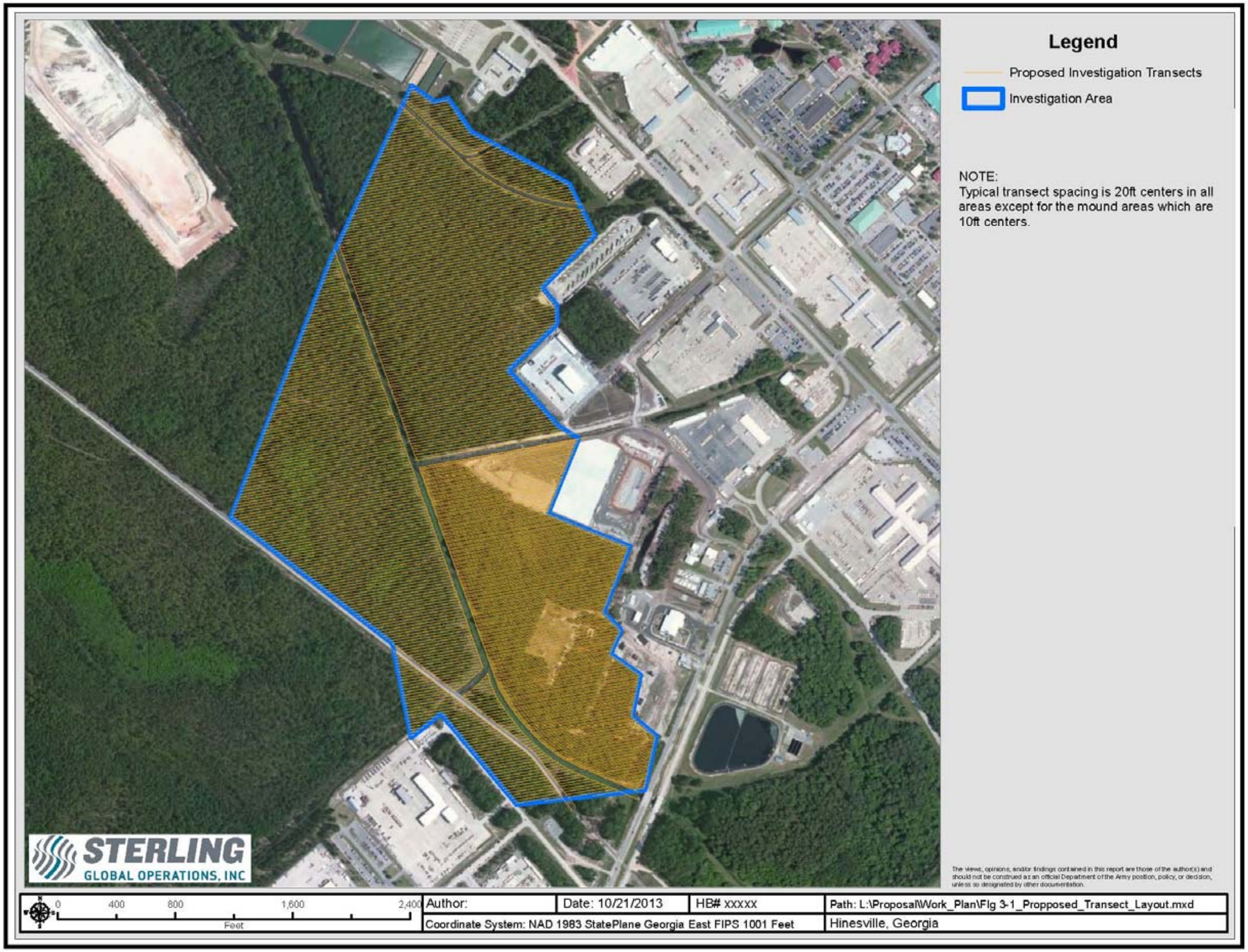


Figure 3-1 Site Investigation Transect Plan

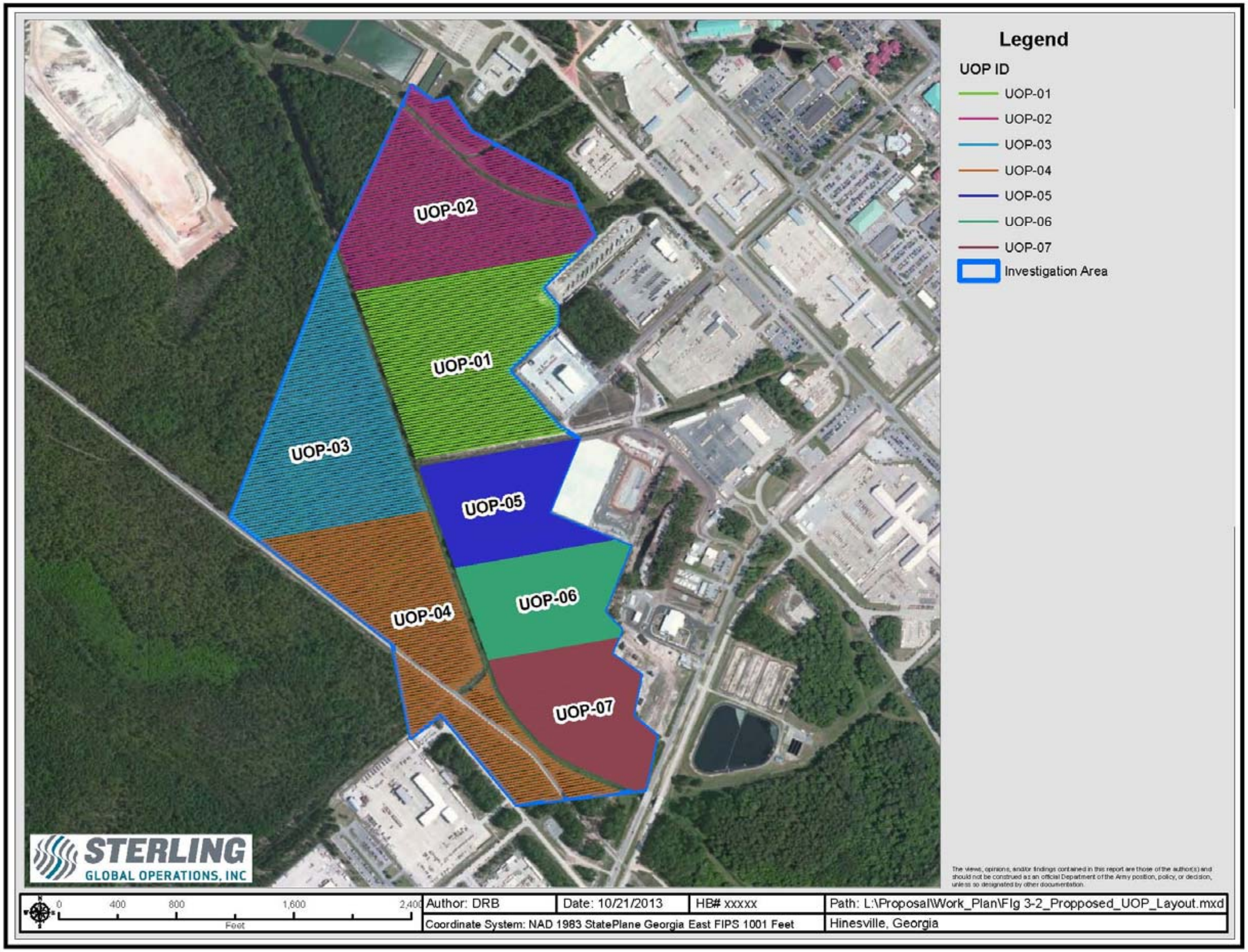


Figure 3-2 Site Location with Sub Areas

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.

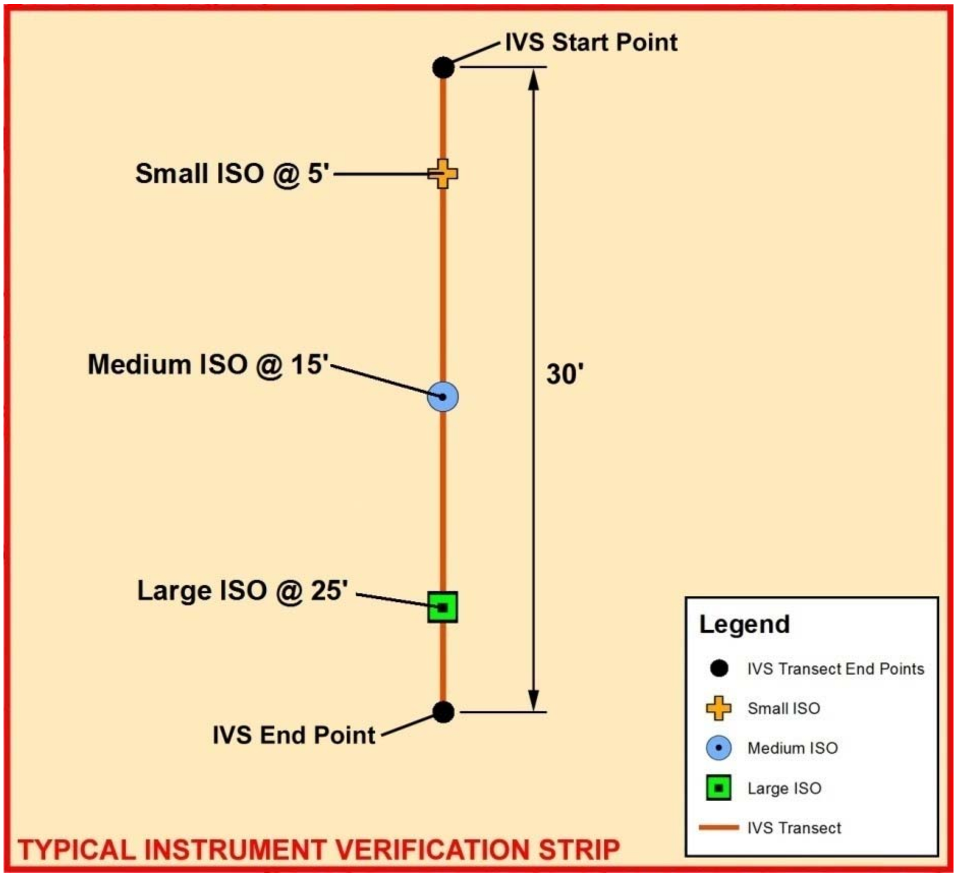


Figure 3-3 Proposed Instrument Verification Strip

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 and clicking on the IRTH 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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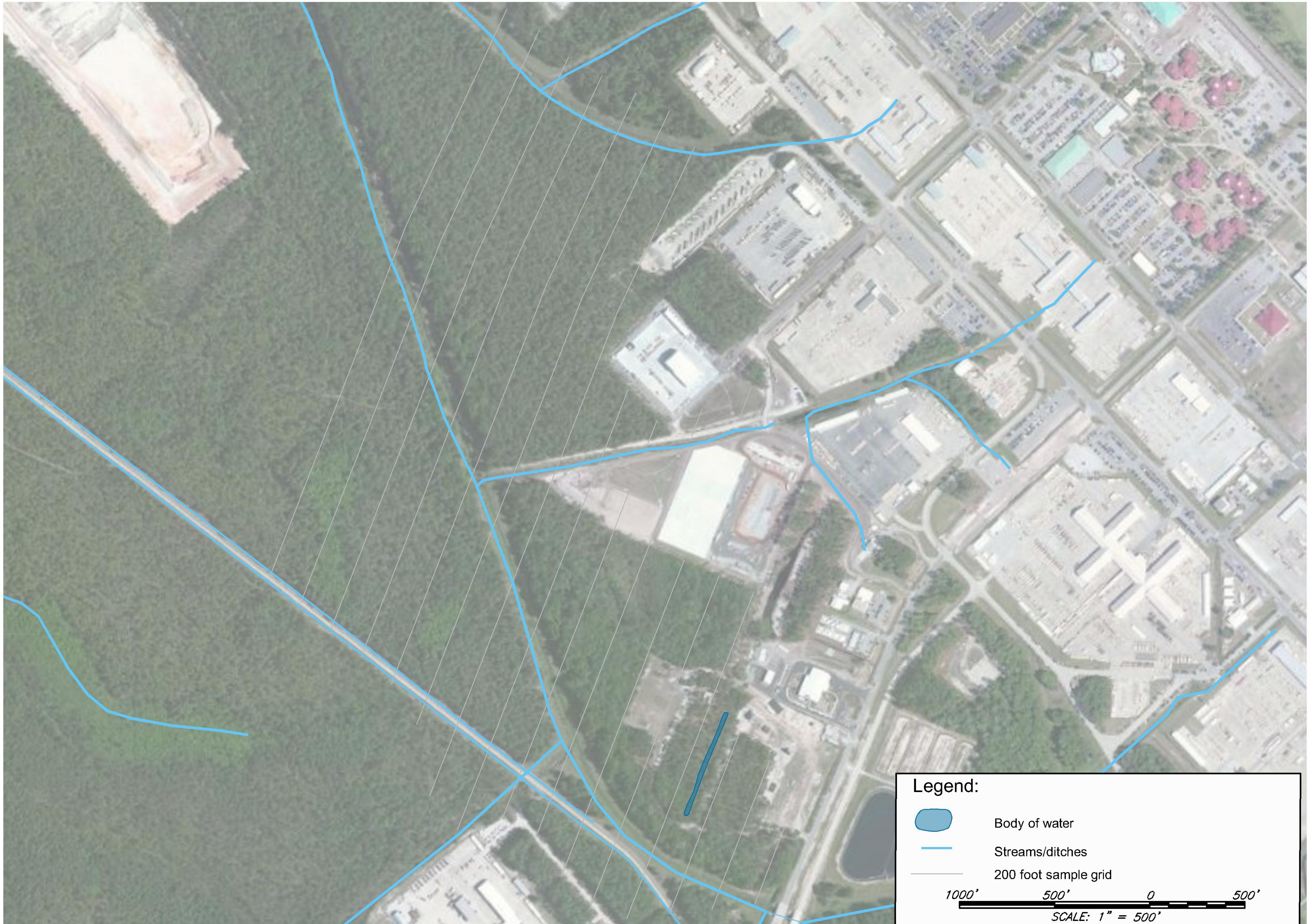

SpecPro Environmental Services LLC
1006 Floyd Culler Court
Oak Ridge, Tennessee 37830

SES

Job Title: Site Investigation Report
for the Small Arms
Range Berm Area
Fort Stewart, Georgia
Source: Google Earth and GPS

Figure 3-4 Sample Grid

R:\E0209\E0209.0025\Graphics\SAR Surface Soil Sample Fig 3-4_WP.dwg (7/18/14)

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Table 3-2 Soil Samples for Small Arms Range

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

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

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

Data Quality Objective Element	Site-Specific DQO Statement
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	• 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. • Up to two samples will be collected from each soil boring within the four berms.
Number of samples required	• 400 samples will be collected from 200 soil borings in the project area. • Up to 144 samples will be collected from the four berm locations from 72 soil borings.
Reference concentration of interest or other performance criteria	• EPA Regional Screening Levels • Fort Stewart background levels
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

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

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 Fort Stewart's background levels, which are in Table 3-6.

Table 3-6 Regional Screening Levels

Contaminant of Potential Concern	Fort Stewart Background Levels (mg/kg)
Antimony	*
Copper	3.1
Lead	12.9

*Antimony background level will be determined based on sampling (Section 3.9.1)
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). SES will determine antimony background concentrations by conducting surface and subsurface soil sampling from the same locations as indicated in the copper and lead referenced documents; SES will use 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.

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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 ±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 ±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 ±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.

4.2.3 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 Fort Stewart's background levels 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 OHSA-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
GPS = Global Positioning System
PID = photoionization detector
PPE = personal protective equipment
SES = SpecPro Environmental Services

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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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 antiaircraft 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 antiaircraft 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 15th 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

DOCUMENT	SUBMITTAL DATE (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

*** Denotes contractor submittals**

3.3.4 Document Distribution

OVERNIGHT MAILING ADDRESS	COPIES OF REPORTS 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
TOTAL	**4**	**4**	***4**

* 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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Contact Information for Key Project Personnel

Tressa Rutland Fort Stewart Prevention and Compliance Branch Chief, Environmental Branch Directorate of Public Works HQs 3d Infantry Division (Mechanized and Fort Stewart) 1550 Veterans Parkway, Building 1137 Fort Stewart, Georgia 31314-4938	(912) 767-7919
Algeana Stevenson Fort Stewart Project Manager Environmental Branch Directorate of Public Works HQs 3d Infantry Division (Mechanized and Fort Stewart) 1550 Veterans Parkway, Building 1137 Fort Stewart, Georgia 31314-4938	(912) 210-2950
Ana Vergara Project Manager U.S. Army Corps of Engineers Savannah District Box 889 Savannah, Georgia 31402	(912) 652-5835
Zsolt Haverland Technical Manager U.S. Army Corps of Engineers Savannah District Box 889 Savannah, Georgia 31402-0889	(912) 652-5815
Jim Madaj, PG Senior Program Manager SpecPro Environmental Services LLC 1006 Floyd Culler Court Oak Ridge, Tennessee 37830	(865) 481-7837 ext. 266
Doug Hawn Project Manager SpecPro Environmental Services LLC 1006 Floyd Culler Court Oak Ridge, Tennessee 37830	(865) 481-7837 ext. 264

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Appendix C

Contractor Forms

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STERLING
OPERATIONS, INC

QUALITY DAILY EQUIPMENT INSPECTION LOG

Contract:__________ **Task Order:**__________ **Location:**__________

Month Covered:__________ **SUXOS:**__________ **QCS:**__________

Equipment Type:__________

Equipment ID:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Notes:

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STERLING GLOBAL OPERATIONS, INC

DAILY INSPECTION AND WEEKLY AUDIT LOG FOR OE OPERATIONS

DATE:	TIME:	LOG NO.:
CONTRACT NO.:	TASK ORDER NO.:	
SITE NAME AND LOCATION:		

WEATHER CONDITIONS: ______________________________

I. AREAS INSPECTED: (List by grid number, team or task) ______________________________

II. INSPECTION RESULTS

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

III. SUMMARY OF DEFICIENCIES NOTED: (If required) ______________________________

IV. CORRECTIVE ACTIONS RECOMMENDED: (If required) ______________________________

V. REINSPECTION RESULTS: (If required) ______________________________

VI. SIGNATURES:

I acknowledge that I have been briefed on the results of this inspection and will take corrective actions (if necessary)

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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STERLING GLOBAL OPERATIONS, INC

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)

1. DOCUMENTATION:	**Pass**	**Fail**	**2. BRAKES:**	**Pass**	**Fail**
Registration	[ ]	[ ]	Hand/Emergency	[ ]	[ ]
Insurance	[ ]	[ ]	Service	[ ]	[ ]
Emergency Route Map and Phone Numbers	[ ]	[ ]			
3. TIRES:			**4. BELTS:**		
Pressure	[ ]	[ ]	Proper tension	[ ]	[ ]
Condition	[ ]	[ ]	Condition	[ ]	[ ]
5. EQUIPMENT:			**6. LIGHTS:**		
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*	[ ]	[ ]			
7. FLUID LEVELS:			**8. GENERAL:**		
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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STERLING OPERATIONS, INC

INSTRUMENT TEST REPORT – DAILY

Project Name:	Project No:	Location:	Date:

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, ☒ indicates good for operation	Personnel Testing Equipment	Comments
				☐		
				☐		
				☐		
				☐		
				☐		
				☐		
				☐		
				☐		
				☐		
				☐		

III. Problems Encountered / Corrective Actions Taken.

Explain in space below:

IV. Supervisor

Name and Signature:	Title/Company:	Date:

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<SITE> DAILY REPORT

CONTRACT NUMBER	TITLE AND LOCATION	DAY/DATE	REPORT NUMBER
X###XX-##-X-####-###	<Location, e.g., Ft. Hunter Liggett> <Title, e.g., MPMG Surface Clearance>	MM/DD/YYYY	1 Page 1
CONTRACTOR: SOI		NAME OF SUXOS	
WEATHER: <e.g., clear>		TEMPERATURE	Low: 0 High: 0
WEATHER EFFECTS: <e.g., None>			

PRIME CONTRACTOR/SUBCONTRACTOR WORKFORCE				SUMMARY OF WORK PERFORMED
NAME	POSITION	HOURS	EMPLOYER	
	<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>
<e.g., Survey Sub>	<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>
<e.g., Survey>	<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>
< e.g., Team 1>				
	<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>
< e.g., Team 2>				
	<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>

* TOTAL WORK HOURS ON JOB SITE THIS DATE	0.0	WERE THERE ANY LOST TIME ACCIDENTS THIS DATE? ☐ YES ☐ NO
* CUMULATIVE TOTAL OF WORK HOURS FROM PREVIOUS REPORT	0.0	
* TOTAL WORK HOURS FROM START OF PROJECT	0.0	IF "YES", ATTACH SUMMARY OF INCIDENT OR OSHA REPORT

<SITE> DAILY REPORT

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	1 Page 2

* **Number of Points Surveyed today**:

* **The following Grids passed SOI QC**:

* **The following Grids failed an SOI QC Inspection**:

LOCATION AND DESCRIPTION OF DEFICIENCIES

(Materials, Equipment, Safety, and/or Workmanship)

*
*

DEFICIENCIES CORRECTED

	Report No.	Compliance Notice No.
*		

*	SAFETY TOPICS COVERED:
*	<e.g., Ordnance safety, heavy equipment>
*	
*	

REMARKS: (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	
*				
*				
*				
*	TOTAL Anomalies TODAY:		0	

Comments:

*
*
*
*

<SITE> DAILY REPORT

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	1 Page 3

DETAILED DESCRIPTION OF ACTIVITIES:

* <e.g., Conducted Task Order and Safety Brief>
* <e,g., MEC Clearance Operations>
* <e.g., Team One (1) completed the following Grids in Tract:> FHL
* <e.g., Team Two (2) completed the following Grids in Tract:> FHL

Date	# Grid Completed	Team #	MEC Items Recovered	QA Seed	QC Seed	lbs of MD Recovered	lbs of Non-MD Recovered	Number of Excavations/ DGM
		1	0	NA		0	0	0
		2	0	NA		0	0	0
				NA				
				NA				
				NA				
				NA				

MM/DD/YYYY

SOI Safety/QC Representative Date

MM/DD/YYYY

SOI SUXOS Date

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STERLING
GLOBAL OPERATIONS, INC

DAILY QUALITY CONTROL REPORT

Project Name:		Report No:	
Project No:	Location:	Date:	
☐ Sunday ☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday			
Weather/Precipitation:	High Temperature: Low Temperature:	Wind:	Humidity

I. Personnel Present (Reference/attach Site Managers daily report, if applicable.)

Name	Position	Company

II. Work Performed (Annotate the field work performed during the Reporting Period.)

III. Quality Control Activities (Reference/attach inspection/surveillance reports.)

IV. Problems Encountered / Corrective Actions Taken

V. Directions Given / Received

VI. Special Notes / Lessons Learned

VII. Visitors

VIII. Certification (I certify that the above information is correct and complete.)

Name and Signature:	Title/Company:	Date:

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SPECPRO 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. <u>Testing of all safety devices must be observed by health and safety personnel</u>. 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 retail 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:

____

____

____

____

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:

____

____

____

LIST ANALYTICAL SUITE **CONTAINER**

____

____

____

____

____

____

____

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?
1.0	**Project Administration: 1926, Subpart C**				
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?				
2.0	**Housekeeping: 1926, Subpart C**				
2.1	General orderliness of the site acceptable?				
2.2	Passageways and walkways clear?				
2.3	Containers with lids provided for trash?				
3.0	**Medical Services and First Aid: 19256, Subpart D**				
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?				
4.0	**Sanitation, 1926, Subpart D**				
4.1	Adequate supply of drinking water provided?				
5.0	**Hazard Communication**				
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?				
6.0	Personal Protective Equipment: 1926, Subpart E				
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?
7.0	**Fire Protection and Prevention: 1926, Subpart F**				
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?				
8.0	**Signs and Signals**				
8.1	Are warning signs properly posted and visible?				
8.2	Is the construction area properly posted?				
9.0	**Handling and Storage: 1926, Subpart H**				
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?				
10.0	**Tools – Hand and Power: 1926, Subpart I**				
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?				
11.0	**Electrical: 1926, Subpart K**				
11.1	Adequate wiring, well-insulated, no frayed cords?				
11.2	Are extension wires 3-prong and designed for rough usage?				
12.0	**Others**				
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.
Battery Compartment cleanliness														
water levels														
connections														
Battery Indicator inspect state of charge														
Tire Check damaged wheels														
damaged or missing lugs														
condition of tires														
Brakes pedal travel														
parking brake holds equipment in place														
Safety Devices check horn														
check backup alarm														
lights and reflectors														
Check for new Damage Explain in remarks section														
Operators compartment check operator controls														
check seat belts														
windshield wipers														
defrosters														
fire extinguisher														
overhead guard in place & secure														
Leaks Check under vehicle for puddles														
Steering Check operation of steering mechanism														
General Operation inspect for unusual operation														
Mast and Forks fork pins														
mast operation														
are forks level														

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AIR SAMPLING AND CALIBRATION DATA SHEET

Date:__________________ Sampled By:____

Analyzed By:____

Job: #__________________ Job Location:____

Work Location:____

Type of Work:____

AIR SAMPLING INFORMATION

Sample Number	Sample Location or Workers Name	SS#-00-000	Time On	Time Off	Total Time In	Flow Rate	Total Volume	Concent. f/cc	TWA 10 Hr.	*Resp Type

* Type of Respirator Worn A – ½ Face Resp. D – Full Face Neg. Press.

B - PAPR E – Other (Specify)

Calibration Device Used: C – Type "C" P/Demand ____________________

____________________ C_1- Type "C" Cont. Flow ____________________

CALIBRATION INFORMATION

Pump Number		Trial # 1	Trial # 2	Trial # 3	Average	Average LPM Avg. Before + After/2	Sample # (From Above)
	Before						
	After						
	Before						
	After						
	Before						
	After						
	Before						
	After						

Note: OSHA Stipulates that personal sampling be performed at 2.0 lpm.

Signed: ____________________

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Daily Hydrant Water Usage

Date	Load 1	Load 2	Load 3	Load 4	Load 5	Load 6	Total (gallons)
				Shift Total (gallons) =			

Geologist ______________________________

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SES Field Sample Collection Log

Project Location:	
Project Number:	
Date:	

Sample Date	Sample Time	Sample Location	Sample ID #	Sampler's Name	Media	Container	Analysis

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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/ft)	Lithologic Description	USCS	Blows/6 in	Stratigraphic Log	Well Construciton Data	Water Depth & Remarks	GS Elev
0														
5														
10														
15														
20														
25														
30														
35														

U = Thin Wall Tube
S = Split Spoon (tube)
C = Cuttings
Notes:

R = Rock Coring
O = Other
OVA Instrument (Make/Model)

On-Site G/C (Make/Model)
G/C Operator:

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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

Send Results to:	Send Invoice to:	Analysis Requirements:	Lab Use Only:
Name ____ Company ____ Address ____ City ____ State, Zip ____ Phone____ Fax ____ E-mail ____	Name ____ Company ____ Address ____ City ____ State, Zip ____ Phone ____ Fax ____ E-mail ____		VOA Headspace Y N NA Field Filtered Y N NA Correct Containers Y N NA Discrepancies Y N NA Cust. Seals Intact Y N NA Containers Intact Y N NA Airbill #: ____ CAR #: ____
Project No./Name:	**Sampler's (Signature):**		

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix													Comments	No. of Bottles	*Lab Use Only* Containers/Pres.

C-35

Sample Kit Prep'd by: (Signature)	Date/Time	Received By: (Signature)	REMARKS:	Details:
Relinquished by: (Signature)	Date/Time	Received By: (Signature)		Page ____ of ____ Cooler No. ____ of ____
Relinquished by: (Signature)	Date/Time	Received By: (Signature)		Date Shipped ____ Shipped By ____
Received for Laboratory by: (Signature)	Date/Time	*Temperature*		Turnaround ____

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

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Appendix D

Resumes

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Doug Hawn
Project Manager/Environmental Scientist

Education
- BS, Wildlife and Fisheries Science, University of Tennessee, 1988

Training
- Asbestos Inspector
- OSHA 40-Hour HAZWOPER and 8-Hour refreshers
- HAZWOPER Supervisor
- USACE Construction Quality Management for Contractors
- Asbestos in Buildings: Inspector Training and refreshers
- Emergency Response
- First Aid/CPR/AED

Summary of Qualifications

Mr. Hawn has over 24 years of diversified experience as an environmental scientist. He specializes in environmental assessments, regulatory compliance audits, field investigation, and environmental remediation. He has worked in 26 states as well as Guam, Midway Island, Germany, and Canada. Many of the regulatory audits were for active manufacturing facilities to determine compliance with appropriate environmental regulations. He has performed many Phase I environmental assessments which typically involved site visits, record searches at regulatory agencies, and reviews of aerial photographs and old maps: many of these assessments have been used to support property transfer agreements.

In addition to his field investigation and remediation experience, Mr. Hawn also serves as the SES analytical coordinator for all company projects. He is responsible for planning sampling requirements, and coordinating with field staff, laboratory personnel, and validators to ensure that samples are collected, shipped, and analyzed for the appropriate parameters.

Mr. Hawn has supported numerous projects for Department of Defense (DoD) clients, including the U.S. Corps of Engineers (USACE) and the Naval Facilities Engineering Command (NAVFAC), on both construction and demolition activities, Resource Conservation and Recovery Act (RCRA) facility investigations (RFIs), and remedial actions. For these projects, his responsibilities have included peer review of project documents, management of field activities, conducting confirmatory sampling, oversight of monitoring well installation, laboratory coordination and management of analytical data, and quality assurance/quality control (QA/QC). He has also prepared project deliverables such as work plans, Corrective Action Plans (CAPs) and reports, sampling and analysis plans, and QA plans. In addition, as the Task Manager for underground storage tank (UST) projects, he has managed monitoring activities and the installation of groundwater monitoring wells, UST excavation and removal, and soil sampling during closure activities.

Additional highlights of Mr. Hawn's experience include:

- Building material characterization (asbestos, lead-based paint, polychlorinated biphenyls [PCBs], radioactivity) prior to the decontamination and decommissioning of several Department of Energy (DOE) buildings in Oak Ridge, TN;
- Preparation of preliminary assessments/site investigations for numerous contaminated areas at the DOE Savannah River Site for which he reviewed environmental assessments, investigated historical data, developed a sampling and analysis plan, and evaluated analytical data;
- Regulatory compliance for a feasibility study at a DOE facility, which included wetlands and floodplains assessments, threatened and endangered species surveys, cultural and archaeological resources assessments, and ecological risk assessments.

Experience

SES Group of Companies, 1994–Present
Oak Ridge, Tennessee
Environmental Scientist/Project Manager

2013–Present: Outdoor Small Arms Range Berm Clearance, Marine Corps Recruit Depot (MCRD), Parris Island, SC. Project manager for the removal of the top three feet of a small arms range berm, the screening for projectiles and other debris, and appropriate disposal of all hazardous materials including projectile-damaged wooden timbers. The berm will be reconstructed to an approximate 2:1 slope, utilizing additional fill and topsoil as needed from an off-site source and erosion control matting on the berm face, followed by complete restoration of the disturbed site.

2013–Present: Time-Critical Removal Action at Former Camp Wheeler, GA. Project manager overseeing subcontractor's removal of Munitions and Explosives of Concern (MEC) to a depth of detection on 52 acres within a former firing range at the former Camp Wheeler, in preparation for surface-mining the area.

2012–Present: Response to Regulatory Review Comments and CAP, Fort Benning, GA. Project manager overseeing groundwater monitoring at two UST sites.

2012–Present: Heating Oil Spill Site Investigation at Building 419, Fort Stewart, GA. Project manager conducting a site delineation and extraction of free product from a heating oil spill site, and conducting a two-year groundwater monitoring program, disposal of investigative-derived waste, and preparation of a CAP Part A and Part B.

2012: Waste Management Support at Navy Operational Support Center (NOSC), Amarillo, TX. Project manager overseeing the safe containerization, labeling and disposal of excess waste materials at the NOSC facility.

2011–2013: Non Time-Critical Removal Action (NTCRA) at Former Camp Wheeler, GA. Project manager overseeing subcontractor's removal of MEC to a depth of detection at the Power Line Corridor and the Layfield Property within a former firing range that was part of the former Camp Wheeler.

2011–Present: RFI Interim Removal Action at Former Skeet Range, Fort Benning, GA. Project manager currently investigating potential contaminants at solid waste management unit (SWMU) FBSB-102, a former rod and gun club skeet range: a groundwater monitor well will be installed using Geoprobe® direct push technology, and soil samples will be collected from borings and analyzed for polycyclic aromatic hydrocarbons (PAHs) and total lead.

2011–Present: Site Investigation at Small Arms Range Berm, Fort Stewart, GA. Project manager for follow-on work to further delineate contaminants of concern in areas of the project site not yet delineated and to remove an estimated 2,500 cubic yards of soils. An Interim Removal Action will be developed containing detailed documentation of all completed work and disposal details of the berm material.

2010–2013: Environmental Impact Statement (EIS) for Training Land Expansion Program, Fort Benning, GA. Project manager responsible for the preparation of an EIS to address a proposed 82,800 acre expansion of army training activities. Of the needed total acreage, 60,000 acres would support maneuver training for heavy battalions. The remaining 22,800 acres would support the Army Reconnaissance Course (ARC) and other training that could be moved off the 2009 footprint of Ft.

Benning. The immediate need is the acquisition of land to allow the ARC to conduct the field training tasks off the Installation footprint by October 2016.

2011–2012: Removal of Unpermitted Debris from Kelley Hill Site, Fort Benning, GA. Project manager on the removal of approximately 16,500 cu. yds. of debris from a highly eroded area. After examination and sorting for hazardous materials, which were removed, approximately 2,500 cubic yards of clean soil and 750 tons of clean concrete were recovered for reuse. After backfilling, the site was graded to form three terraces downsloping to the point of natural drainage and best management practices (BMPs) in the form of "micro" pools and a drainage channel system were created to transition stormwater flow from the site.

2011–2012: Mobile Indoor Firing Range Lead Removal, Naval Air Station (NAS), Joint Reserve Base (JRB), Fort Worth, TX. Project manager for removal of lead-contaminated range material, disposal, cleaning, sampling, and decontaminating activities at the Base's mobile indoor firing range.

2011–Present: Indoor Firing Range Lead Removal and Maintenance, NAS JRB, Fort Worth, TX. Project manager organizing the 2-phase removal of lead-contaminated materials and maintenance activities on both halves of the indoor firing range at NAS JRB Fort Worth. In the 50-feet wide, 12-lane section of the range, the bullet trap Grantex rubber was removed and replaced, and lead/bullet fragments disposed of; subsequently lead residue was removed from the interior range surfaces, vacuumed and wet-washed; sampling was performed to ensure lead remediation goals were achieved. Waste disposal, material replacement, patching and reinstallation activities completed the work. From both sides of the range, a total of approximately 60 cu. yds. of material was removed, including the spent Grantex.

2011–2012: Mobile Indoor Firing Range Cleanup and Dental Clinic Closure, Naval Support Activity (NSA), New Orleans, LA. Project manager for removal of lead contaminated material at a mobile indoor firing range where ceiling, tiles, the ventilation system, bullet backstop components and soundproofing materials were removed and disposed of as hazardous waste. Confirmatory sampling in the firing range resulted in re-cleaning to achieve remedial goals. Also included in the scope was the cleanup at the dental clinic prosthetics laboratory where all contaminated equipment was removed and waste materials were characterized.

2011–2012: Evaluation of Soil and Groundwater at Potential Construction Sites, Fort Stewart and HAAF, GA. Project manager on the rapid response evaluation of soil and groundwater at five proposed construction sites.

2011: Excavation and Soil Screening at Former Gas Station, Fort Benning, GA. Project manager responsible for the completion of an excavation of potentially contaminated soil at the site of Building 3763, a demolished gas station where the USTs and all associated piping had already been removed. Approximately 1,000 cubic yards of soils were removed, to a depth of approximately 29 feet, and screened for disposal purposes, and confirmatory sampling was performed.

2010–2012: Heating Oil Spill Site, Fort Stewart, GA. Project manager overseeing a site investigation of 4,500 gallons of heating oil spilt near Building 419 at Fort Stewart.

2008–2011: Site Investigation of Small Arms Range Berm Area, Fort Stewart, GA. Project manager responsible for the delineation of contaminants of concern at a former small arms firing range. A volume of contaminated soil was identified and removed and the investigation indicated the need to extend the area of delineation beyond the extent of the berm.

2010: UST Removal at Building 95, Fort Campbell, KY. Subcontracting laboratory coordinator overseeing the sampling activities for the closure by removal of a 6,000-gallon unregulated heating oil UST associated with Building 95 in the Kentucky portion of Fort Campbell.

2008–2010: Training Range and Garrison Support Facilities Construction and Operation EIS, Fort Stewart, GA. Project manager for the preparation of an EIS that addresses the resulting environmental and socioeconomic effects of proposed military activities at Fort Stewart beginning in Fiscal Year (FY) 11 and extending through FY14. The purpose of the proposed action is to provide modern training capabilities, build facilities to support stationing changes, and enhance management of land and infrastructure of Fort Stewart to support current and future missions while sustaining its stewardship of natural and cultural resources.

2008: Soil Remediation at Central Energy Facility, Fort Campbell, KY. Project manager overseeing the permanent closure of a fuel oil system, which had previously served as an auxiliary fuel system for boilers in the Central Energy Facility (Building 3902) at Fort Campbell.

2007–2008: Remedial Action at Former UST Sites, Fort Campbell, KY. Environmental scientist on project using oxygen release compound to treat source area petroleum, oil and lubricant (POL) contamination in the soil and groundwater. RegenOx™ was injected into the subsurface as a relatively high-volume aqueous solution that oxidizes contaminants and generates free radicals, which provide further oxidation. SES collected confirmation samples at three and six months to evaluate the effectiveness of the treatment.

2007–2008: Lubrication Rack Sites Investigations and Demolition, Fort Campbell, KY. Project manager for investigations to determine extent of soil contamination at multiple former lubrication rack sites throughout the installation, utilizing direct push technology to install several borings at each site, and collecting surface and subsurface soil samples for analysis for PAHs and total metals. Also oversaw the demolition of two lubrication racks.

2007–2008: Remedial and Investigative Activities at Helicopter Crash Site, Skyline, AL. Project manager responsible for project to conduct emergency response activities at a helicopter crash site, including: delineation of a crash site area of approximately 10,000 square feet; identification of 19 impacted areas; soil sampling at impacted areas to assess for Total Petroleum Hydrocarbons (TPHs) and RCRA metals; excavation and proper disposal of approximately196 cubic yards of TPH impacted soil; collection and disposal of helicopter fragments; sampling of perched water; confirmatory soil sampling post-soil removal activities to assess adequacy of the removal effort; repair of a culvert damaged by the Army during crash removal activities; and site restoration and reseeding.

2007: Phase I Environmental Audit, Knoxville, TN. Performed a Phase I environmental audit at two adjoining parcels of property to provide client with information needed to make cost-effective and timely decisions regarding potential environmental liabilities associated with the properties.

2006–2009: Slurry Wall and Environmental Pilot Studies at South Central Landfill, Fort Stewart, GA. Analytical coordinator assisting in the development of a barrier wall to protect personnel from explosive amounts of methane, generated by the South Central Landfill at Fort Stewart, which was potentially gathering in low-lying areas near a tank trail used by military personnel.

2006–2007: Free Product Recovery at Campbell Army Airfield (CAAF), FY06, Fort Campbell, KY. Environmental scientist overseeing the sampling and analysis of effluent from the two treatment systems at CAAF as part of a project to provide eight months of support for the fixed multi-phase vacuum extraction system at the airfield.

2006–2007: Removal of a 30,000 Gallon Diesel UST at Building 7008, Fort Campbell, KY. Project manager overseeing the removal of a 30,000 gallon petroleum underground storage tank (UST) at a former energy facility in accordance with state requirements. The related piping, concrete ducts and cement block pump house were also demolished and removed. The UST and other metal components were properly disposed or recycled after asbestos abatement on the piping conduit insulation, contaminated soil was characterized and disposed, and the excavated area was restored.

2006: Corrective Measures Study for SWMU 170Z11, Fort Campbell, KY. Provided peer review of the corrective measures study for the site of a former lubrication rack where free project and dissolved groundwater contaminants were a concern. Provided regulatory guidance during development of site-specific, qualitative cleanup goals to address contamination and protect human health and the environment. Five remedial alternatives were evaluated, and passive skimmers were selected as a cost-effective remedial strategy to meet remedial goals.

2005–2006: UST Removals at Ellyson Army Airfield, Sites 3 and 6, Pensacola, FL. Analytical Coordinator on a project that called for the removal and closure of four small USTs located at Site 3, and 14 500-gallon lube oil USTs, 47 fuel dispensing pits/dispensers, one oil water separator and wash rack, four valve pits, three junction pits, and approximately 6,000 feet of piping runs at Site 6.

2005–2006: Tier II and Tier III Risk Assessment for the Old Hospital Complex, Fort Campbell, KY. Environmental scientist and project manager responsible for directing risk assessment and data management personnel during a large-scale human health risk assessment involving over 600 soil samples. Work included analysis of risks to future residents and recreational users of the site from pesticide, metals, and semi-volatile organic compounds in soil.

2005: Preliminary Site Investigation, Loudon, TN. Project manager responsible for an investigation of an old convenience store in support of a property transfer. Performed a site inspection, historical record search, and interviews of prior site tenants to determine the potential for future environmental problems. Prepared the Phase I report.

2004; Sinkhole Verification, Fort Campbell, KY. Environmental scientist during a project to verify the existence of over 90 sinkholes that were referenced in historical documents at Fort Campbell. Visited each site to assess whether storm water flowed into the sinkholes, photograph each area, install markers, and collect survey data using GPS equipment.

2004; Bryan Village CAP A, Fort Stewart, GA. Analytical coordinator and member of the field team during installation of four groundwater wells, well sampling, and soil sampling around a former tank pit where fuel related contamination had been detected in the groundwater. Coordinated all sampling during the 2-week effort and performed the majority of fieldwork at night to minimize disruption to the active fueling facility. Prepared the project work plan and provided peer review of other project documents.

2003–2004; Soil Removal at SWMU 15, Millington, TN. Analytical coordinator during a large-scale removal action of over 57,000 tons of petroleum-contaminated soil at a former fuel farm. Coordinated with laboratory personnel and the field team during collection and analysis of over 50 soil samples to ensure that all contaminated soil was removed.

2003-2004; Site Investigation at the Old Hospital Complex, Fort Campbell, KY. Environmental scientist responsible for leading the field-sampling team during an investigation to determine the presence and extent of contamination from previous activities at the Old Hospital Complex. Managed collection of both surface and subsurface soil samples using both direct push technology (Geoprobe) as well as stainless steel spoons and trowels. Over 600 samples were collected and submitted to the analytical laboratory for analysis in accordance with Fort Campbell Standard Operating Procedures. Soil was also examined visually and field-screened using a MiniRAE 2000 photoionization detector with a 10.6 eV lamp.

2002–2003; AIMTech; RCRA Facility Investigation at SWMU 39, Fort Stewart, GA. Environmental scientist responsible for oversight during Geoprobe boring and monitoring well installation. Sampled existing and new wells, and soil for PAH and VOC analysis. Sampling was performed to investigate boundaries of a waste oil plume at the site. Assisted with preparation of the RFI report.

2002; AIMTech; UST/Heating Oil Tank Investigation, Fort Stewart, GA. Environmental scientist during a subsurface investigation of underground fuel storage systems at Fort Stewart. Responsible for oversight of drilling personnel during installation of 32 monitoring wells. Collected soil and groundwater samples, and coordinated with laboratory and data validation personnel.

2002; AIMTech; RCRA Facility Investigation at SWMU 27, Open Burn/Open Detonation Unit, Fort Campbell, KY. Task manager responsible for a RCRA Facility Investigation to determine whether residual contamination from explosives was present at the site. The task included developing and sampling 16 existing wells, and collecting 35 surface soil samples and 21 subsurface samples from 7 Geoprobe borings. Samples were analyzed for VOCs, SVOCs, energetics, sulfites, nitrates/nitrites, and total phosphorous. Coordinated transfer of lab data and with validation personnel. Also responsible for coordinating field efforts with UXO specialists to ensure that all project activities were conducted safely. Prepared the final project report.

2002; Phase I Environmental Audit for the Former Custom Pak Meats Property. Task manager responsible for a Phase I audit in support of a property transfer for the Former Custom Pak Meats property in Knox County. Completed a site visit, personnel interviews to determine site history, and research at regulatory agencies to determine any past environmental problems at the site or with adjacent properties. Authored final phase I report.

2001; Phase I Environmental Assessment for 17 Property Parcels in Knox County, TN. Task manager responsible for a Phase I Environmental Assessment covering approximately 5.5 acres. Reviewed topographic maps of the area, property boundary information, environmental databases incorporating federal and state lists of contaminated sites, and local tax maps. Also contacted local fire and health departments to obtain information regarding underground storage tanks, spills, and reported health problems at the site or in the area. Reviewed historic aerial photographs of the site and vicinity, to obtain soil information, wetlands maps, and floodplain maps. Conducted a site visit to inspect the site for any evidence of environmental impairment, and identified building materials that could potentially contain lead based paint and asbestos. Phase II sampling was recommended.

2001; USACE–Mobile District; IDIQ Base Environmental Support Contracts. Analytical coordinator for two $3M Base Environmental Support Contracts. Responsible for arranging laboratory analysis, coordinating with the data validator, and management of electronic databases containing results. Task orders under these contracts have included a deconstruction feasibility study, removal of asbestos and lead based paint-contaminated housing, a preliminary site assessment; removal of lead-contaminated waste piles; design of a waste treatment system; a RCRA facility investigation, and compilation of a yearly groundwater summary report.

2001; Environmental Site Assessment for the Bungalow Market Site, Maryville, TN. Task manager for a Phase I Environmental Site Assessment. to determine whether potentially adverse environmental conditions were present. Reviewed local, state, and federal databases for listings of the property or of properties in the immediate area. Contacted local officials and employees of the facility to inquire about environmental conditions, and reviewed the history of the site. Authored final report.

2000–2001; USACE–Nashville District; Update to the Fort Campbell Generic Work Plan and Sampling and Analysis Plan. Task manager responsible for the Generic Work Plan, and Sampling and Analysis Plan update. These documents are used by both Fort Campbell and subcontractor personnel. Mr. Hawn was lead author responsible for incorporation of new regulatory information, sampling techniques, and environmental investigation procedures.

1999–2003; USACE–Nashville District; Groundwater Summary Report, Fort Campbell, KY. Data manager responsible for preparation of the annual report summarizing analytical data collected from over 100 wells at various solid waste management units, one area of concern, and the Campbell Army Airfield. The report was used as a planning document to determine whether contaminant concentrations were increasing or decreasing, and to help determine future remedial strategies.

1999–2001; Stokely/National Park Service; LeConte Lodge Wilderness Camp, Gatlinburg, TN. Lead environmental scientist during the inspection and sampling of kerosene-impacted soil within the fuel storage area. Responsibilities included coordination for approval with the State of Tennessee, Remediation Division of Solid Waste and the National Park Service on the Sampling and Analyses Plan and remediation alternatives.

1998–2001; USACE–Nashville District; ID/IQ Contracts at Fort Campbell, KY. Environmental scientist on over 30 tasks at Fort Campbell carried out under HTRW IDIQ contracts. Work included sampling and analysis, ecological risk assessments, data validation and interpretation, and environmental compliance studies and regulatory interface. Acted as laboratory and electronic data management coordinator for all Fort Campbell HTRW tasks. Part of the team that received the Fort Campbell Corporate Performance Award.

2000; USACE–Nashville District; Environmental Assessment at the WJCW Site, Gray, TN. Environmental scientist responsible for sampling the WJCW radio station site where leaks from an old UST had impacted groundwater. Project activities included sampling three groundwater wells and surface water from a nearby stream. Samples were analyzed for TPH EPH.

2000; Environmental Audits, Alltrista Corporation. Lead environmental auditor responsible for routine environmental compliance and permit reviews at Alltrista facilities in FL, TN, IN, AK, IA, and SC. Responsible for site visits, interviews with key personnel, and review of analytical data. Ensured that all hazardous waste, solid waste, and wastewater management activities were in compliance with local, state, and Federal regulations.

2000; USACE–Nashville District; AOC H, Fort Campbell, KY. Environmental scientist during collection phase of additional sediment and surface water samples (7 pairs, 14 total); updated the existing Tier I Human health risk evaluation, updated the existing Tier I Ecological Risk Assessment and conducted a Tier III Baseline Ecological Risk Assessment. Managed sampling activities and was responsible for coordination with the laboratory and data validator.

2000; Solid Waste Management Unit 149x and 149y, Fort Campbell, KY. Analytical coordinator responsible for sampling equipment, tracking, and electronic data deliverables. Reviewed all analytical data and served as primary point of contact with laboratory personnel.

2000; Underground Storage Tank Investigation, Fort Stewart, GA. Environmental scientist responsible for the construction oversight of eight groundwater monitoring wells at potentially contaminated sites. Conducted soil and groundwater sampling in accordance with the work plan, and served as primary point of contact for laboratory personnel.

1999–2000, Drakes Creek Project, Hendersonville, TN. Environmental scientist responsible for set up of sampling procedures and equipment during the Drakes Creek restoration project. Restoration was performed by dredging the creek in most areas to a depth of five feet, installing geotubes to contain dredged material, and use of bioengineering and conventional techniques for site restoration. Sampling was conducted to monitor the turbidity of the water in the creek.

1999–2000; Skeet Range, Fort Campbell, KY. Project manager for the Phase I RFI. Responsible for sediment, surface water, and soil sampling to address lead and PAH contamination at the site. Coordinated data analysis and validation in accordance with the project work plan. Also responsible for report preparation, and an ecological assessment of the site based on EPA guidance.

1999–2000; USACE–Nashville District; Wastewater Treatment Plant Demolition and Characterization, Fort Campbell, KY. Environmental scientist for the characterization and demolition of an abandoned wastewater treatment plant. Responsibilities included review of SOW with regard to regulatory issues (e.g., analytical methods, sampling techniques and decontamination), supporting the preparation of the Work Plan (reviewed and approved by the USACE, Environmental Protection Agency [EPA], and the Commonwealth of Kentucky), management of the field activities (e.g., sampling, decontamination and coordination with Post personnel), coordination with the laboratories, management of analytical data, and report preparation.
Other representative projects at Fort Campbell with similar responsibilities included: Subsurface Investigation of SWMU 149 Oil Pits, Area of Concern D, and Fort Campbell CAAF Groundwater Sampling.

1999; US Slate & Marble, Morristown, TN. Lead auditor during an Environmental Audit. US Slate & Marble was vacating a site for a new owner. Responsibilities included an on-site visit, review of documentation and existing environmental data, and interviewing key personnel.

1999; Lockheed Martin Energy Systems, Inc., Hazardous Wastes Remedial Action Program, Oak Ridge, TN. Environmental scientist and regulatory specialist for remediation at Fort Campbell, Kentucky. Prepared work plan for Pumphouses 1 and 2 at Area of Concern A. The area was suspected to have fuel contamination. Work plan included Geoprobe sampling, soil borings, sampling existing monitoring wells, and installing new monitoring wells. Conducted field QA/QC, laboratory coordination, data analysis, and report preparation for a RCRA facility investigation at 8 sites. Prepared the work plan, QA plan, and sampling and analysis plan for the removal and demolition of a battery shop. The site was suspected to have lead contamination. This project was especially challenging because it involved a combination of environmental investigation and construction activities. Coordinated the revegetation efforts for two landfill sites. Also responsible for coordinating laboratory activities and revegetation of a former landfill site that was used for building a new troop medical and dental clinic. This project was successfully completed in a very short time to allow construction of the building to begin.

1998–1999; USACE–Nashville District; Fort Campbell Battery Shop, Fort Campbell, KY. Regulatory specialist/environmental scientist for confirmatory sampling at SWMU 163, Maintenance Battery Shop. Prepared the Work Plan, QA Plan, and Sampling and Analysis Plan for the removal/demolition of a battery shop.

1998–1999; Frederickson Truck Terminal, Knoxville, TN. Project manager and lead environmental scientist for the removal of a 10,000 gallon UST which contained 2,400 gallons of diesel fuel. After excavation and removal of the tank, soil samples were collected from inside the pit and from the stockpiled soil. The Tennessee Department of Environment and Conservation approved the UST closure report for this site.

1997–1999; Rice Oil Company, Caryville, TN. Project manager and lead environmental scientist for the installation of groundwater monitoring wells and soil sampling for an Environmental Assessment of underground storage tanks. Completed a CAP for the remediation of the site and negotiated with the UST Division of Tennessee Department of Environment and Conservation (TDEC) during all phases of the assessment and corrective action.

1995–1998; Westinghouse Savannah River Company (WSRC), Inc.; Aiken, SC. Project manager and lead environmental scientist responsible for preparing preliminary assessments/site investigations at the DOE Savannah River Site. Investigated past uses of sites, developed and implemented sampling and analysis plan for three sludge application sites totaling over 70 acres, evaluated analytical data, and prepared reports. Managerial responsibilities included cost and schedule control, billing, interacting with the WSRC technical representative. Reduced costs to the client by providing a more extensive review of existing data instead of conducting more sampling.

1995–1997; Ridgeview Landfill, Knoxville, TN. Environmental scientist during the planning, investigation, design, and permitting of a 16 acre Subtitle D construction/demolition landfill in Knox County, Tennessee. Investigations included a hydrogeologic study with the associated modeling; a threatened and endangered survey, an archeological survey, and zoning surveys. Responsible for topographic surveying, quarterly groundwater sampling, and annual stormwater sampling.

1995–1997; Dutton Motors, Lenoir City, TN. Environmental scientist for the UST project which included monitoring of 2 unpermitted UST pits in order to bring them into compliance. Two wells were installed, and the stockpiled soil was monitored. Clean closure approval was received following monitoring activities.

1996; Lockheed Martin Energy Systems, Inc., Oak Ridge, TN. Project scientist for building material characterization (asbestos, lead-based paint, PCBs, radioactivity) prior to D&D of the K-25 Power House, Building 1401, Building 1200, Building 1001, and Building 1037. This project was completed very rapidly (6 days per week, 10 hours per day) to save the client money by allowing the demolition team on the adjacent location to begin work on the site without the need for remobilization costs.

1994–1996; Lockheed Martin Energy Systems, Inc., Oak Ridge, TN. Environmental scientist responsible for regulatory compliance for the Bear Creek Valley feasibility study at the DOE Y-12 Plant. This investigation included wetlands and floodplains assessments, threatened and endangered species surveys, cultural and archaeological resources assessments, and ecological risk assessment. This project was the pilot for the watershed approach to investigation and remediation and resulted in substantial savings to the client.

1994; Geotek Drilling Company, Oak Ridge, TN. Project manager responsible for soil sampling during the closure in place of ten USTs at Oak Ridge National Laboratory.

Ogden Environmental and Energy Services Company, Inc., 1989–1994
Knoxville and Oak Ridge, Tennessee
Environmental Scientist

1993–1994; U.S. Navy, Pacific Naval Facilities Command, Honolulu, HI. Field manager for inspections at three U.S. Naval facilities in Guam, Midway Island, and Hawaii. Inspected 900 structures for asbestos and lead-based paint in six weeks. Results were used for D&D of the buildings. This project, which was completed in a very short timeframe, involved extensive travel, and included both active and inactive facilities.

1993; Stone and Webster, Oak Ridge, TN. Environmental scientist for wastewater sampling at the Radford Army Ammunition Depot, Virginia. Determined sampling locations, set up continuous samplers, and collected samples. Used SW-846 methodology and maintained chain-of-custody. All field activities were conducted within an active ammunition facility.

1991–1992; Ebasco Environmental, State of Mississippi. Environmental scientist on a team that conducted compliance surveys of more then 100 National Guard Armories in Mississippi. Survey assessed facilities for compliance with RCRA, the Comprehensive Environmental Response, Compensation and Liability Act, Toxic Substances Control Act, Clean Air Act, and other Federal regulations. This project was completed in a very short timeframe, and daily results of the investigation were sent via modem to a central location for concurrent incorporation into a report.

1991; Ogden Environmental Services Co., San Diego, CA. Environmental scientist for a PCB remediation project at an active oil field in remote areas in the Kenai National Wildlife Refuge in Alaska. This project involved sampling areas before, during, and after remediation and included more than 600 soil, water, oil, and wipe samples. Successfully coordinated activities of remediation contractor, oil field engineers, laboratory personnel, and U.S. Fish and Wildlife Services, Region 7.

1989–1993; OSCO, Inc., Nashville, TN. Asbestos specialist in charge of asbestos surveys, bulk sampling, quantification of asbestos-containing materials, and cost estimates for asbestos abatement planning and removal for more than 15 million square feet of private, commercial, industrial properties in numerous states. This project involved extensive travel and difficult working conditions, sometimes in active hospitals.

Professional Affiliations

Society of Wetlands Scientists

Ambrose J. (Jim) Madaj, PG
Senior Program Manager

Summary of Qualifications

Mr. Madaj has served for over 15 years as senior project and program manager and technical advisor for SES LLC, primarily managing programs since 2002 at Fort Campbell for the Nashville U.S. Army Corps of Engineers (USACE) and at Fort Stewart and other bases for USACE Savannah District contracts that he has grown with repeat business since 2004.

Mr. Madaj's regulatory experience includes a thorough understanding of U.S. Environmental Protection Agency (EPA) sampling and drilling guidance, as well as state-specific regulations. Using his knowledge of subsurface hydrogeology, he has managed and provided technical input on projects dealing with shallow and deep petroleum contamination, deep solvent contamination (up to 400 feet below ground surface at a site in California), and shallow pesticide and dioxin contamination.

Education
- BS, Geology, University of Oklahoma, 1985

Registrations/Certifications

Professional Geologist:
- Alabama #0612
- Georgia #PG001805
- Kentucky #KY-2420
- Mississippi #624
- Tennessee #0516
- Texas #5147

Training
- OSHA 40-Hour HAZWOPER and 8-Hour Refreshers
- OSHA 8-Hour Confined Space for Attendant/Entry
- OSHA 8-Hour Hazardous Waste Supervisor
- OSHA 10-Hour Construction Safety and Health
- USACE Construction Quality Management for Contractors
- Lead Awareness (Title 29 CFR 1910.1025)
- Georgia Soil and Water Conservation Committee (GASWCC), Level II, Level 1B, Level 1A
- Respirator Fit Test
- First Aid/CPR/AED

Experience

SES Group of Companies, 1998–Present
Oak Ridge, Tennessee
Senior Program Manager/Senior Hydrogeologist

Program Management

2004–Present: Basewide Environmental Support (BEST) Contracts, USACE–Savannah District, Fort Stewart, GA; W912HN-04-D-0019 ($3M), W912HN-07-D-0012 ($15M), W912HN-10-D-0001 ($40M), W912HN-11-D-0024 ($9.9M), W912HN-12-D-0021 ($9.9M), W912HN-13-D-0023 ($9.9M). Consecutive follow-on IDIQ contracts with general environmental construction and remediation scopes of work comprising compliance, restoration, conservation, and pollution prevention, supporting programs primarily at Hunter Army Airfield, Fort Stewart, and Ellyson Field. Activities have included interim removal actions, corrective measures studies (CMSs), corrective action plans, multimedia sampling, underground storage tank (UST) removal, and waste management planning.

2012–Present: Defense Logistics Agency (DLA) Installation Environmental Management Support, Fort Belvoir, VA, under USACE-Savannah District Contract W912HN-12-D-0021. Program manager overseeing installation support to assist in program management-related functions and provision of financial expertise to DLA's Restoration Team in the annual estimating and reporting of future environmental liabilities.

2011–Present: Waste Management and Small Arms Range Support, Naval Facilities Engineering Command Southeast (NAVFAC SE) Area of Responsibility; Contract N69450-11-D-0056. Program manager for a $4M indefinite delivery/indefinite quantity (IDIQ) contract to provide hazardous waste management and release support, small arms shooting range clearance and remediation services, and site investigations and evaluations within the NAVFAC SE region.

2002–Present: USACE, Nashville District, and Fort Campbell, KY; Contracts DAW62-02-D-0009, W912P5-04-D-0016 ($3M), W912P5-04-D-0004 ($14 M), W912P5-11-D-0004 ($10M). Provided Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)/Resource Conservation and Recovery Act (RCRA) support to Fort Campbell for over a decade under various contracts. Typical projects have included: emergency response; spill remediation; well installation and abandonment; best management practices and sinkhole improvements; landfill maintenance, repairs, and construction support; UST removal and line leak testing; aboveground storage tank (AST) integrity testing and replacement; remediation of oil pits, lubrication racks, oil-water separators, and other petroleum, oil, and lubricant remediation; site investigations; human health and ecological risk assessments; CMSs; RCRA permit support; free product delineation and recovery; and contaminant removal in residential areas. Responsibilities include coordination with USACE–Nashville District and Fort Campbell personnel, allocating resources for simultaneous projects, review of reports to ensure technical accuracy, and ensuring that projects are completed on time and within budget.

2013–Present: UT-Battelle Fort Campbell Energy Management Program, Fort Campbell, KY; 4000123536. Providing energy management and process engineering support to Fort Campbell through integration of existing monitoring and communication systems and the design and management of system engineering projects including reliability, logistics, system requirements, evaluation measurements, work-processes, optimization methods, and energy management tools as related to energy consumption and efficiency.

2006–2011: UT-Battelle Environmental Services, Fort Stewart, GA; 4200000214. Eight tasks were issued under this $5M blanket subcontract for projects that included storage tank compliance, low-impact development construction and enhancements, and environmental pilot landfill studies on Fort Stewart.

2006–2009: South Central Landfill, Fort Stewart, GA, ($1.97M). Program manager responsible for responding to a methane migration problem associated with an old landfill near a heavily used tank trail. Directed a geophysical survey and exploratory trenches to delineate the boundaries of an old disposal area. When sanitary debris was found outside the landfill boundary, was responsible for removal of over 50,000 tons of waste and appropriate disposal into an active waste cell. Conducted a pilot study to determine the most appropriate technology for installing an impervious barrier to prevent methane gas from migrating off the prescribed southern boundary of the landfill. A less permeable barrier, using compacted borrow soil, was installed.

Project Management

2006–Present: Long Term Monitoring and Natural Attenuation Field Support, Dover AFB. DE. Project manager responsible for evaluation of suspected problems associated with past waste disposal and spill sites. Ongoing tasks assessed under this technical assistance subcontract to Oak Ridge National Laboratory are: semi- and annual natural attenuation monitoring at multiple sites; and quarterly long-term monitoring at three sites on the installation.

2010–2012: Joint Base Lewis-McChord (JBLM) Planning Support, WA. Project manager providing studies and analysis capability to support planning, execution and evaluation of the impact of Joint Base (JB) requirements at JBLM. Objective is to provide the JB, which became fully operational in 2010, with technical support on strategic planning and change management with a focus on preparation and refinement of JB execution plans and evaluation of the efficiency of JB directed changes.

2006: CMS for Solid Waste Management Unit (SWMU) 170Z11, Fort Campbell, KY. Project manager for the CMS of a former lubrication rack site where free product and dissolved groundwater contaminants were a concern. Directed development of site-specific, qualitative cleanup goals to address the contamination and protect human health and the environment. Evaluated five remedial alternatives, and ultimately selected passive skimmers as the most cost-effective remedial strategy to meet remedial goals.

2005–2006: Tank Support, Robins Air Force Base, GA. Project manager responsible for evaluating and installing Stage 1 vapor recovery at three locations, correcting tank deficiencies at 30 locations, performing tank vapor and interstitial monitoring at 90 wells in 17 different locations, and providing Robins Air Force Base (AFB) with technical support as needed. Ensured that all specifications were met, and coordinated with the Robins AFB Contracting Officer and Environmental Management Resources Division.

2005: Oil-Water Separator Directory, Fort Campbell, KY. Project manager responsible for confirming active or closure status of oil-water separators at more than 100 sites across Fort Campbell. Directed the update of information and photographic documentation in the directory to ensure accurate listings.

2005: Review of Land Use Controls, Fort Stewart, GA. Project manager completed a five-year review of existing documentation for nine sites at Fort Stewart to determine the effectiveness of corrective actions and institutional controls. Directed site visits and research for three inactive landfills, four closed explosives ordnance disposal sites, a former fire training area, and a tanker purge station to determine whether chosen remedies had functioned as intended and whether exposure assumptions were still valid. Provided technical review of the final report.

2004–2005: Interim Action and CMS at SWMU 39, Fort Stewart, GA. Project manager responsible for an interim action at a site used for vehicle service. A pilot study was conducted using multi-phase extraction to remediate both waste oil and solvent contamination as an interim measure. The CMS evaluated several options, including the following remedial technologies: passive skimmer pumps, active skimmer pumps, multi-phase extraction, and excavation of the area containing free product. In addition, the in situ groundwater remediation technologies evaluated in the study were monitored natural attenuation, hydrogen peroxide injection, bacteria injection, oxygen injection, hydrogen injection, and soil vapor extraction.

2003–2005: Investigation, Risk Assessment, and CMS for the Old Hospital Complex Site at Fort Campbell, KY. As project manager, was responsible for directing the collection of over 600 soil samples and a subsequent human health risk assessment and CMS for a 70 acre site contaminated with pesticides and semivolatile organic compounds (SVOCs).

2004: AST Repairs, Fort Campbell, KY. Project manager responsible for oversight and coordination with facility representatives during repairs of large ASTs used for bulk fuel storage at three separate sites at Fort Campbell. The work included repairs to piping and structural supports, interior tank cleaning, and welding repairs. Much of this project involved confined space entry for personnel in up to Level C personal protective equipment.

2004: Removal of 33 Heating Oil Tanks Within the Main Cantonment Area and Campbell Army Airfield, Fort Campbell, KY. Project manager responsible for allocating resources and oversight during removal of 33 USTs containing heating oil (6 tanks in Kentucky, 27 tanks in Tennessee). Directed the excavation and removal of tanks and contaminated soil and performed confirmatory sampling in accordance with Kentucky and Tennessee requirements. The removal action was completed ahead of schedule. Recommended clean closure for 28 tank sites. The remaining five tanks will require further action to meet cleanup criteria.

2004: Convault Replacement, Fort Campbell, KY. Project manager for the time-critical removal and replacement of an 18,000 pound AST supplying fuel to the generator for runway lights at Fort Campbell. Under Mr. Madaj's leadership, the fieldwork was completed ahead of schedule and the use of a temporary tank ensured no interruption in generator use.

2003-2006: Free Product Recovery at Campbell Army Airfield, Fort Campbell, KY. Project manager for an ongoing product recovery effort at the Campbell Army Airfield. Directed the installation of a solar-powered product recovery pump, which automatically seeks the oil-water interface. The unit is portable and was used for pockets of groundwater contamination and hard to reach areas. Because groundwater can fluctuate as much as 20 feet at the airfield, the automatically adjusting pump reduced the monitoring and maintenance that would have been required with fixed pumps.

2003: Removal of Small Arms Ammunition at Fort Campbell, KY. Project manager responsible for coordinating the removal of buried small arms ammunition. Provided oversight for the unexploded ordnance (UXO) subcontractor and coordinated all activities with Fort Campbell personnel. Directed project personnel during excavation and removal of 3240 rounds of 0.3- caliber and five rounds of 0.5-caliber ammunition. The ammunition was transported to the Clean Harbors Colfax facility in Louisiana, with all appropriate hazardous waste manifest documentation. Following the removal action, UXO specialists conducted a sweep of the area to confirm removal.

2002: Phase 4 RCRA Facility Investigation (RFI) at Campbell Army Airfield for Bravo Parking Apron and SWMU 41, Fort Campbell, KY. Project manager for an RFI involving the installation of two groundwater monitoring wells at SWMU 41 and the completion of three soil gas surveys at Campbell Army Airfield used to delineate the extent of subsurface fuel contamination. The results were included in a human health risk assessment. Coordinated all field activities and provided technical review of final reports.

2002: RFI at SWMU 27, Open Burn/Open Detonation Unit, Fort Campbell, KY. Project manager responsible for an RFI to determine whether residual contamination from explosives was present at the site. The task included developing and sampling 16 existing wells, and collecting 35 surface soil samples and 21 subsurface samples from seven geoprobe borings. The groundwater and soil samples were analyzed for volatile organic compounds (VOCs), SVOCs, energetics, sulfites, nitrates/nitrites, and total phosphorous. All field efforts were coordinated with UXO specialists to ensure that all project activities were conducted in a safe manner.

2001–2002: Oil-water Separator Removal, Fort Campbell, KY. As project manager, provided oversight during the removal of 42 oil-water separators. Removal activities included demolition of below ground structures and their associated influent and effluent piping. Pits were overexcavated, and confirmatory samples were collected and analyzed for VOCs, SVOCs, RCRA 8 metals, and polychlorinated biphenyls (PCBs).

2000–2002: UST Investigation, Fort Stewart, GA. Project manager responsible for oversight to determine the extent of contamination related to UST and heating oil tanks at Fort Stewart. Project activities included installation of groundwater monitoring wells as well as soil and groundwater sampling to determine the extent of VOC and polycyclic aromatic hydrocarbon (PAH) contamination.

2001: Various Projects Involving Fuel Releases at the Campbell Army Airfield, Fort Campbell, KY. Project manager responsible for addressing fuel releases to soil and groundwater near Pumphouse 1, Pumphouse 2, and Hangar 3 at the Campbell Army Airfield. Free product recovery at the two pumphouses was performed using vapor extraction and skimmer pumps. Over the first 11 weeks, over 11,000 gallons of fuel were recovered.

2000: Investigation of Oil Pit Sites at SWMU 149, Fort Campbell, KY. Project manager for the investigation of 40 suspected oil pits used for vehicle maintenance fluids. Project activities included verification of the presence of oil pits, removal of contaminated soil from two of the sites, installation of groundwater monitoring wells, and soil sampling. Interfaced with client representatives to determine remedial options.

2000: Pumphouse 1 Fuel Reconnaissance and Pipeline Repair, Fort Campbell, KY. Project manager for pipeline repair activities near Pumphouse 1 at Fort Campbell. In April 2000, tracer testing on the active fuel line near the Pumphouse indicated the presence of a fuel leak. Project activities included excavation to a depth of 8 feet to expose the pipeline in the suspected leak area. Sampling was performed to determine appropriate method of disposal.

1999–2001: RFI and Corrective Action, Skeet Range, Fort Campbell, KY. Project manager for RFI activities to characterize surface soil, sediment, and surface water contamination. Surface soil, surface water, and sediment samples were collected and analyzed for Target Compound List (TCL) PAHs and Target Analyte List (TAL) metals. Responsible for project management, client interface, technical direction, and oversight during the removal of the top 18 inches of soil from the site.

1999–2000: Update Generic Work Plan and Sampling and Analysis Plan, Fort Campbell, KY. Project manager responsible for revision of the Fort Campbell Generic Work Plan and Standard Sampling and Analysis Plan to reflect changes in regulatory requirements and a better understanding of site conditions.

1999–2000: Fort Campbell Pumphouse RFI, Fort Campbell, KY. Project manager responsible for conducting groundwater and soil sampling to determine the presence or absence of fuel contamination. Two groundwater wells were installed. Surface and subsurface soil samples were collected and analyzed for TCL VOCs and SVOCs, TAL metals, total petroleum hydrocarbons (TPH), and geotechnical parameters. Provided project management and technical oversight for these activities.

1999–2001: Post Exchange (PX) Service Station RFI and CMS, Fort Campbell, KY. Project manager for the Phase II and III RFIs at the PX Service Station to delineate the extent of soil and groundwater contamination, determine the future movement of contaminants, assess potential risks to human health and the environment, and determine the requirements for corrective action. Served as technical advisor when drilling activities unexpectedly encountered a large subterranean cave. Responsible for project management, client interface, and technical direction. Provided oversight for the CMS to evaluate and select appropriate remedial action methods.

1999: Fort Campbell 801st Oil Pit RFI, Fort Campbell, KY. Project manager for an RFI at SWMUs 134, 135, 136, and 137 to determine the presence or absence of groundwater contamination due to past practices at the motor pool. Performed a field investigation, installed two monitoring wells, and conducted soil and groundwater sampling for TCL VOC and SVOC, PCB, and TAL metals analyses. Responsible for project management, client interface, and technical direction and oversight.

1998–1999: Lockheed Martin Energy Systems, Inc.–Hazardous Waste Remedial Action Program (LMES-HAZWRAP); Fort Campbell Master RFI, Fort Campbell, KY. Project manager for several RFIs and confirmatory sampling investigations at Fort Campbell ranging from UST removals to complex

RFIs that delineate/investigate complex underground fuel distribution systems. Attended meetings with state and federal regulatory agencies to expedite the review and approval of submitted plans and reports.

Previous Experience

Ogden Environmental and Energy Services Company, Inc., 1995–1998
Science and Technology, Inc., 1991–1995
Oak Ridge, Tennessee
Senior Hydrogeologist

1991–1998: LMES-HAZWRAP, Oak Ridge, TN. Provided full-time technical support to HAZWRAP. Assisted in the effort to identify, control, and remediate environmental contamination resulting from past methods of storage, handling, and disposal of hazardous waste at military bases nationwide. Prepared statements of work; reviewed business and technical proposals; reviewed work plans and technical reports; interacted with subcontractors, clients, and regulators; provided technical consulting support to the project manager; and provided technical oversight of fieldwork. Ensured quality of all deliverables for CERCLA and UST projects. Acted as a technical lead for the Air National Guard's Rapid Response UST Program. Supervised preparation of environmental assessment plans, environmental assessment reports, and corrective action plans. Trained personnel for environmental fieldwork, including drill rig supervision and sample collection techniques. U.S. Department of Defense facilities included McConnell AFB, Loring AFB, Columbus AFB, Chanute AFB, Tinker AFB, Mountain Home AFB, Fresno Air Terminal, and New York Air National Guard. Managed a rapid response investigation at McGhee Tyson Air National Guard Base, Tennessee. Prepared work plans, sampling and analysis plans, quality assurance plans, health and safety plans, and final reports. Maintained projects within budget and schedule constraints and interfaced with clients and regulatory agencies.

NUS Corporation, 1988–1991
Tucker, Georgia
Project Manager

Planned, conducted, and supervised project assignments. He estimated and scheduled work to meet completion dates and budgets, directed assistants, reviewed progress and evaluated results, made changes in methodology, and designed equipment. Designed cost-effective approaches to define the extent of contamination at various hazardous waste sites and developed remedial options. Developed site safety plans for all field personnel according to NUS directives as well as Occupational Safety and Health Administration, National Institute for Occupational Safety and Health, and other health and safety guidelines. Other duties included field team leader for well drilling and sampling on numerous hazardous waste site investigations. Prepared drilling bid specifications and supervised subcontractors in the drilling and installation of groundwater monitoring wells. Designed and implemented environmental sampling programs, coordinated field activities and managed sampling teams, and conducted site investigations/inspections. Prepared site investigation and hydrogeologic reports for the EPA. Specific National Priorities List sites included National Southwire Aluminum, Kentucky; Lakeland Tanning, Florida; Zellwood Delisting Project, Florida; Valley Sanitation Landfill, Kentucky; Amnicola Dump, Tennessee; Southwire, Georgia; Beckwith Dump, South Carolina; Ringold Chemical, North Carolina; and Caldwell Systems, North Carolina.

Tinker Air Force Base, 1987–1988
Midwest City, Oklahoma
Hydrogeologist

Responsible for asbestos surveys and asbestos abatement at multiple sites.

Association of Central Oklahoma Governments, Water Resources Division, 1986–1987
Oklahoma City, Oklahoma
Hydrogeologist

Completed water resource studies to determine whether water supply resources were sufficient for surrounding populations.

U.S. Geological Survey, Water Resources Division, 1982–1986
Oklahoma City, Oklahoma
Hydrologic Technician

Conducted hydrogeologic and surface water studies at sites in Oklahoma and surrounding states.

Honors/Awards

Received the "Award for Individual Excellence for exceptional individual professionalism, dedication, and loyalty demonstrated in support of the Installation Restoration Program at Fort Campbell, Kentucky, during the period of October 1, 2000, through September 30, 2001" presented by the Fort Campbell Environmental Restoration Staff, June 27, 2001.

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Jeff Williams, PE
Design/ Civil Engineer

Summary of Qualifications

Mr. Williams has over 35 years of experience representing a diverse background in the environmental, geological, geotechnical, and engineering disciplines. He has conducted environmental and hydrological assessments for the U.S. Department of Defense (DoD), U.S. Department of Energy (DOE), industrial and commercial facilities, and residential subdivisions. He has experience performing data acquisition, analysis, and modeling for potential soil, groundwater, and surface water contamination and environmental remediation designs for underground storage tanks (USTs), storm water, and waste disposal facilities. Additional experience includes data acquisition and designs for erosion control and storm water collection, containment, chemical treatment, and discharge facilities; land use plans; topographic mapping; and engineering surveying. Mr. Williams has performed surveying for site plans, topographic surveys, construction layouts, and as-built drawings using electronic field data collection and has produced topographic maps using AutoCAD software for more than 100 projects and thousands of acres. His erosion control design experience includes ditches, culverts, earthen dams, riverbank stabilization, and storm conveyances along roads. He has also designed roadways in subdivisions, incorporating the appropriate drainage structures.

Education
- BS, Civil Engineering, University of Tennessee, 1983

Registrations/Certifications

Professional Engineer:
- Georgia #028348 (12-31-02)
- Kentucky #15560 (8-10-88)
- Tennessee #19235 (8-11-87)

Level II Certified Design Professional, State of Georgia

Training
- OSHA 40-Hour Hazardous Waste Operations and refreshers
- USACE, Construction Quality Management Training
- Radiological Worker I and II Training
- OSHA 8-Hour Hazardous Waste Supervisor
- OSHA 30-Hour Construction

During his career, Mr. Williams has designed over 10 landfills ranging in size from 15 to 150 acres, to contain: hazardous waste, construction/demolition debris, and Resource Conservation and Recovery Act (RCRA) Subtitle C&D waste. He has also designed over 100 surface mine permits, and has a thorough knowledge of Bureau of Land Management, Department of the Interior, Office of Surface Mining, and state regulations in Tennessee, Kentucky, and Nevada. In addition to solid waste and mining permits, he has also prepared National Pollutant Discharge Elimination System (NPDES) permits. His remedial design experience includes addressing contamination at airfields, petroleum, oil, and lubricant facilities, and fuel distribution sites. In many cases, he also supervised the implementation of the remediation. He has managed numerous remediation tasks in Tennessee, Kentucky, and Georgia, and is familiar with remedial regulations and wastewater permitting in those states. His managerial experience includes supervision of project teams and monitoring project performance.

Mr. Williams has performed engineering design and construction supervision for coal mines, landfills, subdivisions, and drainage control structures at sites in Tennessee, Kentucky, California, Nevada, and

Experience

SES Group of Companies, 1992–Present
Oak Ridge, Tennessee
Project Manager/Design and Civil Engineer

2012–Present: Remedial Action at Site A11J, Former Turner Air Force Base (AFB), GA. Project manager overseeing the delineation of the extent of contamination at the site of a 25,000-gal. fuel UST and to revise the CAP-Part B and provide the approach for site closure in accordance with the Georgia EPD UST Management Program.

2012–Present: Remedial Action at Site A, Former Turner AFB, GA. Project manager overseeing the installation of at least three new monitoring wells at 11 sites and amendment of the existing CAP B based on results of additional investigation at Site A, a former fuel distribution center.

2012–Present: Methane Evaluation and Utilization Study, Fort Stewart, GA. Project manager on project to address public safety as it relates to possible methane migration from the South Central Landfill at Fort Stewart and evaluating the technical and economic feasibility of collecting the landfill gas (LFG) from the landfill and using the LFG as a fuel source at the Installation. Field testing will determine the presence and concentration of landfill gas and modeling will determine the LFG production estimates using the Environmental Protection Agency's (EPA) Landfill Gas Emissions Model (LandGEM).

2011–2012: Kelley Hill Debris Removal, Fort Benning, GA. Senior engineer on the designs for removal activities of 11,000 cubic yards of debris from a highly eroded area at a closed inert landfill.

2011–2012: Land Use Controls at the 4th Infantry Brigade Combat Team (IBCT) Complex, Fort Stewart, GA. Project manager on the installation of 11,300 feet of 6-foot high security fencing around four separate wetland areas within the IBCT complex.

2010–2012: Storm Water, Erosion and Sediment Controls at Mirror Lake, Fort Gordon, GA. Project manager upgrading the existing water control system through repair to the standpipe and outlet pipe system at Mirror Lake, to properly convey storm water in compliance with state and federal regulations.

2010–Present: Interim Remedial Action at USTs 208 and 209, Fort Stewart, GA. Project manager responsible for a 24-hour enhanced fluid recovery event at one extraction point (monitor well 42-13) at which 76 gallons of petroleum hydrocarbons were removed. A semi-annual sampling event took place to determine groundwater flow direction and free product was measured in monitor well 42-13 at a thickness of 0.95 feet. Conducted excavation to remove free product and petroleum contaminated soil, quarterly groundwater monitoring.

2010–Present: Municipal Separate Water Sewer System Compliance, Fort Stewart, GA. Project manager on in-stream seasonal monitoring, compliance and flood plain modeling, and Best Management Practices (BMP) and/or maintenance recommendations.

2010–Present: UST Corrective Action Plan (CAP), Victory Shopette, Fort Stewart, GA. Project manager on the preparation of a CAP Part A at site of four USTs at the active gas station: facility renovations included relocation of the gasoline pumps and removal and closure of the former pump islands. Results of associated soil sampling indicated that soil and/or groundwater contamination existed above appropriate limits. Installed five soil borings using direct push technology and obtained a total of 10 soil samples using a Geoprobe. Groundwater monitoring wells were installed at each of the five soil borings, and groundwater sampled for benzene, toluene, ethylbenzene, xylenes (BTEX), polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH) gasoline range organics (GRO) and diesel range organics (DRO).

2010–2011: Detention Pond Study, Fort Bragg, NC. Project manager on the design of a flow control structure to provide peak flow reduction and short-term storage for runoff to improve water quality by reducing sediment traveling downstream.

2010–2011: Curb Washrack and Tank Curb Implementation for Pollution Prevention, Fort Stewart, GA. Project manager at installation of rollover curbing at 12 locations, all either washrack or tanker containment sites, on Fort Stewart. Some motor pools received both tanker containment curbing and washrack rollover curbing, and other motor pools only received one or the other. In addition, a concrete pad was constructed near a loading ramp at Building 720 at Hunter Army Airfield (HAAF).

2009–2012: Sediment Removal from Wilkerson Lake, Fort Gordon, GA. Project manager on a $1.3 million effort to remove sedimentation from Wilkerson Lake and two 10-feet wide culverts draining into the lake. To date approximately 5,000 cubic yards, or 20% of total has been removed.

2009–2010: Curb Washrack Implementation and Hazardous Waste Satellite Covers, Fort Stewart, GA. Project manager responsible for ongoing installation of concrete drive-over curbing to divert storm water away from washracks and providing secondary containment at tanker parking areas, and the procurement and installation of Hazardous Waste Satellite Covers (Lockers) at Fort Stewart and HAAF.

2009: UST Removal, Fort Stewart, GA. Field manager responsible for removal of two unregistered 5,000-gallon USTs 5-J1 and 5-J2 at Building 1330 in Fort Stewart. Approximately 14,000 gallons of surface water were removed from the area first; the water was stored in an on-site, rented storage tank until analysis verified the water to be acceptable for disposal. Soil was removed from the area using a track hoe, and placed in plastic-lined roll-offs. The area was backfilled with #57 stone and rolled in with a drum roller. The roll-off containers were staged in an off-site area until characterization analysis determined the soil acceptable for landfill disposal. Because soil concentrations above the groundwater table were below the GUST-9 detection limits, “Clean Closure, No Further Action Required” was recommended for this UST system.

2008–2009: Soil Remediation and FY08 Groundwater Monitoring, HAAF, GA. Field manager responsible for remediation and monitoring efforts at the former Pumphouse #2 site, an old aviation-gas fuel island that had ten 25,000-gallon USTs, all since removed. Tasks included: excavating and stockpiling the uncontaminated soil; removing the contaminated soil; applying Oxygen Release Compound® (ORC®) to the excavation floor and four side walls; backfilling the excavation site; re-installing three groundwater monitoring wells that were within the excavation area; and conducting groundwater monitoring at the site.

2008–2009: Time Critical Removal Action (TCRA), Fort Stewart, GA. Project manager for TCRA to extend security fencing and signage at the Hero Road Trench Area Munitions Response Site in Fort Stewart. SES cleared brush from the proposed fence line and installed approximately 1,122 linear feet of 7-feet high, chain-link fence, one 20-foot wide double swing gate to allow vehicular access to the site, and five permanent warning signs.

2007–2009: Abandonment of 22 Monitoring Wells at the Victory Shoppette Site, Fort Stewart, GA. Project manager responsible for abandonment of 22 monitoring wells at a busy service station. Four of the wells were installed in the tank-pit backfill and were not normal monitoring wells which were abandoned by pulling the well materials from the ground, allowing the cavity to fill and plugging and sealing the surface; the remaining 18 wells were abandoned according to state of Georgia regulations. This was a follow-on project from an annual storage tank assessment project.

2007–2009: Low Impact Development Projects, Fort Stewart, GA. Project manager responsible for design and construction of two low impact development projects. Designed and supervised construction of a retrofit for the Soldiers Services Center, by eliminating an unsightly storm water retention pond close to the building and routing storm water drainage to another retention basin, allowing a recreation area next to the building. Removed sediment accumulation from several storm water conveyance systems. Designed and replaced several storm water culverts that allowed for needed storm water conveyance and upgrading due to installation infrastructure development. Designed and constructed a channel system to provide additional storm water retention, thus reducing flooding impacts downstream. Total cost of projects was $3.2 million.

2007–2008: Remedial Action for UST CAP Part B, Fort Stewart, GA. Project manager overseeing a remedial action to treat benzene-contaminated groundwater at a former UST site at an active automobile service station in a residential area on Fort Stewart, Georgia. Advanced Formula Oxygen Release Compound® (ORC Advanced®) was applied through direct push technology at three locations as a means of accelerating contaminant degradation at the site. SES installed three groundwater wells and conducted semi-annual well sampling from these and twelve existing wells to monitor the treatment. The ORC treatment was successful with benzene levels reduced to within acceptable limits and the 15 wells were subsequently closed with no further action required.

2006–2007: South Central Landfill, Fort Stewart, GA. Project manager responsible for responding to a methane migration problem associated with an old landfill near a heavily used tank trail. Directed a geophysical survey and exploratory trenches to delineate the boundaries of an old disposal area. When sanitary debris was found outside the landfill boundary, was responsible for removal of over 50,000 tons of waste and appropriate disposal into an active waste cell. Conducted a pilot study to determine the most appropriate technology for installing an impervious barrier to prevent methane gas from migrating off the prescribed southern boundary of the landfill. A less permeable barrier, using compacted borrow soil, was installed. Total project cost was $1.1 million.

2005–2006: Solid Waste Management unit (SWMU) 149 Oil Pits, USACE-Nashville District, Fort Campbell, KY. Project manager for a $200,000 site investigation of four suspected oil pit sites, where waste oil was disposed using a French drain seepage pit. Obtained utility clearances and required digging permits for each site prior to removal action. At each site, all surface and subsurface oil pit structures and contaminated soils encountered were removed and disposed, confirmatory samples were collected, the excavations were backfilled, and the sites were restored to blend with the surrounding terrain. The data obtained from the confirmatory sampling were used in conducting a data screening assessment for each site where a removal action occurred. The screening assessments were conducted in accordance with the approved work plan. Results indicated that all remaining concentrations were below cleanup standards and no further action was recommended. The methodology used saved the client time and money by eliminating the investigative, delineation, and corrective measures phases by remediating the site at the time contamination was found.

2004: Permanent Tank Closure, Robins AFB, GA. Task manager responsible for the removal of two USTs in accordance with Georgia closure requirements. Work included disposal of tank contents, soil and groundwater sampling, drilling soil borings, removal of existing vapor monitoring wells, and determining action levels based on the distance to nearby water wells and groundwater pollution susceptibility. Prepared all closure documentation to support no further action at both sites.

2004: Hemmitt Tanker Pad Construction, Fort Campbell, KY. Project manager for the installation of a new reinforced concrete pad, complete with a secondary containment system, for the new Hemmitt tanker parking facility. The project included a topographic survey to determine existing site elevations and site preparation, including grubbing, grading, filling, and compacting as needed. Managed installation of the 8-in. reinforced concrete pad measuring approximately 141 ft x 61 ft; secondary containment curbing (three sides) and rollover (one side) was constructed to meet regulatory requirements, and control joints were sealed with fuel-resistant caulking. Five galvanized static ground connection rods were installed with the pad.

2004: Sinkhole Verification, Fort Campbell, KY. Project manager of a task to verify the existence of over 90 sinkholes that were referenced in historical documents at Fort Campbell. Visited each site to assess whether storm water flowed into the sinkholes, photographed each area, installed markers, and collected survey data using global positioning system equipment.

2004: Bryan Village Corrective Action Plan A, Fort Stewart, GA. Lead engineer and field team member during installation of four groundwater wells, well sampling, and soil sampling around a former tank pit where fuel-related contamination had been detected in the groundwater. Performed the majority of fieldwork at night to minimize disruption to the active fueling facility. Provided peer review of the work plan and other project documents.

2003–2004: UST Removal at Wright Army Airfield, Fort Stewart, GA. Task manager and engineer for the removal of a 2,000 gallon UST used for heating oil. Directed fieldwork during tank and line removal, and collected soil samples in accordance with Georgia requirements. Completed all fieldwork, including capping the lines and removing the tank and associated equipment, in just two days, well ahead of schedule. Prepared all permanent closure documentation and project report.

2003: SWMUs 12 and 15, Fort Campbell, KY. QC supervisor for a project involving the application of hydrogen release compound (HRC) into the subsurface in an effort to remediate trichloroethylene (TCE) and benzene contamination. HRC was pumped into injection points through hollow-stem rods. Periodic samples were collected to determine the effectiveness of the HRC treatment. Responsible for QC review of project documents, logbooks, and field procedures.

2003: Old Hospital Complex Investigation, Fort Campbell, KY. Sampling team member responsible for collecting over 600 soil samples on a 70-acre site. The samples were shipped to the laboratory and analyzed for metals, volatile organic compound (VOC), semi-volatile organic compound (SVOC), and pesticide contamination. Conducted a QC review of the project document and all laboratory data.

2003: Oil Pit Removal, Fort Campbell, KY. Task manager for a follow-on task to remove additional oil pits at Fort Campbell. Responsible for preparation of project reports. Provided oversight of fieldwork to remove oil pits 149B and 149O in Tennessee and oil pits 149S, 149T, 149U, and 149V in Kentucky. Surface and subsurface oil pit structures were removed as well as all contaminated soil. Confirmatory samples were collected.

2003: Removal and Permanent Closure of USTs at Hunter Army Airfield, Fort Stewart, GA. Task manager for permanent closure of five USTs in accordance with state of Georgia requirements. Tanks ranged in size from 500 to 12,000 gallons and contained diesel fuel, used oil, and anti-freeze. Responsible for oversight of the removal of all tanks and ancillary equipment. Tanks were recycled and confirmatory samples were collected (soil and groundwater). All removal activities were completed in less than two weeks.

2002–2003: SWMU 146 Bioremediation, Fort Campbell, KY. As QC supervisor, reviewed logbooks, field procedures, and project documents during this project to determine whether oxygen release compound (ORC) would accelerate bioremediation in groundwater at SWMU 146. ORC was applied at the site in October 2002 to mitigate total petroleum hydrocarbon (TPH)-EPH contamination. The ORC was sprayed as slurry on the bottom and sidewalls of an excavated area, which was subsequently backfilled with #57 limestone, restored to blend with the surrounding topography, and monitored for one year to determine the effectiveness of the treatment.

2002: Y-12 Boneyard/Burnyard Project, National Security Complex (Y-12), Oak Ridge, TN. Project engineer responsible for oversight during the removal of approximately 80,000 cubic yards of low-level radioactive waste. Coordinated with radiation control personnel during all sampling activities.

2002: SWMU 11, Fort Campbell, KY. Project manager for the investiga-tion of a suspected landfill site. Eighty trenches were excavated to determine whether buried debris was present over the 40-acre area. Responsible for surveying and preparation of the work plan and health and safety plan. Interviewed knowledgeable utility personnel to determine likely areas of debris. Established the boundaries of an existing three-acre landfill and prepared the final drawings.

2002: Landfill 17, Fort Campbell, KY. Project engineer for the restoration of the vegetative cover at Landfill 17. Restoration was necessary because of erosion damage and debris settlement. Responsible for surveying and verifying that the final design provided positive drainage for the site. Fill material was brought in, graded, and seeded to re-establish vegetation.

2002: SWMU 27 Investigation, Fort Campbell, KY. Project engineer during a RCRA facility investigation at the Open Burn/Open Detonation site. Worked closely with unexploded ordnance (UXO) personnel and conducted UXO screenings prior to all soil and groundwater sampling events. Surveyed soil samples and provided peer review of project reports.

2001–2002: Oil Pit/Lube Rack Removals, Fort Campbell, KY. Project manager for the removal of 12 oil pits and one lube rack in the Main Cantonment area of Fort Campbell. Prepared the work plan, health and safety plan, and final project reports. Responsible for managing the field crew, surveying excavation areas and sampling locations, collecting confirmatory soil samples, and coordinating the off-site disposal of contaminated soil.

2000: Drakes Creek Project, Hendersonville, TN. Project engineer and QC manager responsible for the initial soundings of the Drakes Creek area to determine sediment thickness. Performed the initial topographic verification before dredging activities began. Project was conducted to restore the Drakes Creek embankment and activities included dredging to a depth of five feet, installation of geotubes to contain the dredged material, and restoration of the site using bioengineering and conventional techniques.

2000: Mousetail Landing, Perry County, TN. Project engineer for the initial site reconnaissance and topographic survey. Identified additional erosion that required redesign efforts. Project activities included the protection of the shoreline and an exposed Indian Burial Mound using geotextile and Class B riprap.

1999–2003: Groundwater Summary Report, Fort Campbell, KY. QC manager responsible for final report review. The annual report summarized analytical data that had been collected from over 140 wells at various SWMUs, one area of concern, and the Campbell Army Airfield.

1999–2000: Knoxville Streambank Protection, Knoxville, TN. Project engineer responsible for the initial topographic verification of pre-construction conditions. Project activities included the installation of 20,000 tons of Class B riprap and geotextile fabric to protect the shoreline near Neyland Drive. The effort was completed over 3 months ahead of schedule, and protected 2,275 feet of shoreline.

1999–2000: Wastewater Treatment Plant Demolition and Characterization, Fort Campbell, KY. Project engineer for the characterization and demolition of an abandoned wastewater treatment plant located in the northwest corner of the Old Clarksville Base area of Fort Campbell. Surveyed and mapped sampling locations, conducted soil sampling, and assisted in writing/editing project reports.

1999–2000: Drain Line Replacement at Areas of Concern A and D, Fort Campbell, KY. Project engineer for the Phase II drain line replacement at Areas of Concern A and D at Fort Campbell. Responsible for sampling of the contaminated soils beneath the old pipes that were removed and for placing the new pipes on grade to achieve gravity flow. Assisted in writing/editing the reports and providing as-built drawings for the new drain lines.

1998–2000: Subsurface Investigation of SWMU 149 Oil Pits, Fort Campbell, KY. Project engineer for confirmatory sampling at two oil pits within SWMU 149 at Fort Campbell to confirm the presence of TPH, SVOCs, and polychlorinated biphenyls (PCBs). The effort required trenching and excavating soil at SWMUs 149A and 149F. Responsible for soil sampling to confirm the presence of contamination within the pits, guiding the removal of the oil pit at SWMU 149A, and writing/editing the reports.

1998: Streambank Protection at Decatur, Hardin, Perry, and Wayne Counties, TN. Project engineer for streambank protection on the Tennessee River. Work included the installation of erosion controls, excavation and restoration of the existing stream channel, installation of geotextile, clearing, and grubbing. Responsible for the redesign of approximately 3000 feet of streambank on the Tennessee River at Clifton Marina, along with the construction stakeout, placement of over 12,000 tons of stone, and 6,200 sq. ft of geotextile for erosion control next to the campground. Produced the construction layout for storm water drainage piping, with inlet grates on the downstream side of the earthen portion of Center Hill Dam.

1998: Land Between the Lakes Landfill, Tennessee Valley Authority (TVA) Golden Pond, KY. Project engineer for redesigning the final grade of the supplemental cover for a non-permitted landfill at Land Between the Lakes. The landfill, which was constructed in 1984, pre-dated permitting requirements, but the State of Kentucky directed that it be characterized under CERCLA. Redesigned the configuration of a portion of the landfill for positive drainage and to eliminate excessive settling of the existing cap, provided construction stakeout, and prepared as-built drawings. Assisted in groundwater sampling and editing project reports.

1997–1998: LMES-HAZWRAP–Environmental Remediation, Fort Campbell, KY. As project engineer for remedial activities at Fort Campbell:

- Redesigned the final cover configuration, drainage system, and access roads for a non-permitted landfill site (Landfill No. 9), which was constructed prior to current regulatory requirements. Prepared the initial construction layout and as-built drawings.
- For Landfill 7, redesigned the cap, surrounding channels, and final topography. Supervised construction of the channels, placement of riprap, and construction stakeout of the final cover. Duties included site characterization and design, removal of landfill debris, collection of quality assurance (QA)/QC samples to determine if all the debris was removed and whether any contaminants had leached into the soil beneath the landfill, and supervised disposal of the excavated debris at Landfill 7. This project resulted in considerable savings to the client partially because the channels were designed to use existing drainages. The client and USACE were very pleased with the success of this project and, therefore, increased the scope of work to include the construction of an additional 500 feet of channels.
- Designed investigation-derived waste (IDW) site. Prepared the site grading/drainage plan and road design and sited a pre-fabricated metal building and a truck/drill rig washing facility. This site was

designed to facilitate decontamination onsite for regulatory driven investigations, resulting in more rapid decontamination of equipment and shorter field investigations.

- Conducted preconstruction site preparation for the new troop medical and dental facility, which was to be built on an old landfill. Duties included site characterization and removal of landfill debris, QA/QC sampling to determine if all the debris was removed and whether any contaminants had leached into the soil beneath the landfill, and supervised the disposal of excavated debris. The project was completed in a brief amount of time to enable construction of the $7.2 million clinic to proceed on schedule.

1995-1997: Site Assessment, U.S. Bronze Powders; Maryville, TN. Project engineer for the site investigation, regulatory negotiations, remedial design, and remedial actions of an uncontrolled industrial disposal area containing buried drums, fugitive metallic waste, and concrete debris. This project was one of the initial voluntary cleanup actions in the state and was based on our recommendation to the client to proceed before the regulators required it.

1994–1996: Construction and Demolition Landfill Services, Inc.; Poplar View Landfill, Knoxville, TN. Project engineer for the planning, investigation, design, and permitting of a 26-acre Class IV RCRA Subtitle D construction/demolition landfill in Knox County. Responsible for the design, construction, construction monitoring/oversight, and certification documents for the Poplar View Landfill. Conducted a hydrogeologic investigation, computer modeling, and completed the construction of a geologic buffer required to satisfy siting requirements.

1994: LMES–K-25 Powerhouse Demolition Project, Oak Ridge, TN. Project engineer responsible for surveying sampling locations to support decontamination and decommissioning activities. Materials characterized included all insulation, building components and surfaces, wire, roofing material, floor mastic, oils, grease, paint, lead-based materials, and mercury switches. Materials were analyzed for the presence of radiological emissions, PCBs, lead, chromium, cadmium, mercury, and asbestos. The surface area of the buildings that required characterization exceeded one million square feet.

1994: LMES–Landfill Design, Oak Ridge, TN. Project engineer for conducting three conceptual designs for Class IV RCRA Subtitle D landfills within the K-25 site. This included addressing site access, placement of wastes, and operational and cover requirements for a substantial quantity of demolition debris. Responsible for producing conceptual designs for landfills at the K-25 site, which will be used for disposal of wastes generated from decommissioning and demolition activities.

1994: IMCO Recycling, Inc., Landfill Design, Rockwood, TN. Project engineer for the planning, site investigation, design, and permitting of a 150-acre Subtitle D, Class II industrial landfill in Roane County. Responsibilities included the conceptual design, hydrogeological investigation using computer modeling, and the design to contain and dispose of special industrial waste that produces heat and ammonia when exposed to water. The design included ponds, roads, and disposal cells using the U.S. Environmental Protection Agency's Hydrologic Evaluation of Landfill
Performance (HELP) computer model.

1994–2000: Jacobs Engineering Group, Jacobs Environmental Management Team, Oak Ridge, TN. Civil engineer providing support to the Jacobs Environmental Management Team. Determined capping requirements and storm water impacts for the feasibility study for the Bear Creek Valley Project at Y-12. This site included numerous waste disposal areas, and analyses indicated that contaminants were migrating off site. This project was the pilot study for the watershed approach to investigation and remediation and resulted in substantial savings to the client.

1993–1996: TVA, Landfill Closure Plans, New Johnsonville, TN. Project engineer for the design and preparation of closure plans for TVA landfills in Tennessee and Kentucky. Responsible for site investigations, RCRA corrective action plans, cap design and construction, construction QA/QC during remedial actions, and closure certification for a 2-acre Class IV demolition landfill contaminated with TCE. Work included site characterization and engineering design to minimize/prevent migration of TCE to groundwater beneath the site.

1993–1996: Construction and Demolition Landfill Services, Inc., Ridgeview Landfill, Knoxville, TN. Project engineer for the planning, investigation, design, and permitting of a 18-acre Class IV RCRA Subtitle D construction/demolition landfill in Knox County. Responsible for the design, construc-tion, construction monitoring/oversight, and certification documents for Ridgeview Landfill. Project activities included a hydrogeologic investigation, associated computer modeling, and addressing zoning issues. Designed and supervised the construction of a storm water impoundment as well as a leachate control system. Also responsible for design of the cap and the daily operation plan. The project included the treatment and disposal of approximately 50,000 gallons of contaminated water.

Metal Resources, Inc., Loudon, TN. Design engineer for redesigning a landfill in Loudon County for disposal of heat and ammonia producing industrial waste. The landfill was redesigned according to RCRA Subtitle C requirements to improve the efficiency and maintenance requirements of the initial design and to reduce construction costs. The design included a double liner system, leachate collection and leak detection systems, ponds and impoundments for surface runoff, access roads, disposal cells, grading to promote positive drainage, control of gas migration, and a vegetative cover to minimize erosion.

IMCO Recycling, Inc., Roane County, TN. Design engineer for the design of a RCRA Subtitle C landfill near Midtown in Roane County. The first phase of the project was a preliminary investigation of the soils and a stream as well as conceptual design plans. The second phase consisted of conducting the hydrogeological investigation for the Part II permit application required by the Tennessee Division of Solid Waste Management. This investigation included 84 soil borings and associated testing/evaluation of the samples, which were used to describe the subsurface conditions. Based on this information, the next phase entailed producing the engineering designs for a monolithic landfill. Although the regulations do not require such stringent designs for Class II industrial solid waste disposal facilities, this landfill was designed to meet the requirements of RCRA Subtitle C for hazardous wastes. The landfill was designed using two geomembrane liners in addition to the geologic buffer. Specific design elements included establishing the perimeter of the landfill and final contours, balancing cut and fill, developing the phasing and sequencing plan, preparing the basin/ditch layout and hydrologic investigation, designing collection and diversion ditches, designing sediment impoundments and the leachate collection system, conducting a threatened and endangered species survey, and conducting a Phase I archaeological survey. A second conceptual design was prepared that specified having all waste disposal activities conducted under a moving shelter system on rails to keep the wastes dry. This design was proposed because the waste produced ammonia gas when contacted by water. The site closure plan included provisions for management of the landfill gases, erosion control, and grading for proper drainage.

Roane County–Roane County, TN. Project engineer for the redesign, regulatory negotiation, leachate control, remediation, construction, and construction management of a 30-acre Class I solid waste landfill. Prevented discharge of leachate mixed with surface water into Watts Bar Lake for three months. Designed and constructed a ten million gallon holding pond. This project allowed the client to successfully comply with regulations by redesigning the operations and closure plan for the landfill. The closure plan included regrading the site to promote positive drainage, a cover of vegetation in order to minimize erosion damage, and gas migration controls.

TVA– Gallatin, TN. Project engineer responsible for construction QC during remedial actions and closure certification for a seven acre demolition Class II landfill containing asbestos.

Core Group, Inc., 1989–1992
Vice President/Owner

Responsible for permitting, design, and environmental compliance for coal mines and landfills.

Kenwill, Inc., 1981–1989
Maryville, Tennessee
Vice President/Natural Resources

Served in progressive roles from engineering technician to vice president of the Natural Resources Division. Responsible for the permitting, design, and environmental compliance of coal mines and landfills.

G&B Nolan, Inc., 1979–1981
Lake City, Tennessee
Mining Consultant

Responsible for coal mine design, preparing mining permits, and environmental compliance with regulatory guidelines.

Dixie Pine Coal, 1978–1979
Lafollette, Tennessee
Engineering Technician

Assisted with coal mining permits and design.

Honors/Awards

In August 2000, Mr. Williams received the “Award for Individual Excellence” presented by the Fort Campbell Environmental Restoration staff.

Chris Napoleon
Project Geologist/SSHO

Summary of Qualifications

Mr. Napoleon is a geologist with over eight years of experience in geotechnical, environmental, and construction projects. His specialties and responsibilities include: health and safety; trenching and excavations; field coordination and project planning; soil treatment and dewatering; Phase I and Phase II projects; Geoprobe® direct-push and hollow-stem auger rig operation; air rotary rig operation, rotosonic rig operation, soil boring and monitoring well installation, sampling, and development; soil sampling/logging; field surveys; global positioning system equipment; and water treatment and monitoring including surface, storm water, and activated carbon treatment and system monitoring and maintenance.

Mr. Napoleon's Geoprobe® experience includes familiarity with both deep and shallow probing methods and appropriate tooling for sampling. He is experienced in groundwater sampling at different intervals through the Geoprobe® dual-tube sampler. In addition, he is capable of taking soil gas readings from Geoprobe® soil screens, is proficient in design and placement of temporary monitoring wells and boring placement, and has geotechnical experience with cone penetrometer testing. His hollow-stem auger, air-rotary, and rotosonic drilling experience includes driller oversight, logging soils and core and well installation. Mr. Napoleon is familiar with the operation and appropriate tooling for many styles of drill rigs, including hollow-stem auger, air rotary, mud rotary, rotosonic, and DPT, and is able to identify and test for soil type and determine proper hazard control measures for sloping/shoring. He performs daily excavation inspections to verify safety, regularly trains and briefs workers on potential excavation hazards, and assures safe placement of spoil pile operation of equipment and activities of persons working in, and operating around, excavation sites.

Education
- BS, Geography and Geology, East Tennessee State University, 2005

Certifications
- Underground Petroleum Storage Tank Remover, Kentucky: LUG0009636

Training
- 40-Hour HAZWOPER and 8-Hour Refreshers
- OSHA 30-Hour Outreach Training for the Construction Industry
- OSHA Competent Person for Excavation Trenching and Shoring
- 8-Hour HAZWOPER Management and Supervisor
- 40-Hour Asbestos Supervisor
- Respirator Fit Test
- OSHA Bloodborne Pathogens
- CPR/First Aid/AED

Mr. Napoleon has performed soil sampling ranging from large-scale excavation sites to split-spoon and Geoprobe® liners. He tests for soil classifications using an approved method, i.e. pocket pentrometer, plasticity/wet threadtest or visually. In the area of groundwater sampling, he is proficient in both low-flow and bailer-type sampling and is experienced with Grundfos®, air bladder, Whale® and parastaltic pumps. Mr. Napoleon's monitoring well installation experience includes development by airlift, pumping, surging, and bailing. He is familiar with sampling protocol for temporary and permanent wells.

Mr. Napoleon is also proficient in stormwater and process water treatment. He has experience in setup and operation of activated carbon water treatment systems ranging from treatment systems for small-scale operations up to 1,000 gallon per minute systems.

Mr. Napoleon has over five years of experience in health and safety oversight, trenching and excavation oversight, and he is the site safety and health officer (SSHO) with responsibility for project safety orientation, safety training, daily tailgate meetings, site safety inspections and incident investigation and reporting. Mr. Napoleon is experienced with area and personal air monitoring using instruments such as personal air pumps, Draeger Tubes, and vacuum air canisters, and is responsible for inspection of excavations, trench boxes, and trench installations.

Experience

SES Group of Companies, 2011–Present
Oak Ridge, Tennessee
Project Geologist

2013: Geothermal Test Bore, Redstone Arsenal, AL. Project geologist for installation of one geothermal test borehole for the testing of formation thermal conductivity for the development of geothermal heating and cooling at Redstone Arsenal.

2013–Present: Groundwater Monitoring at USTs 208 and 209, Fort Stewart, GA. Field Manager/Alternate SSHO on a two-year groundwater monitoring project of nine wells where long term monitoring will be used to ensure contamination associated with former UST has been removed.

2013–Present: UST Corrective Action Plan, Part A and B, at Victory Shoppette, Fort Stewart, GA. Field Manager/Alternate SSHO during semi-annual groundwater monitoring activities at Victory Shoppette. Groundwater wells were installed to ensure contamination associated with former fuel line piping has been removed during excavation activities.

2013–Present: Remedial Action at Site A, Turner AFB, GA. Alternate SSHO on the installation of multiple new monitoring wells at a former fuel distribution center associated with former air field fueling operations.

2012–Present: Evaluation of Soil and Groundwater at Potential Construction Sites, Fort Stewart and HAAF, GA. Field manager on the rapid response evaluation, over a two-year period, of soil and groundwater at five proposed construction sites: groundwater wells were installed on a site-by-site basis with up to three sediment samples and three surface water samples to be collected from each site as applicable.

2011–Present: Redstone Arsenal Drilling and Monitoring Well Installation, Huntsville, AL. Project geologist and SSHO, providing drilling and health and safety coordination and oversight during a $1.9 million drilling and monitoring deep bedrock and shallow well installation program at Redstone Arsenal under contract to Shaw Environmental. Evaluated potential project safety and health hazards and communicated awareness of, and/or mitigated concerns as necessary.

2011–Present: Former Skeet Range Polynuclear Aromatic Hydrocarbon (PAH) and Lead Testing, Fort Gordon, GA. Project geologist and SSHO providing Geoprobe® soil sampling support on a former skeet range: performed 26 soil borings over a two-week period while also providing health and safety site actions to identify, mitigate and/or correct potential safety risks.

2013: Vertical Test Bores and Formation Thermal Conductivity Testing, Fort Campbell, KY. Project geologist on the installation of three vertical test borings to 300 ft. bgs, and the testing of formation thermal conductivity to determine the average thermal conductivity.

2012: Storm Water, Erosion, Sediment Controls Mirror Lake, Fort Gordon, GA. Performed SSHO duties on the repair to the standpipe and outlet pipe system at Mirror Lake, to properly convey storm water in compliance with state and federal regulations: conducted daily pre-task safety meetings, briefed employees on AHA requirements, and weekly site condition inspections and equipment inspections, and also acted in the capacity of excavation competent person.

2011–2012: Kelley Hill Debris Removal, Fort Benning, GA. Project geologist and SSHO on the removal activities of 11,000 cubic yards of debris from a highly eroded area at a closed inert landfill. Identified and mitigated potential health and safety issues during landfill excavation activities and conducted daily pre-task safety meetings, briefed employees on activity hazard analysis (AHA) requirements, and performed weekly site condition inspections and equipment inspections

Previous Experience

Tetra Tech, Inc., 2007–2011
Oak Ridge, Tennessee
Geologist/Site Superintendent

2010: Pond Liner Installation, McGuire Nuclear Station, Huntersville, NC. Site Superintendent and SSHO at the installation of a pond liner for a waste water treatment facility at Duke Energy's active McGuire Nuclear Station. Conducted daily safety tailgate meetings and oversight of excavation of radiological contaminated soils where he ensured slopes, compaction, and grade were within acceptable tolerances of engineer's design. During the project he supervised installation of 15 feet deep trenches and trench box installation for the new underground utilities and circulation piping associated with the pond. Subsequently provided oversight for an HDPE pond liner and oversight for testing procedures associated with plastic welding on the HDPE liner.

2010: Water Treatment, Iowa Army Ammunition Plant, Middletown, IA. Geologist and SSHO supervising water treatment, landfill excavation, trenching and capping, installation of carbon water filtration systems, treatment and dewatering of sludge at a former army ammunition plant. Conducted daily safety tailgate meetings and oversight of all project activities for safety and health concerns. Supervised the capping of an inert disposal landfill where he supervised trenching for characterization, and ensured all slopes, compaction, and grades were within acceptable tolerances of the engineer's design.

2008–2011: Groundwater Sampling, Volunteer Army Ammunition Plant, Chattanooga, TN. Lead Geologist and SSHO for semi-annual sampling activities at a former Army ammunition plant with TNT, DNT and metals contaminated groundwater. Performed sampling at both monitoring wells and underwater springs while maintaining crew's compliance with health and safety regulations through daily safety tailgate meetings

2007–2009: Soil Remediation, Volunteer Army Ammunition Plant, Chattanooga, TN. At this former Army ammunition plant contaminated with TNT, DNT, and metals, Mr. Napoleon's activities included worker oversight, trenching and excavation oversight, health and safety monitoring and evaluation of safety hazards, field coordination, sampling, water treatment, storm water monitoring, and rainfall monitoring. Provided excavation oversight of large scale three-acre by 20-feet deep excavations where soil was removed for treatment with alkaline hydrolysis. Mr. Napoleon also supervised the trenching for removal of contaminated process sewer lines. He was responsible for ensuring worker safety and maintaining a safety program for proper trenching procedures.

MACTEC Engineering and Consulting, 2005–2007
Knoxville, Tennessee
Geologist

2007: Core Sample Drilling, Dominion Power Plant, Castlewood, VA. Geologist providing safety oversight and guidance for drilling to obtain 500-ft. core samples to compile data to determine how an area would support a 300-ft. deep ash pile. Activities included logging core, packer testing, running and maintaining water lines for winter coring conditions, and driller oversight.

2005–2007: Semi-annual Groundwater Sampling, Former Textron Plant, Textron; Cookeville, TN. Geologist sampling multiple monitoring wells once per quarter. Wells were multiple levels, including residuum and bedrock level. Sampling styles included bladder pumps and parastaltic pumps. Activities included sampling, labeling, and shipping samples.

2005–2007: Semi-annual Groundwater Sampling, Poplar View Landfill, Knoxville, TN. Provided biannual sampling expertise for multiple bedrock wells. Sampling was by Grundfos pumps. Activities included sampling, labeling, and shipping samples.

2007: Drilling Oversight at John Sevier Fossil Plant, Tennessee Valley Authority (TVA); Rogersville, TN. Provided oversight of drillers installing monitoring wells and collected geotechnical data from core and soil drilling. Wells were installed by hollow-stem auger and air-rotary drill rigs. Activities included soil logging, driller oversight, and relaying information to the TVA project manager.

2006–2007: Drilling Oversight, Cumberland Fossil Plant, TVA, Cumberland City, TN. Performed drilling oversight on ash piles with activities including: directing placement of monitoring wells; oversight of drillers; and relaying of information from drilling events back to the TVA project manager.

2006: Installation of Granite and Sand Pillars, Bull Run Steam Plant, TVA; Oak Ridge, TN. Provided oversight for installation of granite sand pillars in fly ash landfills to promote more efficient dewatering of ash piles. Activities included worker oversight, soil logging, geosynthetic fabric installation oversight, and implementation design. Provided oversight for all excavation work completed on this project to maintain acceptable tolerances with the engineer's designs.

2005–2006: Deep Soils Sampling, Volunteer Army Ammunition Plant, Chattanooga, TN. In his capacity as geologist, assisted with deep soils Geoprobing. Work included deep soil borings to depths of 110 feet below ground surface, sampling, soil logging and decontamination of equipment. As site safety officer ensured compliance with site safety and health activities and procedures.

Roy Hoekstra, P.E.
Sr. Program Manager

Mr.Hoekstra, P.E., has worked with the SES group of companies as a senior program manager, project manager and civil engineer for 14 years. He has spent his 38-year career in the construction, engineering and environmental fields including 24 years in commercial industry. Since 1999 he has served as program manager on ten major federal government indefinite delivery indefinite quantity (IDIQ) contracts, managing multiple project teams at multiple sites, primarily in the southern U.S. Design-build tasks under these contracts frequently utilize technologies related to HVAC systems with associated controls, many types of pump repair and replacement, valve replacement, electric motors, VFDs, motor soft start systems, switchgear and wiring. Mr. Hoekstra is responsible for overseeing all such task orders and for providing technical and management direction to task and project managers as well as quality control oversight, and he frequently assumes the role of *Quality Control Manager*.

Mr. Hoekstra's structural engineering experience includes knowledge of industry consensus standards such as the Steel Code and the American Concrete Institute Code, and model building codes such as the Southern Building Code and Uniform Building Code. He has performed structural analysis for seismic response, high wind conditions, and internal pipe breaks, and has conducted structural evaluations of old industrial buildings to include allowable floor loads and actual concentrated loads.

Additionally, Mr. Hoekstra has over 20 years of experience in Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) investigations, studies, design and remediation. He has planned and allocated resources, performance, and closeout of many challenging hazardous, toxic, and radioactive waste (HTRW) projects.

Education
- MS, Environmental Engineering, University of Tennessee, 1994
- MS, Civil Engineering, University of Tennessee, 1980
- BS, Civil Engineering, University of Illinois, 1975

Registrations/Certifications

Professional Engineer:
- Alabama #26414 (7-15-04)
- Florida #49690 (10-20-95)
- Georgia #25339 (5-10-99)
- Kentucky #20884 (5-3-99)
- Massachusetts #37599 (9-24-93)
- North Carolina #20006 (5-13-94)
- South Carolina #20656 (8-17-00)
- Tennessee #15905 (2-18-83)
- Texas #94420 (10-28-04)

Registered Professional Engineer with NCEES #11892 (1995)

Training
- OSHA 40-Hour Hazardous Waste Operations and Refreshers
- OSHA Hazardous Waste Operations Supervisor Training
- CPR/First Aid

Experience

SpecPro Environmental Services LLC (SES), 1999–Present
Oak Ridge, Tennessee
Senior Program Manager

Program Management

2011–Present: Environmental Construction Services for Three Rivers Project; U.S. Army Corps of Engineers (USACE)-Fort Worth District (W9126G-11-D-0066). Program manager overseeing a $13M IDIQ to deliver miscellaneous construction tasks at recreational facilities at multiple lakes within the Three Rivers Regional Project in Texas. To date, 19 task orders have been issued, ranging in value up to $3.01M with scopes of work to include dewatering of stilling basins; miscellaneous property repairs such as gates, fencing and playground resurfacing; electrical and plumbing repairs; identification and repair of life safety and fire safety deficiencies; repairs to floating boat docks; facility renovations; installation of sewer systems and waterlines; erosion repairs on lake shorelines; and construction of an inverted berm filter.

2011–Present: Basewide Environmental Support (BEST); USACE-Mobile District (W91278-11-D-0094), multiple locations. Program manager for a $4M IDIQ to provide basewide services, primarily at locations within multiple states. Tasks have included a $1.1M project for storm water and wastewater support and the identification and correction of the infiltration/inflow for a sanitary sewer system at Patrick AFB, Florida, and a $0.5M petroleum remediation at four sites at Fort Belvoir, Virginia.

2009–Present: Environmental Remediation Services; USACE-Omaha District (W9128F-09-D-0027), multiple sites at Patrick Air Force Base (PAFB) and Cape Canaveral Air Force Station (CCAFS), FL and other Omaha District customer locations. Program manager for an IDIQ contract providing environmental support. To date, almost $4.3M has been awarded under ten task orders that include total maximum daily load mitigation (TMDL) measures, wharf design, evaluation and implementation of best management practices, and mitigation of sewer inflow/infiltration, wastewater mitigation and remediation. A representative project is a water assessment of TMDL and water conservation measures at PAFB and CCAFS—a task comprising demolition and abandonment in-place of five 1,000-gallon below ground septic tanks, one 2,000-gallon below ground septic tank, and one 16,490-gallon aboveground septic tank and adjacent lift station.

2008–Present: Veterans Administration (VA) and Military Construction; USACE-Mobile District (W91278-09-D-0011 and W91278-09D-0013), multiple sites. Program manager overseeing two IDIQ SATOCs for military and construction projects. Task orders have included the $6 removal and replacement of a boiler plant at the VA Medical Center in Tuscaloosa, Alabama, where the scope of work comprised: the removal of four existing boilers and other ancillary systems and components, including asbestos abatement; alterations to piping systems to accept new boilers; installation of four new boilers, controls and ancillary systems; and general mechanical and electrical work. ***Work on this project was recognized with a 2011 Safety Award from the USACE Mobile District.*** A second project involved facility upgrades at the Malcolm Randall Medical Center in Gainesville, Florida, including: design and installation of an overhead paging system for several buildings; design and installation of a sprinkler system at unprotected areas in Building 1; and upgrades to cold water piping at AHUs 1, 2, and 3. This project also included an asbestos survey of existing features prior to construction activities. A current design-build project at the Atlanta VA Medical Center in Decatur, Georgia, is an electrical upgrades phase-2 project valued at almost $16M.

2008–Present: Environmental Remediation Services; USACE-Tulsa District (W912BV-08-D-2051), various U.S. Army Bases. Program manager directing work on a $15M IDIQ contract providing environmental remediation services throughout Tulsa District. Project scopes to date have included: a corrective measures implementation on benzene-impacted groundwater at Fort Polk, Louisiana; construction of a bio-cell to treat petroleum contaminated soil at Fort Bliss, Texas; mold cleaning, abatement and spraying at 18 barrack facilities at Fort Polk; a water distribution line repair at Laughlin AFB; and technical support to AFCEE with its Installation Restoration Program (IRP) relative to environmental database management and documentation.

2004–2009: Comprehensive Environmental Contract (CEC) (W912BV-04-D-2018) for USACE–Tulsa District, Tulsa, OK, multiple sites in TX, OK, LA. Program manager for a broad scope IDIQ contract. Under this multiple award task order contract (MATOC), Mr. Hoekstra received five delivery orders with a dollar value of $2.3M. Work on this contract was located in southwest Texas, Oklahoma, and Louisiana. Projects included: demolition of 35 ASTs at Fort Sill, Oklahoma; implementation of best management practices for storm water management at Fort Hood, Texas; clean closure of the old used oil facility and installation of upgrades to the new used oil recycling facility at Fort Polk, Louisiana;

and design and construction of an Ammunition Residue Storage Building to prevent storm water runoff from becoming contaminated from spent artillery shells at Fort Sill, Oklahoma.

2003–2008: Air Force Center for Engineering and the Environment (AFCEE) 4P AE (F41624-03-D-8616) Brooks City-Base, TX, various U.S. Air Force Bases (AFBs). Program manager providing oversight and direction for task order project managers performing work on 37 task orders worth over $3.96M at military facilities both within and outside the contiguous United States. Project locations included Germany, Alaska, California, Colorado, Georgia, Tennessee, and Washington D.C. Project scopes included environmental impact analysis process support, facility utilization studies, area development plans, flood zone assessment, Phase I and II archeological studies, environmental assessments, design of the replacement golf cart storage facility at Lackland AFB, design of the Petroleum Operations Facility for Arnold AFB, and hazardous materials/hazardous waste compliance support at Bolling AFB under three consecutive one-year task orders. Mr. Hoekstra received follow-on task orders for work at the same facilities as well as task orders at other facilities based on quality of work.

2000–2007: Base Environmental Support Contracts (DACA01-00-D-0007, DACA01-01-D-0007, DACA01-03-D-0010 and W91278-04-D-0041) for USACE–Mobile District, Mobile, AL, numerous sites nationwide. Program manager for four BEST contracts, the first of which was awarded in 2000: superior performance resulted in the award of three follow-on contracts under which 58 task orders, totaling approximately $19M, were issued. Mr. Hoekstra was instrumental in growing this client from one $20,000 Phase I investigation to a multi-M dollar, multi-contract program. This broad scope contract was used at sites nationwide, from Florida to California, for a wide variety of environmental restoration and sustainment, restoration, and modernization (SRM) activities, including: remediation of a radioactive site at a former Naval Air Station in Miami, Florida; “green” deconstruction and recycling of World War II buildings at Camp Roberts in California; and constructing a 28-station obstacle course in Anniston, Alabama, for the Alabama Army National Guard. As part of these contracts, Mr. Hoekstra has also done extensive work at two superfund sites in Pensacola, Florida, including site investigation, multimedia characterization, investigation-derived waste consolidation and disposal, demolition of residential housing in the vicinity, and security fence installation.

Project Management

2009–2010: Environmental Compliance Support for Storm Water and Sewer Systems, CCAFS, FL. Project manager for the construction of a new sludge drying bed and closure by demolition of the phytoremediation vegetative barrier system at the Cape Canaveral Landfill. The project included the removal of vegetation, the disassembly of an irrigation system, the abandonment and closing of 14 monitoring wells, disposal of non-hazardous waste, site restoration and backfilling an infiltration ditch.

2006: Fort Sill Building Construction and Upgrade, Fort Sill, OK. Project manager responsible for design and construction of an ammunition residue storage building to protect storm water runoff from contamination by spent artillery shells. The pre-engineered building was constructed in an existing paved area. The finished structure measures 60 feet × 200 feet × 24 feet high. Despite cold weather delays and winds of 40 miles per hour during the roofing phase of the project, the building was completed on time and within budget. As part of this task order, Mr. Hoekstra also directed the field effort to provide electrical power to Building 2337, install an explosion-proof distribution panel, and connect existing lights and outlets to the new distribution panel.

2005–2006: Fort Hood Erosion Control, Fort Hood, TX. Project manager responsible for designing and constructing storm water control systems at six locations at Fort Hood. Work included removing old pipe, clearing debris, reconstructing drainage channels, installing a specialized Gravelpave 2 system in a landfill parking lot, installing concrete curbs and gutters to divert rainfall, installing weirs, and modifying wash racks. All project activities were completed ahead of schedule, and flooding problems at the Defense Reutilization and Marketing Office (DRMO) were eliminated.

2004–2005: Escambia Arms Apartment Complex and Housing, Pensacola, FL. Project manager for a large-scale, $1.99M demolition project involving the removal of an apartment complex and single-family housing. These properties were bought by the U.S. Environmental Protection Agency as part of an environmental justice settlement and had been vacant for several years. The Escambia Arms apartment complex was a 12-acre site comprising 18 apartment buildings and containing a total of 200 apartment units as well as auxiliary buildings consisting of two laundromats and a office/maintenance building. The single-family houses were in three neighborhoods near the superfund site. Mr. Hoekstra provided oversight of specialty subcontractors that performed asbestos abatement and air monitoring; abandonment of sewer and water lines; and recycling of hazardous materials such as light ballasts, mercury containing devices (i.e., thermostats) and smoke detectors. The project schedule was disrupted by Hurricane Ivan, and finding landfill capacity in the wake of the hurricane became a significant challenge yet the project was successfully completed on time.

2005: Pelham Range, Anniston Army Base, AL. Project manager responsible for a $1.1M project to upgrade Range 52 at the Alabama Army National Guard Facility at Pelham Range to a Combat Pistol Qualification Course with an overlay Military Police Firearms Qualification Course. Work included design and construction of a new course consisting of 15 lanes with seven electronically activated targets on each lane. Other improvements were made to the site including: demolition of the interior of an old latrine and converting the building to a storage area; demolition of the old ammunition breakdown canopy; construction of a new latrine and ammunition breakdown building; abatement of lead-based paint; painting the range operations tower, bleacher cover, and mess cover structural steel; and installation of a new public address system.

2004: Demolition and Site Work at the Base Firing Range, Cannon Air AFB, NM. Project manager responsible for demolition of a deteriorated six-row baffle system, rebuilding the earthen berm at the end of the rage that had eroded and was out of compliance with DOD standards, regrading the site for proper drainage, excavating and installing footers for a new baffle system, and constructing a new concrete slab to extend the existing firing line area. Over 19 tons of metal was recycled at an off-site facility, and 11,000 board feet of lumber that contained lead was disposed as hazardous waste. Fieldwork was completed ahead of schedule.

2003–2004: Soil and Free Product Removal at Chicora Tank Farm, Charleston, SC. Project manager responsible for excavating fourteen trenches that were suspected to contain contaminated soil, collecting soil samples, and installing 14 groundwater monitoring wells. Provided oversight during removal and disposal of 279 tons of contaminated soil and 5600 gallons of wastewater collected by vacuum truck.

2004: Obstacle Course Planning and Construction at Pelham Range, Anniston Army Base, AL. Project manager and lead engineer for construction of an obstacle course for use in military training. Site activities included clearing and grubbing, grading the area to provide positive drainage, and constructing 24 individual obstacles with names such as “The Tough One”; “Slide For Life”; “Swing, Stop, and Jump”; “The Skyscraper”; and “Confidence Climb.” Also provided direction and oversight during construction of a 22 foot × 48 foot bleacher cover as an open shelter for troops and a 20 foot × 60 foot storage building slab with turndown footers.

2004: Construction of Tank Crossings, Camp Shelby, MS. Project manager responsible for the development of two designs and the subsequent construction of eight tank crossing roadways through wetland areas. These crossings were designed for soil stability and to protect adjacent land from damage caused by tracked vehicle training maneuvers. Crossings were constructed using a combination of woven filter fabric, "Geoweb" fabric (comprised of strong polyethylene material in a one inch grid pattern) for soil stability, crushed stone bedding material for support, 6–10 inch riprap, Armor Flex concrete blocks, and small stone for finishing. Field activities were conducted during dry weather and were completed in four weeks, well ahead of schedule.

2003: Soil Removal, Millington, TN. Project manager responsible for directing the removal of 55,000 tons of contaminated soil at Solid Waste Management Unit (SWMU) 15, the site of a former fuel farm. Coordinated subcontractors, backfilling the open pit as soon as possible to avoid delays caused by wet weather. Directed an immediate field response when a previously unknown subsurface fuel line full of fuel was discovered. Within the hour, field personnel placed absorbent material in the area of the leaking fuel line, and approximately 200 gallons of fuel were recovered. The soil was over-excavated an additional two feet to eliminate additional contamination.

2003: Engineering Evaluation/Cost Analysis for the Former Kentucky Ordnance Works Site, KY. Project manager for an engineering evaluation/cost analysis (EE/CA) for the west gravel pit at Area of Concern (AOC) 4, which was the location of two former gravel pits divided by a drainage swale (covering approximately 2.5 acres). The site was an explosives manufacturing facility that produced trinitrotoluene (TNT) and concentrated sulfuric acid. Responsible for evaluating remedial options for the metals contamination identified during previous site investigations. Directed the excavation of six 30-inch wide trenches and collection of 20 soil samples to define the extent of the fill material and further characterize contaminants. Four options were evaluated to achieve remedial goals in a technically sound and cost-effective manner. The final recommendation, consisting of an impermeable engineered cap, was made to reduce potential risks to long-term site users and the public.

2003: Dunn Field Site Investigation, Memphis, TN. Project manager responsible for excavating 65 exploratory trenches at the Dunn Field site, where historical and anecdotal evidence suggested the presence of buried chemicals and medical waste. Because these chemicals were unknown, over 100 soil samples were collected in Level B personal protective equipment (PPE) with supplied air during the two-week field effort.

2003–2004: U.S. Navy SouthDiv; Chicora Tank Farm, Charleston, SC. Project manager responsible for investigation and remediation of the Chicora Tank Farm, which once supplied fuel and lubricants to the nearby shipyard. After discovering a much larger area of contamination than anticipated in the corrective action plan, Mr. Hoekstra immediately received approval for a change in scope from Navy personnel, which involved diverting available funding to a passive soil gas survey to delineate contaminated areas. Multiple areas of the site showed evidence of contamination, and follow-on work was awarded which involved excavating 14 trenches, sampling, and installing groundwater monitoring wells in each trench. A total of 279 tons of contaminated soil and 5,600 gallons of wastewater were removed from the site.

2002: USACE–Nashville District; Underground Storage Tank Testing, Fort Campbell, KY. Project manager responsible for conducting a vacuum test for a 20,000 gallon underground storage tank (UST) to determine whether a leak was present within the secondary containment system. Performed additional helium testing to localize the leak.

2002: USACE–Nashville District; Extraction System Expansion, Fort Campbell, KY. Project engineer for expanding the capacity of the existing fixed-vacuum extraction system at Campbell Army Airfield. Responsible for installing connecting valves, water meters, flow regulators, pressure gages, and monitoring equipment during the expansion effort.

2002: U.S. Navy SouthDiv; Building 407 Air Sparging System Installation at the Naval Weapons Station, Charleston, SC. Project manager responsible for report preparation, field crew oversight, and subcontractor oversight during installation of an air sparging system to remediate volatile organic compounds (VOCs) in soil and groundwater to concentrations below required limits, and to enhance natural degradation by increasing concentrations of dissolved oxygen in the aquifer. Provided oversight during installation of 58 air sparging wells.

2002: USACE–Mobile District; Removal Action at the Former Richmond Naval Air Station, Perrine, FL. Project manager responsible for removal of low-level radioactive laboratory waste that was disposed in buried trenches between 1946 and1970. Site contaminants included the solvents cesium-137, cobalt-60, hydrogen-3, and carbon-14. Provided oversight for: a radiological survey; delineation of trenches; clearing and grubbing; erosion control; removal of all waste vials, debris, and contaminated soil from the trenches; soil and vial sampling; confirmatory soil sampling; characterization of waste streams generated by the removal action; installation and sampling of five groundwater monitoring wells (two upgradient and three downgradient); and site restoration.

2002: U.S. Navy SouthDiv; Emergency Cleanup of F-18 Crash Site, Savannah, GA. Project manager during the cleanup of a JP-8 fuel spill at the Savannah International Airport.

2001: U.S. Navy SouthDiv; Tank Closure of AST 2505 and Oil/Water Separator Removal, Charleston, SC. Project manager for the removal of a 500-gallon aboveground storage tank (AST) and oil/water separator system that were no longer cost effective for the Navy to use. Responsible for client communication and resource allocation and commitment. After excavating the sump, project personnel discovered that drain lines from other locations would be impacted. Mr. Hoekstra coordinated with client representatives, then directed field personnel to reconfigure the impacted drain lines and install a new concrete vault and pump to direct the flow from floor drains to the sewage system.

2001–2002: USACE–Tulsa District; Perchlorate Study at Longhorn Army Ammunition Plant, Karnack, TX. Project manager responsible for oversight of the perchlorate study, including well installation, groundwater sampling, soil sampling, and pore water sampling to characterize the nature and extent of contamination. Responsible for oversight during wet and dry season sampling of 113 wells (including direct-push water samples) at nine sites and collection of 238 surface and shallow soil samples. Pore water samples were also collected to monitor movement of perchlorates near surface water streams.

2001–2002: USACE–Nashville District; Removal of Seven Waste Oil USTs, Fort Campbell, KY. Project manager during the removal of USTs 6874-5, 6874-6, 6874-7, 6874-8, 6874-9, 7272, and 7268 and their associated piping and electronic monitoring equipment. Directed the demolition and transportation of the tanks to a disposal facility and coordinated confirmatory sampling to determine the effectiveness of removal efforts. No further action and permanent closure were recommended for six of the seven sites. In addition to coordinating the field effort, Mr. Hoekstra interacted with regulators and provided project status reports to USACE.

2001: Jacobs Engineering; Cleanup at Building T-308 and Soil Removal at Building 949, Memphis Depot, TN. Project manager responsible for cleanup at a hazardous waste storage facility and removal of approximately 300 cubic yards of lead and chromium contaminated soil. The hazardous waste storage facility was pressure washed to remove residual contamination.

2001: USACE–Mobile District; Bridge Demolition Utility Study, Camp San Luis Obispo, CA. Project manager responsible for reviewing existing bridge demolition and reconstruction plans. Several of the bridges scheduled for demolition carried utilities. To address the situation, utility lines were re-routed and temporary utilities installed to minimize disruption during bridge demolition.

2000–2001: USACE–Mobile District; Camp Roberts Building Deconstruction, Waste Pile Removal, and Sewer Upgrade, Paso Robles, CA. Project manager responsible for oversight of several task orders at the Camp Roberts site under the Basewide Environmental Support (BEST) Contract. Project activities included removal of 2350 cubic yards of lead-contaminated shredded building debris from the Chicago Grade Landfill. On another task order, 10,040 cubic yards of lead-contaminated shredded building material, stored in large waste piles, were removed from the Camp Roberts site. At the East Garrison Facility, Mr. Hoekstra was responsible for a treatment system design, removal of a sewer pipe that crossed over a river, and upgrading an existing sewer line. Other deconstruction activities at Camp Roberts included a building inventory, a feasibility study to determine the best method of building removal, and a pilot study.

2000: AIMTech; UST Investigation, Fort Stewart, GA. Project engineer responsible for the on-site supervision of drilling and sampling at UST and heating oil tank sites. Ensured that all activities were conducted in accordance with the work plan and health and safety plan.

1999–2000: SVERDRUP Paint Booth Cleanup, Memphis Defense Depot, Memphis, TN. Project manager for the remediation project at the Old Paint Shop and Maintenance areas. Tasks included all sampling activities, asbestos removal, lube rack removal, UST removal, building demolition, building decontamination, and excavation and disposal of contaminated soils [RCRA metals and polycyclic aromatic hydrocarbons (PAHs)]. Responsible for overall management for task order and interaction with the client. Project management responsibilities included resource allocation and commitment; management and execution of all task order activities; coordination of field, laboratory, and engineering activities; and technical oversight. Ensured that all required documents (work plans, sampling plans, and health and safety plans) were prepared and delivered in a timely manner and that all fieldwork was conducted in accordance with these plans.

1999–2000: USACE–Nashville District; Subsurface Investigation of AOC D, Bulk Fuel Tank Farm RFI, Fort Campbell, KY. Manager of the Remediation Division. Responsible for providing technical direction, work plans, health and safety plans, quality control (QC) plans, proposals, and procurement support for the confirmatory sampling and tank demolition project at the Bulk Fuel Tank Farm. This project involved the demolition of three very large ASTs and their associated components.

1999–2000: USACE–Nashville District; PX Service Station RFI, Fort Campbell, KY. Manager of the Remediation Division. Responsible for providing technical direction, work plans, health and safety plans, QC plans, proposals, and procurement support for site investigation at the PX Service Station. Work also included removal of an on-site oil/water separator.

1999–2000; USACE–Mobile District; Clark Sand Pit Preliminary Assessment Screening, Pensacola, FL. Project manager for a pre-acquisition, Phase I Environmental Site Assessment. Project activities included conducting a title search, records search, and site inspection to determine the potential for on-site contamination at the Clark Sand Pit property. Responsible for overall management of the task order and interaction with the client. Project management responsibilities included resource allocation and commitment, procurement support, managing and executing all task order activities, and technical direction. Also responsible for monitoring performance and quality, reporting cost and schedule performance, and meeting reporting requirements.

1999: USACE–Nashville District; Subsurface Investigation of SWMU 149 Oil Pits, Fort Campbell, KY. Manager of the Remediation Division. Responsible for providing technical direction, work plans, health and safety plans, QC plans, proposals, and procurement support for subsurface investigation at SWMUs 149a and 149f oil pits.

1999: USACE–Nashville District; Fort Campbell Data Management, Fort Campbell, KY. Project manager for providing comprehensive database consolidation and managing future remedial action information for Fort Campbell. Responsible for overall management of the task order and interaction with the client. Project management responsibilities included resource allocation and commitment, managing and executing all task order activities, procurement support, and technical direction. Also responsible for monitoring performance and quality, ensuring all deliverables were completed in a timely manner, and meeting reporting requirements.

1999: USACE–Nashville District; DRMO Oil Pit Removal Action Interim Measure, Fort Campbell, KY. Manager of the Remediation Division. Specific project tasks included excavation of contaminated materials, soil sampling, disposal of contaminated materials, and site restoration, including repaving and revegetating the site. Project activities included the excavation and disposal of an abandoned UST for waste oil that was discovered during excavation near the DRMO salvage yard. Responsible for providing technical direction, work plans, health and safety plans, QC plans, proposals, and procurement support during the removal action at the DRMO Oil Pit.

1999: USACE–Nashville District; Campbell Army Airfield Active Fuel System Integrity Testing, Fort Campbell, KY. Manager of the Remediation Division. Responsible for providing technical direction, work plans, QC plans, proposals, and procurement support for the Campbell Army Airfield Active Fuel System Integrity Testing. Project activities included performing integrity testing on twelve 50,000 gallon USTs and their associated piping.

1999: Boeing Corporation; Spill Prevention, Control and Countermeasures Plan Review for Boeing, Oak Ridge, TN. Project manager for the review of Boeing's existing plan to ensure regulatory compliance and consistency with Boeing's overall emergency response program. Responsible for overall task order management as well as interaction with the client. Project management responsibilities included resource allocation and commitment, management and execution of all task order activities; coordination of field, laboratory, and engineering activities; and technical oversight. Also responsible for monitoring performance and quality, reporting cost and schedule performance, and ensuring the documents were reviewed in a timely and thorough manner.

1998–1999: LMES-HAZWRAP; Fort Campbell RFI (Master RFI), Fort Campbell, KY. Manager of the Remediation Division. Responsible for providing task order management and interaction with the client. Project management responsibilities included resource allocation and commitment; management and execution of all task order activities; coordination of field, laboratory, and engineering activities; and providing technical direction. Also responsible for monitoring performance and quality, reporting cost and schedule performance, and meeting reporting requirements.

Previous Experience

Bechtel Environmental, Inc., 1995–1999
Oak Ridge, Tennessee
Project Engineer

1995–1999; U.S. Navy RAC Program, SouthDiv; Charleston, SC. Project engineer for remediation at the Naval Air Station (NAS) Key West. Provided technical direction, work plans, procurement, and interface with construction for numerous tasks. Provided technical direction for the successful installation of an 1800-foot shoreline protection system at Key West. ***This project won the 1998 Award for Environmental Excellence from the International Erosion Control Association***. Provided wetland permits for four sites. Provided technical direction for the design, installation, operation, and successful closure of the SWMU 9 pump and treatment system. Provided technical direction, work plans, and subcontract documents for the successful remediation and closure of a RCRA-permitted ordnance open burn pit. This pit was on a small island and all work was done by boat. Prepared the work plan and all subcontract documents for the closure of 30,000 feet of underground petroleum pipelines at NAS Key West. Developed an on-site treatment system for dichloro-diphenyl-trichloroethane (DDT) contaminated surface water at the SWMU 2 site that resulted in cost savings for the Navy of $200,000. Directed field staff to use field test kits to limit the excavation of DDT contaminated soils; this approach saved $63,000 in disposal costs at SWMU 2. Served on the NAS Key West Partnering Team and provided technical direction. This team consisted of the client, state and federal regulators, the CLEAN contractor, and the Remedial Action Contract (RAC) contractor (Bechtel). The Key West Engineering Director expressed high praise for Mr. Hoekstra's contribution of his expertise and practical approach to problem solving the environmental issues facing NAS Key West.

1995–1999; U.S. Navy RAC Program, SouthDiv; Charleston, SC. Project engineer for remediation at the Parris Island Marine Corps Recruit Depot. Provided technical support for the field effort to delineate the solvent plume at the Parris Island dry cleaners, including designing and implementing an air sparging pilot study. Also prepared the engineering evaluation and work plan for the interim remedial action at the site. Innovative technologies used were direct push groundwater sampling, air sparging, and a proposed in-well groundwater treatment system. Implemented use of an innovative control system for the pump and treat remedial treatment system at the dry cleaners.

Advanced Sciences, Inc., 1990–1995
Oak Ridge, Tennessee
Engineering Department Manager

1991–1995; Lockheed Martin Energy Systems, Inc., Hazardous Waste Remedial Action Program; Oak Ridge, TN. For the Massachusetts Military Reservation (MMR), prepared the work plan and performed the pilot study for air sparging, soil venting, and product recovery for the Sandwich Remedial Investigation at MMR. Contamination at this site was caused by a leaking underground fuel line that had been used to transfer jet fuel and aviation gasoline. After the pilot study was complete, prepared the design and developed plans and specifications for a full-scale air sparging and soil venting system to remediate the 11-acre site. Computer modeling was used to ensure that the planned system would effectively remediate the entire site.

Conducted a free-product recovery study for the Sandwich Remedial Investigation. This task included modeling of the aquifer and various recovery schemes to develop the most efficient pumping scheme for the removal of the free-product at the site.

For the Muniz Air National Guard Base in San Juan, Puerto Rico, served as site manager for the Air National Guard's Rapid Response Initiative. Five sites at the base were included in this effort. Tasks included site investigation, corrective action planning, free-product recovery activities, soil vapor extraction pilot studies, preparation of plans and specifications for a soil vapor extraction system to remediate two sites at the base, and preparation of procurement documents for two UST removals and closures.

1990–1991; U.S. Department of Energy; Fernald Feed Materials Production Facility, Fernald, OH. Prepared CERCLA documents for Operable Unit 4, including feasibility study documents, development of alternatives, cost estimates, conceptual designs, and scheduling studies.

Tennessee Valley Authority, 1976–1990
Knoxville, Tennessee
Senior Civil Engineer

1976; Tennessee Valley Authority; Yellow Creek Nuclear Plant. Prepared the reinforced concrete designs for the Main Steam Galley, the shear walls of the control building, concrete slabs and walls, and the underground concrete tunnels. Also prepared the preliminary design of the structural steel for the turbine building, which included evaluating test data from full-scale load tests of the drilled pier foundations and correlating the data to calculated theoretical results. Prepared the final designs for these drilled piers.

1989; Tennessee Valley Authority; Various Power Generating Plants. Prepared the structural steel and foundation design for several facilities at TVA's power generating facilities. These included office buildings, coal handling facilities, electrical switchyards, and hydro plant modifications. Mr. Hoekstra coordinated these projects with all the involved disciplines, including the architects and electrical and mechanical engineers. Mr. Hoekstra also coordinated the construction of these facilities with the field construction crews.

1982; Tennessee Valley Authority; Sequoyah Nuclear Project. As principle civil engineer for this project, was responsible for technical and administrative oversight of 25 engineers and engineering associates. Work included directing a major restart effort for TVA's Sequoyah Nuclear Plant. Also served as task manager to close Engineering Change Notices for the Configuration Control Program for the Sequoyah Nuclear Plant. This task was a Nuclear Regulatory Commission commitment and was completed successfully.

1987; Tennessee Valley Authority; Sequoyah Seismic Support Calculation Program. Responsible for directing the efforts of four contractors in preparation of 5600 seismic support calculations for the restart of Sequoyah Unit 2. Evaluated all non-conforming pipe supports and made appropriate changes to meet Category I load criteria. Directed the field effort to support necessary field modifications to the supports.

1989; Tennessee Valley Authority Nuclear Program; Piping Completion Project. Served as senior civil engineer for the technical and administrative management of three principle engineers and their design sections (a total of 35 engineers and engineering associates). Responsibilities included managing group activities and ensuring the technical adequacy of all work produced by the group. Work was performed for TVA's Browns Ferry and Watts Bar Nuclear Plants.

The Austin Company, 1975–1976
Des Plaines, Illinois
Civil Engineer

Prepared structural steel and concrete designs for industrial buildings and chemical processing plants. Clients included Midas, Maytag, and Funk Seeds. Mr. Hoekstra prepared detailed drawings, checked shop drawings, and coordinated construction activities with the field crews.

Professional Memberships/Affiliations

Society of American Military Engineers (SAME) – National, Fort Worth, Mobile, Space Coast and Tulsa Posts

Honors and Achievements

- Celebrate Safety Award – to SES from the USACE Mobile District for an emergency boiler replacement project managed by Mr. Hoekstra (April, 2011).
- Award for Corporate Excellence for exceptional corporate professionalism and superior quality performance in the execution of contractual duties. Presented by the Fort Campbell Environmental Restoration Staff (August 25, 1999).
- Letter of Commendation from S. Keith Hamilton, LCDR, CEC, U.S. Navy, for work on the Naval Air Station Key West's Environmental Restoration Program (January 1999).
- Letter of Commendation from O. N. McNeil, Jr., Project Manager, Bechtel, for work performed during the Interim Remedial Action at Naval Air Station Key West (May 1996).

Publications

Roy E. Hoekstra and Teresa E. Rottero. 1994. "Results of an Air Sparging System Pilot Study." Proceedings of the 1994 Federal Environmental Restoration III Conference and Exhibition.

Dudley Patrick and Roy Hoekstra. 1998. "Plume Stabilization Using Pump and Treat Technology." Proceedings of The First International Conference on Remediation of Chlorinated and Recalcitrant Compounds.

Roy Hoekstra, PE
Senior Program Manager

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Jody Barker, PG
Geologist/ Project Manager

Summary of Qualifications

Mr. Barker has over 18 years of experience in construction management and activities associated with geo-environmental and geo-engineering investigations. He has applied his geology and construction management expertise to solve and oversee engineering issues on building sites, road corridors, landfill caps and liners, mine barriers, slurry impoundments, freshwater dams and waste water treatment facilities, and has created geologic maps for many of these projects.

Mr. Barker's considerable field experience includes installation of methane vents and monitoring wells, and compilation, analysis and reporting of well readings to appropriate regulatory agencies. He is very familiar with laboratory soil testing methodology and measurements including Proctors, Atterberg limits, gradation analysis, permeability, consolidation, CBR, and unconfined compression, and has performed numerous soil and rock borings, seismic surveys, and has also developed and implemented boring and seismic exploration programs. He has installed and monitored in-situ monitoring equipment including extensometers, pneumatic piezometers, and inclinometers. Mr. Barker has also implemented erosion and sediment control practices under current Clean Water Act requirements.

As a project manager on multiple underground and aboveground storage tank (UST/AST) removals and closures and AST installations on Fort Campbell, Mr. Barker has experience in coordinating activities and meetings with the Fort Campbell Directorate of Public Works (DPW) and U.S. Army Corps of Engineers (USACE), and in preparing cost estimates and reporting for both Tennessee and Kentucky regulators.

Education

- BS, Geology, Radford University, 1996

Registrations/Certifications

- Licensed Professional Geologist:
  AL #1302
  FL #PG2649
  GA #PG2001
  KY # 2495
  NC #2248
  TN #4715
- Registered Professional Geologist, GA #002001
- Radiation Safety and Use of Nuclear Density Gauge
- Surface Miner, Tennessee Dept. of Labor, Division of Mines
- MSHA Qualified Slurry Impoundment Inspector/Instructor
- Kentucky UPST Remover #LUG0009575
- Tennessee Erosion Prevention and Sediment Control Program Level 1

Training

- OSHA 40-Hour HAZWOPER
- OSHA 8-Hour HAZWOPER Supervisor
- OSHA 8-Hour Confined Space Entry Training
- OSHA 30-Hour Construction Safety and Health Training
- USACE Construction Quality Management (QCM) for Contractors
- First Aid/CPR

Experience

SpecPro Environmental Services LLC, 2009–Present
Oak Ridge, Tennessee
Geologist/Project Manager

2013-Present: Site Investigations of Aqueous Film Forming Foam Usage in Firefighting Agents at Various U.S. Air Force Bases (AFBs). Geologist overseeing environmental investigations to detect the presence or absence of perfluorinated compounds (PFCs) in various environmental media at Air Force Bases in Utah, South Dakota, New Jersey and California. Duties include writing a generic Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) and field sampling plans, management of field crews at each base, logging soil borings, collection of soil, sediment, surface water and groundwater samples for laboratory analysis, reviewing laboratory results and writing reports summarizing the field activities at each base.

2013–Present: Remedial Action at Turner Field, Site A11J, Albany, GA. Geologist logging geoprobe and auger rig borings conducting an environmental investigation at Site A11J, a former UST and fuel line location at Turner Field. Duties included logging soil samples, installing groundwater monitoring wells, and collecting soil and groundwater samples.

2012–Present: Removal Action at Pesticide Mixing Facility, Ft. Gillem, GA. Project manager overseeing the activities of a subcontractor conducting the removal, transportation and disposal of pesticide contaminated soil at Ft. Gillem.

2011–Present: Annual Electronic Monitoring Consoles (EMC) Inspections, Fort Campbell, KY. Project manager responsible for the quarterly inspection and maintenance of EMCs on fuel dispensers and USTs at Fort Campbell. Manages a subcontractor who performs quarterly inspections at 15 facilities with a total of 29 USTs containing petroleum products; reports findings in quarterly report to the DPW; schedules repairs, emergency callouts and meetings. Also maintains the remote monitoring system (RMS) and performs annual line leak detector (LLD) testing on 19 separate lines and detectors.

2012–2013: FY12 UST Removals, Fort Campbell, KY/TN. Project manager at the closure by removal of six heating oil USTs and associated piping at six buildings, four in Kentucky and two in Tennessee.

2012–2013: FY12 Secondary Spill Containments at ASTs and Mobile Fuel Tanker (MFT) Facilities, Fort Campbell, KY. Project manager overseeing the relocation of drive-on and drive-in secondary containments, construction of concrete berms at existing MFT staging areas, construction of concrete curbing for MFT staging on existing concrete surfaces, construction of a concrete pad and concrete curbing for MFT staging, and procurement and installation of drive-on containments.

2012: Removal and Disposal of Treated Lumber at Center Hill Dam, DeKalb County, TN. Project manager directing field operations and report preparation for the removal, transportation and disposal of approximately 600 cubic yards of stockpiled chromated copper arsenate (CCA)-treated lumber and cleared brush debris.

2012–2013: FY12 AST Replacement, Removal and Maintenance, Fort Campbell, KY/TN. Project manager overseeing the repair and/or demolition of ASTs at project sites in the Tennessee and Kentucky portions of Fort Campbell.

2011–2012: Two Fuel Oil, Two Used Oil and Eight Heating Oil UST Removals, Fort Campbell, KY. Project manager responsible for the closure by removal of 12 petroleum USTs. Duties included meeting with Fort Campbell DPW and USACE, scheduling and overseeing field activities, coordinating site access, arranging storage and disposal of materials, cost estimating and reporting for both registered and unregistered UST closures.

2011–2012: FY11 Secondary Spill Containments at ASTs and MFTs, Fort Campbell, KY. Project manager responsible for installation of new secondary containment and the repair of existing containments at AST and MFT system sites. The project also included: installation of protective bollards, new drain valves, pouring concrete rollover curbing and installation of drive-in containments for MFTs.

2011–2012: DPT Borings, Borehole Drilling, and Monitoring Well Installation, Redstone Arsenal, Huntsville, AL. Geologist responsible for logging soil and rock samples from Geoprobe and sonic rigs at Redstone as part of Shaw Environmental's Performance-based Management Contract. Collected soil and groundwater samples to test for explosives, trichloroethene and petroleum products.

2011: FY10 Secondary Spill Containments at ASTs and Mobile Fuel Tanker Facilities, Fort Campbell, KY. Project manager for secondary containment project that involved installation of concrete bollards and pads, rollover curbing, concrete berm repairs, drain valve upgrades, and procurement and installation of drive-in containment at 71 sites throughout the Base. Duties included scheduling and overseeing field activities, coordinating with units in motor pools and DPW, and reporting.

2010: Building 92 UST Closures, Fort Campbell, KY. Project manager for the closure of three 20-000-gallon gasoline, one 1,000-gallon heating oil, and one 1,000-gallon used oil UST at Building 92. Scheduled field activities with DPW and building tenants, oversaw the UST removals and sampling, report writing and site restoration.

2010: Installation of AST and Removal of UST, Fort Campbell, KY. Project manager for the installation of a 1,500-gallon AST and removal of an 8,000-gallon UST at Building 6225. Responsibilities included cost estimating, scheduling, overseeing fieldwork and sampling, report writing and meeting with DPW.

2010: Five Fuel and Six Heating Oil UST Removals, Fort Campbell, KY. Project manager on closure by removal of 11 USTs on the Tennessee and Kentucky portions of Fort Campbell. Each removed UST and associated steel piping was cleaned and prepared for recycling.

2009–2010: Replacement of the UST and Pipeline System at the Air Force Exchange Service (AAFES) Station, Robins AFB, GA. Site superintendent/geologist responsible for the replacement of five 10,000-gallon USTs with three 15,000-gallon USTs. New pipelines and dispenser sumps were also replaced while the station remained in service. Coordinated with AAFES and U.S. Air Force personnel, maintained daily reporting of construction activities and wrote the Georgia closure report

2009–2010: Fuel Oil Storage Tank System Closures at Building 3902 (Central Energy Plant) Fort Campbell, KY. Geologist responsible for writing the Kentucky Department of Environmental Protection (KDEP) 7097C Closure Report detailing the closure of a fuel oil storage tank system at Fort Campbell that included a 1,000,000-gallon AST, 900-linear feet of product piping, a 500-gallon UST and a 20,000-gallon UST.

2009–2010: Fort Gordon Site 15 Free Product Extraction, Fort Gordon, GA. Geologist responsible for monitoring vacuum extraction at a former UST location to remove free product that had accumulated on top of groundwater.

2009–2010: Soil Remediation at the Central Energy Facility, Fort Campbell, KY. Geologist responsible for writing the KDEP 7097C Closure Report that detailed soil remediation activities at Building 3902.

2009–2010: Closure of Eight Oil USTs, Fort Campbell, KY. Geologist responsible for the sampling of UST pits at eight sites on Fort Campbell. Duties included sampling soil and groundwater, data collection and analysis, and report writing.

2009: Diamond Head Avenue Low Impact Development, Fort Stewart, GA. Geologist responsible for performing construction grade staking and as-built surveys.

2009: Former Skeet Range, Fort Gordon, GA. Geologist responsible for collecting groundwater samples for delineation of soil contamination at a former skeet range on Fort Gordon. Collected samples from 39 soil borings installed up to 25 feet below ground surface and from six groundwater monitoring wells.

Previous Experience

PIONEER Engineering & Consulting, PC, 2006–2009
Oak Ridge, Tennessee
Geologist/Project Manager

Geo/Environmental Associates, Inc., 2001–2006
Knoxville, Tennessee
Project Geologist

RLS & Company, 1995–2001
Abingdon, Virginia
Staff Geologist

Solid Waste Management:

City of Wytheville, VA, Municipal Landfill Closure, Wytheville, VA. Geologist responsible for performing soil nuclear density tests on clay material for the landfill cover, and data recording. Performed oversight of the installation of methane vents in the landfill, ensuring installation met minimum Department of Environmental Quality requirements. Provided oversight for the lining of an 800-ft. long 36-in. corrugated metal pipe with an 18-in. HDPE pipe. Logged soil and rock borings for methane-monitoring wells placed around the landfill perimeter. Responsible for monitoring methane amounts from the wells on a quarterly basis.

Carroll County, VA, Municipal Landfill, Hillsville, VA. Geologist responsible for performing sand cone and nuclear density tests on clay material for a landfill liner. Performed Boutwell permeability tests on material placed in the field to determine if it met minimum permeability requirements.

City of Tazewell, VA, Municipal Landfill, Tazewell, VA. Geologist responsible for creating maps of the piezometric surface landfill from monitoring well data.

Dickinson County, VA, Municipal Landfill, Clintwood, VA. Geologist responsible for logging soil and rock borings for groundwater monitoring wells. Monitored methane wells on a quarterly basis. Produced reports on the monitoring results for the Virginia Department of Environmental Quality

Wise County, VA, Municipal Landfill, Wise, VA. Geologist responsible for monitoring methane wells on a quarterly basis. Produced reports on the monitoring results for the Virginia Department of Environmental Quality.

City of Appalachia, VA, Municipal Landfill Closure, Appalachia, VA. Geologist responsible for performing nuclear density tests, sand cone density tests and field moisture checks on the silt used for a cap. Observed the placement of a geosynthetic clay liner over the landfill. Directed the activities of the drill crews that installed the methane vents and methane monitoring probes around the landfill perimeter.

Construction & Demolition Landfill Services, Inc., Poplar View Landfill Leachate Control, Knox County, TN. Geologist responsible for installation of leachate tanks and abandoned monitoring well MW-1.

Construction & Demolition Landfill Services, Inc, Poplar View Landfill Phase IX and X Expansion, Knox County, TN. Geologist responsible for construction management and monitoring for the expansion of the Poplar View landfill into the Phase IX and X area. Activities included layout of roads and access to the site, installation of sediment and erosion control features, grade staking of the site, estimating and scheduling the delivery of materials, selection of soils for use in the construction of the waste-fill berm, supervising a technician performing compaction testing, monitoring the installation of a leachate collection system, supervising the expansion of the existing sediment basin, and aided in the completion of the final report.

Construction & Demolition Landfill Services, Inc., Poplar View Landfill Phase VII & VIII Final Closure, Knox County, TN. Geologist responsible for construction management and monitoring for the Phase VII & VIII Final Closure. Activities included: planning daily activities and scheduling work for the contractor; performing compaction testing and supervising technicians; collecting *in-situ* permeability samples; construction grade staking; quality control of site actions; and completing final report.

Construction and Demolition Landfill Services, Ridgeview Landfill Final Closure, Knox County, TN. Geologist responsible for construction management for cap placement. Performed survey, density testing, permeability sampling, reporting and monitoring well sampling.

Waste Connections, Inc., Meadow Branch Landfill, Area 1 Phase 2, McMinn County, TN. As project geologist, performed construction management and monitoring for the construction of the Area 1 Phase 2 cell. Activities included compaction testing, construction grade staking and verification, and geosynthetic liner installation monitoring.

Waste Connections, Inc., Meadow Branch Landfill, Area 1 Phase 3, McMinn County, TN. Geologist responsible for construction monitoring of the geosynthetic liner installation for the Area 1 Phase 3 cell and final report preparation.

Waste Connections, Inc., Meadow Branch Landfill, Area F Cell 1, McMinn County, TN. Geologist responsible for providing construction monitoring of the construction of Area F Cell 1. Activities included compaction testing, construction grade staking and final report preparation.

Waste Connections, Inc., Volunteer Regional Landfill, Cell 7A, Scott County, TN. Geologist providing construction management and monitoring for the construction of Cell 7A. Activities included field compaction testing, construction grade staking, geosynthetic liner installation monitoring and final report preparation

Geotechnical Investigations:

Virginia Department of Transportation, Coalfields Expressway Preliminary Geotechnical Study, US 58 E02 & E12 Hillsville, VA. Geologist responsible for Geologic Maps, Publications and Department of Mines, Minerals and Energy. Responsible for developing and implementing boring and seismic exploration programs on two five-mile sections (EO2, E12) of proposed highway realignment and widening projects. Approximately 150 soil and rock borings and 100 seismic lines were performed. Logged approximately 100 borings and was responsible for the seismic surveys. Data helped determine the quantities of rock and soil to be removed during construction including slope stabilization and road foundation. Recorded the geology encountered during traverses and used data to supplement the borings.

Virginia Department of Transportation, Coalfields Expressway Preliminary Study, Wise, Dickinson and Buchanan Counties, VA. Geologist responsible for 120 two-man crew seismic surveys on five different proposed road alignments each measuring 60-miles. Data was used to determine the types and depths of materials that might be encountered during road construction. Also recorded the geology and any hazards created by mining activity along the proposed alignments. Used data collected from seismic surveys, field traverses and research to help create maps showing potential hazards along the proposed alignments.

Stone Quarry:

Proposed Stone Quarry, Stuart, VA. Geologist responsible for logging soil and rock borings for the proposed quarry. Responsible for performing seismic refraction surveys as well as analyzing the data collected for a proposed quarry in Stuart, Virginia.

Jellico Stone Quarry; Jellico, TN. As project geologist used geology maps to determine suitability of rock in the dam expansion area for quarrying. Prepared documents and maps for the renewal of the quarry's NPDES permit.

Slurry Impoundments, Ash Ponds and Freshwater Dams:

Massey Energy, Jake Gore and Elisa Fork Slurry Impoundments, Boone County, WV. Over a four -year period, as project geologist, supervised the installation of standpipe piezometers within the impoundment, logged soil and rock borings from the impoundment and surrounding area, performed seven day inspections and construction monitoring.

Massey Energy, Brushy Fork Slurry Impoundment, Boone County, WV. Over a four-year period, as project geologist, supervised and observed the installation of standpipe and pneumatic piezometers, logged performed seven-day inspections and construction monitoring.

Massey Energy, Chess Processing Refuse Disposal Area No. 1, Boone County, WV. Over a four -year period, as project geologist, supervised and observed the installation standpipe and pneumatic piezometers, logged soil and rock borings, logged rock borings cored into an adjacent underground mine to confirm pressure grouting results, monitored and observed spillway pipe abandonment and installation, and performed seven day inspections.

Massey Energy, Shumate Creek Slurry Impoundment, Raleigh County, WV. Geologist responsible for supervising and observing the installation of armor form lining for the emergency spillway and performed seven day inspections.

Massey Energy, Sprouse Creek Slurry Impoundment, Mingo County, WV. Over a four -year period, as project geologist, supervised and observed the installation of standpipe piezometers, logged soil borings from the impoundment, performed seven-day inspections and construction monitoring.

Rocksprings Development, Inc., Trace Branch Slurry Impoundment, Wayne County, WV. Geologist responsible for supervising and observing the installation of Standpipe piezometers, pneumatic piezometers and extensometers. Logged soil and rock borings.

Catenary Coal, Campbell's Creek Slurry Impoundment , Kanawha County, WV. Over a four -year period, as project geologist, supervised and observed the installation of extensometers, logged soil and rock borings from the site, construction monitoring and performed seven day inspections.

Catenary Coal, Moccasin Hollow Slurry Impoundment Sediment Ponds, Kanawha County, WV. Geologist responsible for developing and implementing a soil boring plan to determine the cause of water loss from sediment ponds below the Moccasin Hollow Slurry Impoundment and adjacent strip mining.

Catenary Coal, Moccasin Hollow Slurry Impoundment, Kanawha County,WV. Over a four-year period, as project geologist, performed construction monitoring tasks such as compaction testing, inspection of the core trench, installation of standpipe and Pneumatic piezometers and material selection for the various zones of the dam during the initial construction of the Moccasin Hollow Slurry Impoundment in 2001. Inspected an open channel emergency spillway for joints and weaknesses in the rock that could allow the spillway to wash out. Responsible for taking readings from settlement monuments and reporting the information to (MSHA) on a quarterly basis.

Massey Energy, Sidney Coal Slurry Impoundment, Sidney, KY. Over a four-year period, as project geologist, supervised and observed the installation of standpipe and pneumatic piezometers, logged soil and rock borings from the site, provided construction monitoring for spillway pipe installation and abandonment, and performed seven day inspections. Performed dye trace testing to see if water from the impoundment was seeping through the face of the dam.

Massey Energy, Sukey Branch Slurry Impoundment, Sidney, KY. Geologist responsible for construction monitoring tasks for the initial construction of the Sukey Branch Slurry Impoundment including compaction testing, soil and rock material selection, construction grade staking, underdrain installation, cofferdam construction, temporary spillway pipe installation, core trench excavation, French drain installation and bentonite grouting of fractures and joints within the core trench of the starter dam. Logged soil borings into the clay core of the dam and supervised the installation of an inclinometer into the upstream face of the dam.

Massey Energy, Long Fork Slurry Impoundment, Pike County, KY. Over a four -year period, as project geologist, logged soil and rock borings, installed standpipe and pneumatic piezometers and performed seven-day inspections. Logged several rock cores drilled into underground mine works beneath the impoundment.

Massey Energy, Millstone Slurry Impoundment, Pike County, KY. Geologist responsible for supervising and observing the installation of pneumatic piezometers and performing seven-day inspections.

Enterprise Coal, Oldhouse Slurry Impoundment, Roxanna, KY. Geologist responsible for supervising and observing the construction of a rock buttress at the toe of the Oldhouse Slurry Impoundment. Monitoring activities included sediment pond construction, undercut of unsuitable materials, underdrain extension and selection of materials for use in the buttress.

Massey Energy, New Ridge Slurry Impoundment, Pike County, KY. Geologist responsible for supervising, observing, and logging soil/rock borings into underground mine workings beneath the impoundment. Supervised and observed a crew that placed a down hole camera and data logger into the boring to determine the quality of the rock over the mine works.

TECO Coal, Burke's Branch Slurry Impoundment, Dorton, KY. Over a four-year period, as project geologist, took readings from an inclinometer into the downstream face of the impoundment. Responsible for reporting the data to MSHA.

CONSOL, Jones Fork Slurry Impoundment, Jones Fork, KY. Geologist responsible for supervising and observing soil/rock borings into underground mine works around the impoundment pool. Logged soil and rock samples to determine the extent of the mine works in relation to the impoundment pool. Observed down-hole seismic refraction surveys taken between the boreholes to further delineate the mine works.

CONSOL, Jones Fork Slurry Impoundment Perimeter Barrier Construction, Jones Fork, KY. Over a two-year period, as project geologist, provided construction management and monitoring for the construction of a clay perimeter barrier to prevent water from the impoundment pool entering auger workings and underground mine workings. Activities included compaction testing, construction grade staking using survey equipment, excavating material volumes, inspecting the backfilling of auger holes with stone, installation of two French drains, each approximately 3,000 feet long, and daily updating CONSOL Coal Company of construction activities.

Clinchfield Coal, Moss #1 Slurry Impoundment, Wise County, VA. Geologist responsible for supervising and observing the installation of an extensometer into rock above underground mine workings, logging the rock core taken from the boring and periodic extensometer readings.

Clinchfield Coal, Moss #3 Slurry Impoundment, Russell County, VA. Geologist responsible for providing construction monitoring services such as compaction testing and seven-day inspections.

Clinchfield Coal, McClure River Slurry Impoundment, Dickenson County, VA. Geologist responsible for supervising and installing standpipe piezometers and logged soil borings from the site.

Arch Coal, Mountain Slurry Impoundment, Lee County, VA. Over a three-year period, as project geologist, supervised the installation of six extensometers into the rock above underground mine workings around the impoundment. Logged the rock core from the borings for the extensometers and read the extensometers on a regular basis. Supervised the installation of standpipe piezometers into the face of the dam.

Guice Slawson, Slawson Lake Dam, Louisville, AL. Geologist responsible for logging soil borings for the proposed Slawson Lake Freshwater Dam, correlated soil stratigraphy between the borings, and pressure tested the in-situ soil material.

AEP, AEP Mitchell Plant Ash Disposal Facility, Moundsville, WV . Geologist responsible for logging soil and rock borings into underground mine workings beneath the ash disposal facility. Installed a deep (700 ft.) extensometer into rock above the mine works to monitor settlement beneath the facility.

ALCOA, ALCOA Aluminum Plant Ash Disposal Pond, Evansville, IN. Geologist responsible for monitoring the installation of an Elgin Drain on the slope of the ash disposal pond to collect seepage from the pond.

Groundwater Monitoring:

Construction & Demolition Landfill Services, Inc., Poplar View Landfill, Knox County, TN. Geologist responsible for performing statistical analysis (ANOVA) on groundwater data to determine increases of monitored constituents. Reviewed historical data from Poplar View Landfill and an adjacent landfill and submitted in a report to TDEC. Supervised the cleaning of the Poplar View Landfill's monitoring wells to remove material that had built up on the inner walls. Assumed the sampling duties in addition to the statistical analysis during the May 2008 sampling event. Reviewed data from May 2008 groundwater sampling event and submitted results of the analytical testing, a piezometric surface map and statistical analysis results to TDEC.

Tazewell County, VA, Tazewell, VA. Geologist responsible for sampling monitoring wells from the Tazewell County Landfill as part of their groundwater monitoring program.

LeAnn Taylor McNeal
Environmental Scientist/SSHO

Summary of Qualifications

Ms. McNeal is an environmental scientist with over thirteen years of experience providing technical and field support for multiple environmental and construction projects on U.S. Army and Air Force sites in the southeast region. She prepares, reviews, and analyzes documents, work plans, and site, safety and health plans; conducts environmental sampling of surface water, storm water, groundwater and soil; and assists in the installation of groundwater monitor wells, and various soil and groundwater remedial actions on cleanup sites. Ms. McNeal coordinates activities with subcontractors and vendors and regularly interfaces with the U.S. Army Corps of Engineers (USACE). She has been instrumental in the successful completion of underground storage tank (UST) projects at Fort Stewart and Hunter Army Airfield (HAAF), Georgia, and in support of an environmental impact statement (EIS) at Fort Stewart where she provided valuable coordination with business and public entities and the news media.

Since 2001, Ms. McNeal has supported site safety and health (SSHO) initiatives, regularly reviewing health and safety plans to ensure regulatory compliance, and is fully conversant with all aspects of health and safety codes and practices.

Education
- BS, Earth Science, Eastern Michigan University, 2000

Training
- OSHA 40-Hour HAZWOPER and 8-Hour Refreshers
- OSHA 40-Hour HAZWOPER for Site Workers
- OSHA 30-Hour Construction Safety and Health
- OSHA 8-Hour HAZWOPER Site Supervisor
- Environmental Compliance Officer
- Unexploded Ordnance Basic
- Georgia Utilities Protection Center Web Entry
- Georgia Soil and Water Conservation Commission, Level 1A Certification
- Environmental Restoration Liabilities
- Remedial Action Cost Engineering & Requirements
- Dept. of the Army Computer Users Security
- The Effective Facilitator
- Army Environmental Database-Restoration and Compliance-Related Cleanup Systems Training
- Underground and Aboveground Storage Tank Inspection
- First Aid/CPR/AED

Experience

SES group of companies, 2008–Present
Oak Ridge, Tennessee
Environmental Scientist/SSHO

2012–Present: Heating Oil Spill Site Investigation at Building 419, Fort Stewart, GA. SSHO and environmental scientist providing site support during a site delineation and extraction of free product from a heating oil spill site: performed groundwater monitoring; provided site oversight during monthly vacuum extraction events; and prepared Site Investigation report. Project also involves disposal of investigative-derived waste, and preparation of a CAP Part A.

2013–Present: Site Investigations of Aqueous Fire-Fighting Foam (AFFF) Usage at Various U.S. Air Force Bases. SSHO and environmental scientist assisting with field investigations at 10 installations to identify AFFF usage.

2013–Present: Remedial Action, Site A, at Former Turner AFB, GA. SSHO and environmental scientist performing field efforts and sampling activities during the installation of three new monitoring wells at the site of a former fuel distribution center.

2012–Present: UST Corrective Action Plan (CAP)–Part A and Part B at Victory Shoppette, Fort Stewart, GA. Acting as SSHO and environmental scientist, providing field assistance with well development, slug testing and semi-annual groundwater monitoring at USTs 208 and 209 near Building 939 on Fort Stewart.

2012–Present: Site Investigation at Small Arms Range Berm, Fort Stewart, GA. SSHO and environmental scientist, preparing a work plan and safety plan for a site investigation to delineate contaminants of concern.

2012–2013: Groundwater Investigation Services, Redstone Arsenal, AL. As environmental scientist and SSHO, performed well development, piezometer readings and waste sampling in support of groundwater investigation services being performed by Shaw E&I for the U.S. Army Environmental Command.

2012–2013: Corrective Action Plan (CAP) Part B and Free Product Extraction, Fort Gordon, GA. Provided SSHO guidance during the installation of soil borings and groundwater monitoring wells used to delineate free petroleum product and contamination in soil and groundwater at UST Site 15 during which one surfactant injection and free product extraction event was performed. Also assisted with the public notice process for the CAP B.

2012: Evaluation of Soil and Groundwater at Potential Construction Sites, Fort Stewart and HAAF, GA. Environmental scientist and SSHO on the rapid response evaluation, over a two-year period, of soil and groundwater at five proposed construction sites. Wrote work plan and health and safety plan; coordinated utility clearances and drilling activities and conducted groundwater sampling at wells that were installed on a site-by-site basis.

2011–2013: Building 7009 Sampling and Maintenance Support, HAAF, GA. Project manager providing environmental services including groundwater and air sampling in support of an SAIC contract on a multiphase remediation system at the airfield.

2011–2012: Direct Push Technology (DPT) Borings, Borehole Drilling, and Monitoring Well Installation, Redstone Arsenal, AL. Assisted with groundwater monitor well development and performed piezometer/soil boring sampling in support of Shaw Environmental's contract to install temporary wells, collect groundwater samples from temporary wells, install overburden, overburden/bedrock interface, and shallow bedrock wells at Redstone Arsenal.

2011–2012: Heating Oil Spill Site Investigation at Building 419, Fort Stewart, GA. Environmental scientist: installed soil borings, groundwater monitor wells, and performed soil and groundwater sampling to delineate contaminants of concern at the site; provided site oversight during monthly vacuum extraction events; and prepared Site Investigation report.

2011–2012: UST Corrective Action Plan–Part A at Victory Shoppette, Fort Stewart, GA. Environmental scientist: installed soil borings and groundwater monitor wells and performed soil and groundwater sampling to delineate contaminants of concern at an Army and Air Force Exchange site; and prepared Corrective Action Plan-Part A report.

2011: Fort Stewart 4th IBTC Land Use Controls. Supported the installation of land use controls in the form of 3,000 linear feet of chain link fencing. Coordinated with installation personnel and venders to obtain utility clearances, and provided support to field supervisors and crew.

2011: Interim Removal Action at USTs 208 and 209, Fort Stewart, GA. Environmental scientist and SSHO: performed groundwater sampling and free product recovery at USTs 208 and 209; installed soil borings and groundwater monitor wells; performed soil and groundwater sampling to delineate contaminants of concern at the site; performed health and safety compliance; and wrote project reports.

2011: EIS for Training Land Expansion Program, Fort Benning, GA. Provided support in public scoping meetings related to an environmental impact study.

2010–2011: Disposal of Contaminated Soil, Fort Bragg and Pope Air Force Base (AFB), NC. Field manager on the removal and disposal of 3,700 cubic yards of stockpiled petroleum-contaminated soil: responsible for collecting one soil sample for every 200 cubic yards removed and, following analysis results, for overseeing the final disposal at a local soil farm.

2010–2011: Excavation at Golf Pro Shop, Install Shredder and Upgrade Paint Booth, Fort Bragg, NC. Prepared the Accident Prevention Plan and the Site Safety and Health Plan for the removal and proper disposal of debris from the basement of a former building that was covered with a parking lot, demolition of an incinerator, and installation of a bulk paper shredder and a paint spray booth.

2010: Oil-Water Separator (OWS) Closures, Robins AFB, GA. Environmental scientist and SSHO at three OWS closures: performed closure sampling, and prepared the work plan, health and safety report and closure report.

2009–2011: Site Investigation at Small Arms Range, Fort Stewart, GA. Environmental scientist and SSHO: performed soil and water sampling on delineation of contaminants of concern at a former small arms firing range, and supported the project's safety and health initiatives.

2009–2011: RCRA Facility Investigation (RFI) at Former Skeet Range, Fort Gordon, GA. Prepared RFI report for a soil delineation project at solid waste management unit (SWMU) 046 in Fort Gordon.

2009–2010: Curb Washrack Implementation and Hazardous Waste Satellite Covers, Fort Stewart, GA. Provided project support during installation of concrete curbing to divert storm water away from washracks and to provide secondary containment at tanker parking areas, and installation of hazardous waste satellite covers. Coordinated with installation personnel and venders to obtain utility clearances and provided support to field supervisors and crew.

2009: Diamond Head Avenue Low Impact Development (LID), Fort Stewart, GA. Environmental specialist responsible for storm water sampling activities during rain events and for measuring turbidity.

2009: UST Removals, Building 1330, Fort Stewart, GA. Environmental scientist and SSHO at the removal site of two unregistered USTs: performed soil sampling; health and safety oversight and compliance; and prepared project reports.

2008–2010: Training Range and Garrison Support Facilities Construction and Operation EIS, Fort Stewart, GA. Responsible for coordination of public scoping meetings and media announcements related to an environmental impact study at Fort Stewart.

2008–2010: Renovation of Fuel Purging Facility, Ft. Stewart, GA. Environmental scientist and SSHO at an environmental upgrade of the fuel purging facility: coordinated with installation personnel and obtained utility clearances; performed closure sampling and closure reports for two OWS; and performed safety and health oversight and compliance duties.

2008–2009: Remedial Action Pilot Study, Camp Blanding, FL. Environmental scientist and SSHO at a pilot study investigating two remedial methods and the delineation of a trichloroethylene plume. Performed groundwater sampling and provided health and safety oversight and compliance.

2008–2009: USTs 208, 209, 210 and Well Installation at SWMU 13, Fort Stewart, GA. Environmental scientist and SSHO: performed groundwater sampling at USTs 208, 209 and 210; monitored well installation; performed free product recovery at USTs 208 and 209; provided health and safety oversight and compliance; and prepared project reports.

2008–2009: LID Projects, Fort Stewart, GA. Coordinated with installation personnel and obtained utility clearances for two LID projects. Provided support to field supervisors and crew and wrote project reports.

2008: UST Closure and Aboveground Storage Tank (AST) Replacement, Robins AFB, GA. Performed closure sampling at a UST closure and monitored the installation of a replacement 2,000 gallon AST. Prepared work plan, health and safety report and closure report.

Engineering and Environment, Inc., 2004–2007
Virginia Beach, Virginia
Facilitator/Technical Coordinator for U.S. Army Environmental Command (USAEC)

- Coordinated with Army installations and USAEC prior to the environmental cleanup workshop. Generated agendas, timelines, facilitated meetings, and after-action reports that were used to track the entire progress of the Installation Action Plan (IAP) document;
- Prepared cost estimates for Army installations and National Guard Bureau environmental cleanup sites;
- Reviewed relevant site documentation and prepared cost estimates for site investigations, feasibility studies, remedial designs, remedial actions, and long term management projects. Assisted installations with uploading cost estimates and backup documentation into the Department of the Army's databases of record (AEDB-R and AEDB-CC);
- Created draft IAP documents prior to the workshop, updated/finalized IAP documents following the workshop. Gathered and compiled IAP document comments from the installations, accessed AEDB-R and AEDB-CC for data input, reviewed and finalized IAP documents.

Engineering and Environment, Inc., 2001–2004
Virginia Beach, Virginia
Installation Restoration Program Manager at Fort Stewart and HAAF, Georgia

- Contractor to Fort Stewart and HAAF Directorate of Public Works, Environmental and Natural Resources Division;
- Provided technical expertise and program management to the USAEC on various aspects of the Installation Restoration Program (IRP), Compliance Related Cleanup Program, and the Military Munitions Rule Program (MMRP) at Fort Stewart and HAAF, Georgia;
- Assisted with the implementation of a Performance Based Contract at HAAF: reviewed work plans and schedules, analyzed short and long term implications, assisted with the development of selection criteria;
- Oversaw the cleanup of numerous environmental restoration sites, resulting in the modification of the Installation's Hazardous Waste Permit for approval of 28 sites for No Further Action and another six sites for Institutional Controls;
- Prepared, reviewed, and analyzed documents, plans, scopes of work (SOWs), databases, and tracked the financial status and progress of the environmental programs at the two installations;

- Prepared and submitted reports regarding site investigations and cleanup activities to environmental regulatory agencies. Prepared correspondence and met with representatives of federal and state environmental regulatory agencies, Department of the Army personnel, and contractors;
- Prepared and submitted project funding requests, SOWs, work plans, and updated Army databases for site investigations, remedial actions, and long-term management projects;
- Reviewed reports and work plans generated by contractors, prepared and submitted written comments;
- Served as SSHO: reviewed health and safety plans, ensuring compliance with all regulations; provided safety and health oversight for subcontractor activities including inspections, incident investigation and reporting, implementation of corrective actions, and program communications.

Hull and Associates, Inc., 2000–2001
Toledo, Ohio
Scientist I

- Provided technical support for various environmental engineering projects ranging from groundwater sampling of petroleum release sites to quality control and safety inspections during the construction of state regulated landfills;
- Prepared correspondence to, and met with, state regulators and local citizens;
- Collected soil and groundwater samples for laboratory analysis, and worked with various groundwater remediation units on cleanup sites.

LeAnn McNeal
Environmental Scientist/ SSHO

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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

Requirement	Limited Applicability (Specific to Collection Method/Use)	Performance Standard	Frequency	Consequence of Failure
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

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

Approval on file

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 SOXOS'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

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

Approval on file

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.

Date	Time	**Event**
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 THREE-DAY ON-SITE TRAINING LOG

Location:	
Contract No.:	Task Order No.:
Site/Sr. UXO Supervisor:	SSHO:

The following site personnel have received the three-day supervised on-site training, as required by 29 CFR 1910.120. This training has included: a description of the site chain-of-command; site hazard information; use/care/maintenance of PPE; personnel and equipment decon procedures; safe work practices; medical/training requirements; and emergency response and evacuation procedures.

THREE-DAY TRAINING COURSE ATTENDANTS

NAME (printed)	SIGNATURE	ORGANIZATION	DATE

Page No.: ______

Figure 2a

EODT DOCUMENTATION OF TRAINING LOG
OE OPERATIONS

Date:	Instructor(s):	Time:	No.:
Location:	Contract Number:		Task Order:

Training Provided: G Initial Site Hazard Training G Weekly Safety Training G Other: ______________________________
G Tailgate Safety Briefing G Task/Hazard Specific Training ______________________________

I. TRAINING TOPICS COVERED

Work Plan and /SSHP: ____
____

UXO/OE Hazards: ____
____

Chemical Hazards: ____
____

Physical Hazards: ____
____

Emergency Procedures: ____
____

Other: ____
____

II. TRAINING COURSE ATTENDANTS

NAME (printed)	SIGNATURE	ORGANIZATION

Figure 2b & Figure 3a

page 1 of 2

EODT DOCUMENTATION OF TRAINING LOG
OE OPERATIONS

II. TRAINING COURSE ATTENDANTS (continued)

NAME (printed)	SIGNATURE	ORGANIZATION

III. VERIFICATION

I certify that the personnel listed on this roster received the safety training described above. Site personnel not attending this training will be briefed before beginning their assigned duties.

______________________________________ ______________________________________
Site Safety and Health Officer   Sr. UXO Supervisor / Project Manager

Figure 2c & Figure 3b

page 2 of 2

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	[ ]	[ ]			
3. TIRES:			**4. BELTS:**		
Pressure	[ ]	[ ]	Proper tension	[ ]	[ ]
Condition	[ ]	[ ]	Condition	[ ]	[ ]
5. EQUIPMENT:			**6. LIGHTS:**		
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*	[ ]	[ ]			
7. FLUID LEVELS:			**8. GENERAL:**		
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

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

Approval on file

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 know 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 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 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

SITE INFORMATION	
Site Name:	
Location:	Instructor(s):
Date of Classroom Instruction:	Date of Demonstration:

PPE TRAINING COURSE ATTENDANTS

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

TYPES AND LEVELS OF PPE ADDRESSED DURING TRAINING

Trainer's Initials	Personal Protective Equipment Reviewed	Trainer's Initials	Personal Protective Equipment Reviewed

CERTIFICATION

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
Dioctyl 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
Ketoners	G	E	P	E
L. Lacquer thinners	G	F	P	F
Lactic acid	E	E	E	E
Lautric 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

	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	P	P	P	P
	fuming	F	P	F	F
	*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	G	F	F	F
removers	E	E	E	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 distiliates				
(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	E	F	E	F
	Vanadium fume and dust	E	E	E	E
	Varsol	G	F	G	F
	Vegetable oils	E	G	E	G
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 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 the 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

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
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Attachments

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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

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

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

Plan Concurrence:	Doug Hawn, Project Manager SpecPro Environmental Services LLC	2-24-14 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.

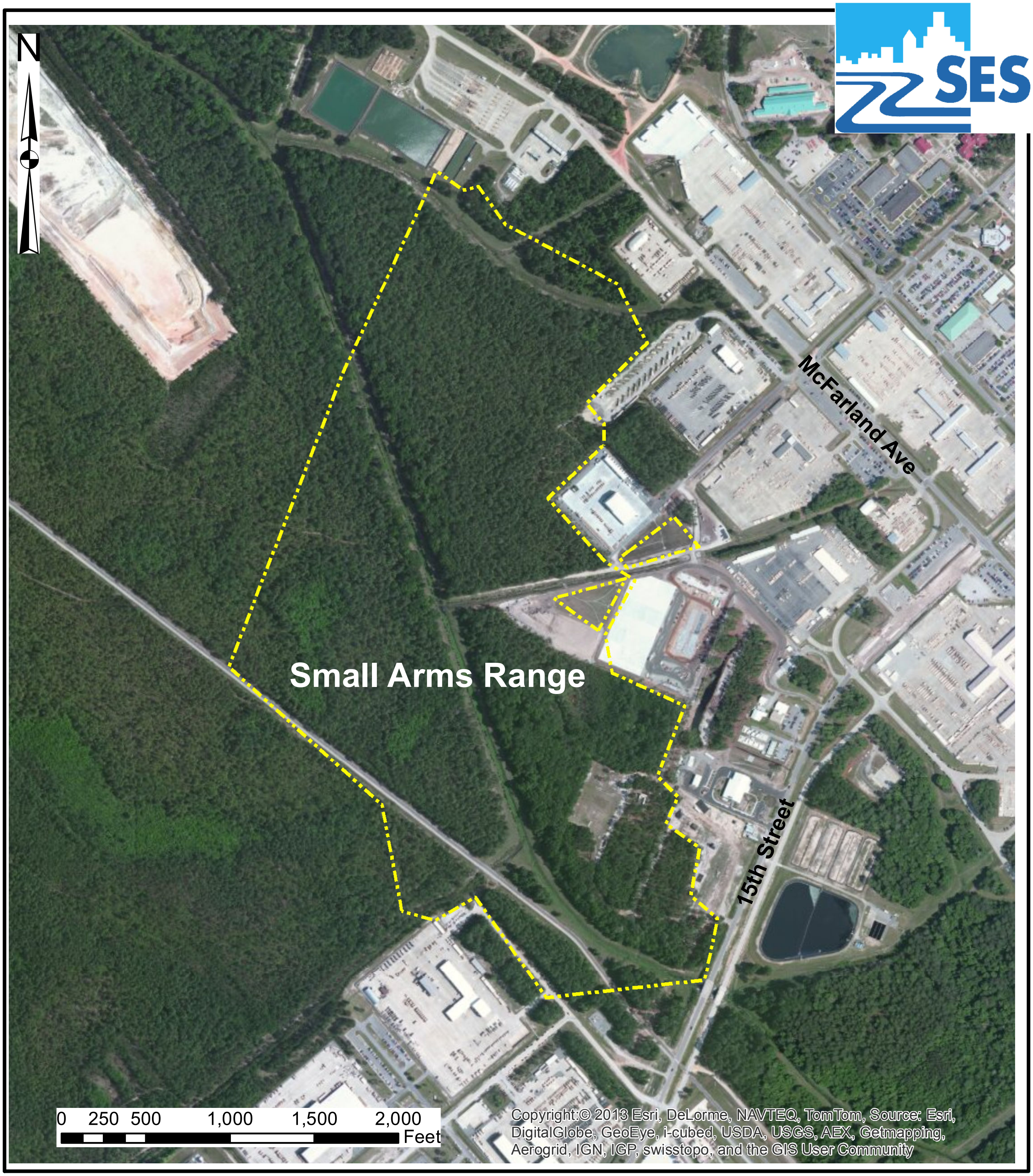
2. BACKGROUND INFORMATION

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 15th 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.



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Legend

Site Investigation Boundary

Job Title: Site Investigation
at the Small Arms Range Berm Area
Fort Stewart, Georgia

Figure 2-1 Site Location Map

E0209.0025

10/22/13

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

Position	Name	Telephone
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 CSP = Certified Safety Professional
SSHO = Site Safety and Health Officer

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.

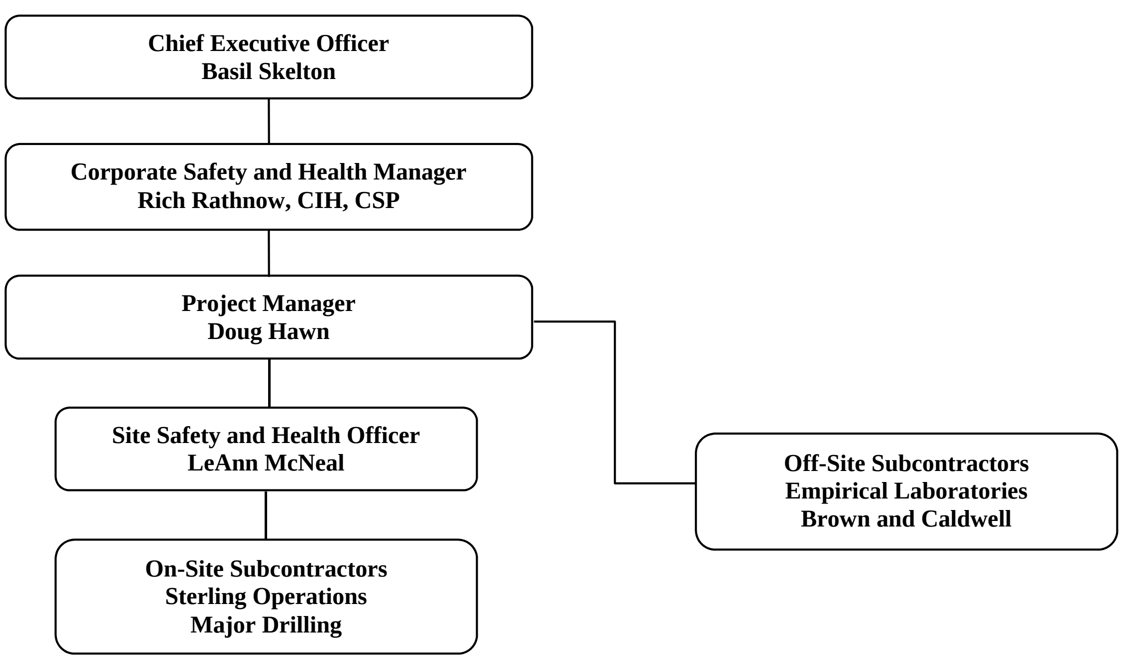

Figure 4-1 Project Safety Program Line of Authority

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

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

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

Training	Worker[a]	Worker[b]	SSHO	Site Visitor[c]
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[d]	Y[d]	N

Note: For the purposes of this table, the SSHO is considered a site worker.
[a]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.
[b]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.
[c]Vendors and similar personnel
[d] Sterling workers and SUXO

CPR = cardiopulmonary resuscitation
OSHA = Occupational Safety and Health Administration
SSHO = site safety and health officer
HAZWOPER = hazardous waste operations and emergency response
PPE = personal protective equipment

Table 6-2 Training Requirements by Role and Project Activity

Project Activity or Role	Training/Certification/Qualifications
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
SUXOT = senior unexploded ordnance technician
UXOQCS = unexploded ordinance quality control specialist
UXOSO = UXO safety officer
UXOT1 = unexploded ordnance technician I
UXOT2 = unexploded ordnance technician II
UXOT3 = unexploded ordnance technician III

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.

<u>Competent Person/SSHO Construction Safety Training</u>

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.

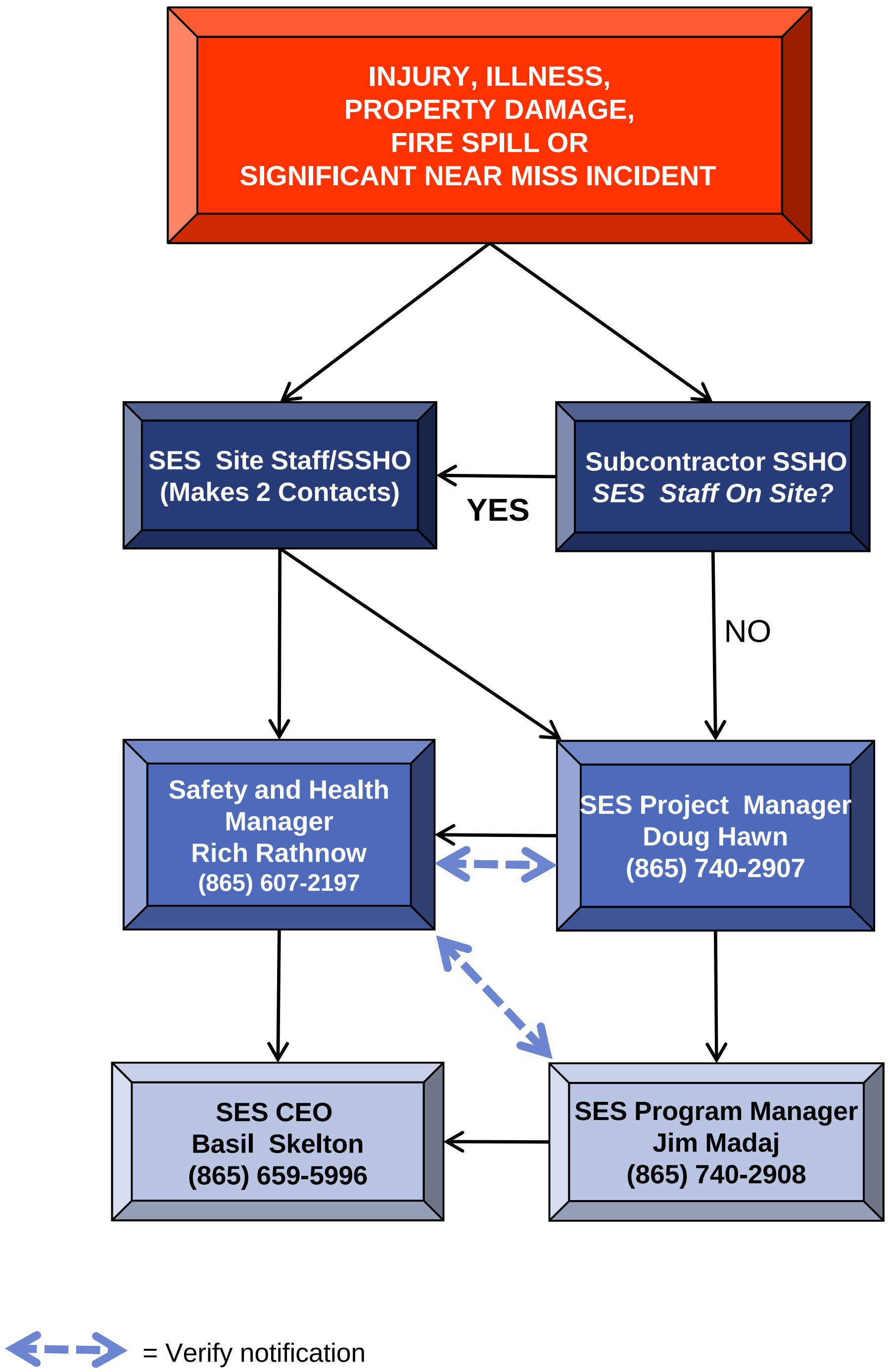

Figure 8-1 SES Incident Reporting Process

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.

<u>Escape Procedures and Routes</u>

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.

<u>Critical Plant Operations</u>

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.

<u>Accounting for Employees following Evacuation</u>

- 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.***

Legend

- Site Investigation Boundary
- Evacuation Route
- Emergency Assembly Area
- Hazard Communication Inventory Storage Area

Job Title: Site Investigation
at the Small Arms Range Berm Area
Fort Stewart, Georgia

Figure 9-1 Evacuation Route, Assembly Area, and Hazard Communication Inventory Location

R:\Projects\E0209\E0209.0025\Fig 9-1 small arms range Evac Route.mxd (10/22/2013)

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

Name	Telephone
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

Name	Telephone
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 SSHO 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 N RR, 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

Instrument	Tasks	Action Levels[a]	Protection	Frequency [b]	Calibration
Dust Monitor: Dataram or equivalent	During any work in potentially contaminated soils	< 1.0 mg/m^3	Continue operations and use wet dust suppression methods.	Continuous during work in contaminated soils	Zero Daily
		≥ 1.0 mg/m^3	Shut down and implement wetting/dust suppression methods until total airborne dust levels decrease and are maintained below 1.0 mg/m^3. If dust suppression does not succeed in maintaining dust levels to below 1.0 mg/m^3, stop work and contact Rich Rathnow, SES safety and health manager.		
Noise-Level Monitor[c]:	As necessary per the SSHO and Section 9.g.1	<85 dB(A)	No action required	Initially and periodically during task	Daily
		85-105 dB(A)	Hearing protection required (NRR 32) Stop and reevaluate periodically		
		>105 dB(A)	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)		

[a] Action levels apply to sustained breathing-zone measurements above background.
[b] The exact frequency of monitoring depends on field conditions and is to be determined by the 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.).
[c] Noise monitoring and audiometric testing also required.
< = less than
> = greater than
db(A) = A-weighted decibels
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 Load*		
Work/Rest Regimen	**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)

*Values are in °C and °F, WBGT.

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.

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

*Clo: Insulation value of clothing. One clo = 5.55 kcal/m^2/hr of heat exchange by radiation and convection for each degree °C difference in temperature between the skin and the adjusted dry bulb temperature.

% = percent
ºF = degrees Fahrenheit
WBGT = Wet Bulb Globe Temperature
ºC = 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 SSHO 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)

Wind Speed (mph)	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	25	-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
High **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
Low **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
Sedentary **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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EMPLOYEE SIGNOFF FORM
Accident Prevention Plan

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

Project Name: Site Investigation at Small Arms Range Berm Area **Project Number:** E0209.0025
Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia

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

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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 al 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

Project Name: ______________________________

Job Start Date: ______________ *Project Location:* ______________

Additional Space for Project Specific Hazard Awareness (if necessary):

I Understand the above Project Safety Orientation:

Name (Printed): Signature:

Orientation Conducted By:

Name Printed Signature Date

(For Safety Staff only)	REPORT NO.	EROC CODE	**UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT** *(For Use of this Form See Help Menu and USACE Suppl to AR 385-40)*	**REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)**

1. ACCIDENT CLASSIFICATION

PERSONNEL CLASSIFICATION	INJURY/ILLNESS/FATAL	PROPERTY DAMAGE	MOTOR VEHICLE INVOLVED	DIVING
GOVERNMENT ☐ CIVILIAN ☐ MILITARY	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ CONTRACTOR	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ PUBLIC	☐ FATAL ☐ OTHER		☐	

2. PERSONAL DATA

a. Name *(Last, First, MI)*	b. AGE	c. SEX ☐ MALE ☐ FEMALE	d. SOCIAL SECURITY NUMBER	e. GRADE

f. JOB SERIES/TITLE

g. DUTY STATUS AT TIME OF ACCIDENT: ☐ ON DUTY ☐ TDY ☐ OFF DUTY

h. EMPLOYMENT STATUS AT TIME OF ACCIDENT: ☐ ARMY ACTIVE ☐ ARMY RESERVE ☐ VOLUNTEER ☐ PERMANENT ☐ FOREIGN NATIONAL ☐ SEASONAL ☐ TEMPORARY ☐ STUDENT ☐ OTHER *(Specify)* ______

3. GENERAL INFORMATION

a. DATE OF ACCIDENT *(month/day/year)*

b. TIME OF ACCIDENT *(Military time)* hrs

c. EXACT LOCATION OF ACCIDENT

d. CONTRACTOR'S NAME
(1) PRIME:
(2) SUBCONTRACTOR:

e. CONTRACT NUMBER ______
☐ CIVIL WORKS ☐ MILITARY ☐ OTHER *(Specify)* ______

f. TYPE OF CONTRACT: ☐ CONSTRUCTION ☐ SERVICE ☐ A/E ☐ DREDGE ☐ OTHER *(Specify)* ______

g. HAZARDOUS/TOXIC WASTE ACTIVITY: ☐ SUPERFUND ☐ DERP ☐ IRP ☐ OTHER *(Specify)* ______

4. CONSTRUCTION ACTIVITIES ONLY *(Fill in line and corresponding code number in box from list - see help menu)*

a. CONSTRUCTION ACTIVITY ______ (CODE) #

b. TYPE OF CONSTRUCTION EQUIPMENT ______ (CODE) #

5. INJURY/ILLNESS INFORMATION *(Include name on line and corresponding code number in box for items e, f & g - see help menu)*

a. SEVERITY OF ILLNESS/INJURY ______ (CODE) #

B. ESTIMATED DAYS LOST

C. ESTIMATED DAYS HOSPITALIZED

D. ESTIMATED DAYS RESTRICTED DUTY

e. BODY PART AFFECTED
PRIMARY ______ (CODE) #
SECONDARY ______ (CODE) #

f. NATURE OF ILLNESS / INJURY ______ (CODE) #

g. TYPE AND SOURCE OF INJURY/ILLNESS
TYPE ______ (CODE) #
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 *(Specify)* ______

b. TYPE OF COLLISION: ☐ SIDE SWIPE ☐ HEAD ON ☐ REAR END ☐ BROADSIDE ☐ ROLL OVER ☐ BACKING ☐ OTHER *(Specify)* ______

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 VESSEI/FLOATING PLANT ______ (CODE) #

b. TYPE OF COLLISION/MISHAP ______ (CODE) #

10. ACCIDENT DESCRIPTION *(Use additional paper, if necessary)*

See attached page.

11. CAUSAL FACTOR(S) *(Read Instruction Before Completing)*

a. (Explain YES answers in item 13)

	YES	NO
DESIGN: Was design of facility, workplace or equipment a factor?	☐	☐
INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor?	☐	☐
PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor?	☐	☐
OPERATING PROCEDURES: Were operating procedures a factor?	☐	☐
JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred?	☐	☐
HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident?	☐	☐
ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident?	☐	☐

a. *(CONTINUED)*

	YES	NO
CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident?	☐	☐
OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident?	☐	☐
SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task?	☐	☐
PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident?	☐	☐
DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident	☐	☐

b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?

☐ YES *(If yes, attach a copy.)* ☐ NO

12. TRAINING

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?	b. TYPE OF TRAINING.	c. DATE OF MOST RECENT FORMAL TRAINING.
☐ YES ☐ NO	☐ CLASSROOM ☐ ON JOB	(Month) (Day) (Year)

13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES *(See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)*

a. DIRECT CAUSE

See attached page.

b. INDIRECT CAUSE(S)

See attached page.

14. ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).

DESCRIBE FULLY:

See attached page.

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 *(1st)*

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

17. MANAGEMENT REVIEW *(2nd - Chief Operations, Construction, Engineering, etc.)*

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW

a. ☐ CONCUR b. ☐ NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS

SIGNATURE	TITLE	DATE

19. COMMAND APPROVAL

COMMENTS

COMMANDER SIGNATURE	DATE

*U.S. GOVERNMENT PRINTING OFFICE: 1993-0-791-757

10. **ACCIDENT DESCRIPTION** *(Continuation)*

13a. **DIRECT CAUSE** *(Continuation)*

13b.	INDIRECT CAUSES *(Continuation)*

14.	ACTION(S) TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE(S) *(Continuation)*

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:

III. The Incident

☐ Near Miss ☐ First Aid ☐ Doctor/Hospital Visit ☐ Property Damage ☐ 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)

☐ Struck By ☐ Struck Against ☐ Caught Between ☐ Same Level Fall ☐ Different Level Fall
☐ Chemical Exposure ☐ Strain/Over Exertion ☐ Other (Explain)_________________

16. Frequency Potential	17. Severity Potential
Select the potential for the incident to occur ☐ Frequent ☐ Occasional ☐ Rare	Select the potential severity of an injury ☐ Major ☐ Serious ☐ Minor
18. Names of Witnesses to the Incident:	19. Property Damage Did equipment or other property damage result from the incident? ☐ Yes ☐ No

IV. The Causes

20. Direct Personal Causes

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"

____

____

22. Direct Environmental Causes

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".

____

____

21. Indirect Personal Causes (check all that apply)

Check items below that best indicate reasons why act identified in above was committed. Write in information for indirect causes not listed.

1. ☐ Unaware of job hazards
2. ☐ Inattentive of hazards
3. ☐ Unaware of safe method
4. ☐ Low level of job skill
5. ☐ Tried to gain or save time
6. ☐ Tried to avoid extra effort
7. ☐ Acted to avoid discomfort
8. ☐ Influence of emotions
9. ☐ Influence of fatigue
10. ☐ Influene of illness
11. ☐ Influence of intoxicants
12. ☐ Defective hearing/vision
13. ☐ Unable to determine
14. ☐ Other (explain)

______________________ ________________________

23. Indirect Environmental Causes (check all that apply)

Check items below that best indicate reasons why condition identified in above existed. Write in information for indirect causes not listed.

1. ☐ Worn out from normal use
2. ☐ Abuse or misuse by others
3. ☐ Required inspection not done
4. ☐ Inspection not required
5. ☐ Clean-up failure
6. ☐ Clean-up not required
7. ☐ Clean-up not done
8. ☐ Inadequate ventilation
9. ☐ Congestion – lack of space
10. ☐ Unsafe design
11. ☐ Inadequate illumination
12. ☐ Fault Construction
13. ☐ Lubrication failure
14. ☐ Exposure to corrosion
15. ☐ Exposure to vibration
16. ☐ Exposure to temp. extreme
17. ☐ Tampering
18. ☐ Supervisor failed to correct
19. ☐ Unable to determine
20. ☐ Other (explain)

______________________ ________________________

24. Primary Unsafe Act (check one)

MAIN CAUSE

1. ☐ Operating or using equipment without authority
2. ☐ Failure to secure against unexpected movement
3. ☐ Operating or working at an unsafe speed
4. ☐ Failure to warn or signal as required
5. ☐ Removing or making safety devices inoperative
6. ☐ Using defective tools or equipment
7. ☐ Taking an unsafe position or posture
8. ☐ Servicing moving, energized or otherwise hazardous equip.
9. ☐ Riding hazardous moving equipment
10. ☐ Horseplay, distracting, startling, teasing, etc.
11. ☐ Failure to wear personal protective equipment
12. ☐ Failure to evaluate/consider/plan for work surroundings
13. ☐ Other than above
14. ☐ None

25. Primary Unsafe Condition (check one)

ENVIRONMENTAL CAUSE

1. ☐ Lack of or inadequate guards and safety devices
2. ☐ Lack of or inadequate warning system
3. ☐ Fire and explosion hazards
4. ☐ Unexpected movement hazards
5. ☐ Poor housekeeping hazards
6. ☐ Protruding objects hazard
7. ☐ Close clearance and congestion hazards
8. ☐ Hazardous atmospheric conditions
9. ☐ Hazardous arrangement, placement, or storage
10. ☐ Hazardous defects of tools, equipment, etc.
11. ☐ Inadequate illumination; intense noise
12. ☐ Hazardous personal attire
13. ☐ Other than above
14. ☐ None

26. Does the investigation require additional technical support? ☐ Yes ☐ No

V. The Correction

27. Corrective Action Taken (check all that apply)

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. ☐ Reinstruction of those involved
2. ☐ Discipline of those involved
3. ☐ Job reassignment
4. ☐ Equipment repair or replace
5. ☐ Action to improve inspection
6. ☐ Order job safety analysis done
7. ☐ Improve housekeeping
8. ☐ Improve personal protection
9. ☐ Improve design
10. ☐ Install guard or device
11. ☐ Correct congestion
12. ☐ Order pre-job instructions
13. ☐ Check with manufacturer
14. ☐ Inform other supervision
15. ☐ Other than above

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:

SES First Aid Injury Log

Record all minor first aid injuries where first aid treatment is rendered.
(Medical attention is not required)

Date	Time	Name	Task Description	Injury/Treatment

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

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DAILY SAFETY MEETING/ PRE-TASK SAFETY PLAN (PTSP)

DAILY PRE-TASK SAFETY PLAN (PTSP)

Project:____________________________ Location: _____________________________ Date:__________

Site Safety & Health Officer: ______________ Job Activity: _____________________ Site #:_________

Task Personnel:
____
____
____

List Tasks:
____
____

Tools/Equipment/Materials required (ladders, scaffolds, fall protection, cranes/rigging, heavy equipment, power tools, cords, generators, compressed gases, regulated chemical products, etc.):
____
____
____

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

__ Chemical burns/contact Dermal protection (hands), eye protection. See SSHP/AHAs for PPE requirements per task.	__ Trench, excavations, cave-ins	__Ergonomics
__ Pressurized lines/equipment	_ Overexertion Work/break regiment as dictated by task. Maintain fluid intake for hydration	__ Chemical splash Use PPE in accordance with SSHP/AHAs. Protect hands from splash during decon. activities.
__Thermal burns Watch for warm engine/muffler components on generators.	__ Pinch points	__ Poisonous plants/insects 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).
_ Electrical GCFIs for generators, Inspect. & protect extension Chords, Chords rated for use & have 3rd wire grounding	_Cuts/abrasions 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)	_ Eye hazards/flying projectile Use eye protection at all times. Ensure head protection is used in areas where heavy brush, trees, thorns, vines exist when accessing well heads.
__ Weather conditions Foul and cold weather clothing as dictated by expected conditions	_ Spills Use funnels & nozzles during fueling of generators.	__ Inhalation hazard
__Heights/fall> 6'	__ Overhead Electrical hazards	_ **Heat**/cold stress 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.
__Noise Use hear protection in loud work environments	__ Elevated loads	__ Water/drowning hazard
__Explosion/fire Metal safety cans for fuel storage, No open flame, sparks ignition in hazardous/flammable/ combustible storage areas. Let engine surfaces cool before fueling.	__ Slips, trip and falls 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.	__ Heavy equipment
__ Radiation Solar. UV protection on skin and UV eye protection. ANSI rated safety eye protection only.	__Manual lifting >50 lbs or awkward loads, get assistance. If employee not capable of lifting 40 lbs. seek assistance.	__ Aerial lifts/platforms
__ Confined space entry	__Welding/cutting	__ Demolition

Continue on page 3 of 3 (if necessary)

Hazard Control Measures (Check all that apply):

PPE	Protective Systems	Fire Protection	Electrical
__ Head protection	__ Locate buried utilities	__ Fire extinguishers	__ Lockout/tagout
__ Face protection	__ Competent person	__ Fire watch	__ Grounded
__ Hard toe work boots	__ Daily inspections	__ Non-spark tools	__ Panels covered
__ Thermal/lined	__ Sloping	__ Grounding/bonding	__ GFCI/extension cords
__ Eye	__ Shoring	__ Intrinsically safe equipment	__ Power tools/cord inspected
__ Dermal/hand	__ Trench box	__Combustible materials storage	__Insulated tools/gloves
__ Hearing	__ Barricades	__Chemical Storage	
__ Respiratory			
__ Reflective vests			
Fall Protection	**Air Monitoring**	**Proper Equipment**	**Welding & Cutting**
__ Harness/lanyards	__ PID/FID	__ Aerial lift/ladders/scaffolds	__ Cylinders secured/capped
__ Adequate anchorage	__ Detector tubes	__ Forklift/ Heavy equipment	__ Cylinders separated/upright
__ Guardrail system	__ Radiation	__ Backup alarms	__ Flash-back arrestors
__ Covered opening	__ Personnel sampling	__ Hand/power tools	__ No cylinders in CSE
__ Fixed barricades	__ LEL/O2	__ Crane w/current inspection	__ Flame retardant clothing
__ Warning system	__ Other	__ Proper rigging	__ Appropriate goggles
		__ Operator qualified	
Confined Space Entry	**Medical/Emerg. Response**	**Heat/Cold Stress**	**Vehicle/Traffic**
__ Isolation	__ First-aid & BBP kit	__ Work/rest regime	__ Traffic Awareness
__ Air monitoring	__ Eye wash	__ Rest area	__Traffic control
__ Trained personnel	__ FA-CPR training	__ Liquids available	__ Barricades
__ Permit completed	__ Route to hospital	__ Monitoring	__ Flags
__ Rescue provisions		__ Training	__ Signs
Permits	**Demolition**	**Inspections**	**Training**
__ Hot work	__ Pre-demolition survey	__ Ladders/aerial lifts	__ Hazwaste
__ Confined space	__ Structure condition	__ Lanyards/harness	__ Construction
__ Lockout/tagout	__ Isolate area/utilities	__ Scaffolds	__Equipment
__ Excavation	__ Competent person	__ Heavy equipment	__ Competent person
__ Demolition	__ Hazmat present	__Cranes and rigging	__ Task-specific (AHA)
__ Energized work		__Other per Field Safety Plan	__ Hazcom
__Local/Environmental			

FieldNotes:____
____
____
____

Additional Space for Project Specific Hazard Awareness (if necessary):

Attendees:

Name (Printed): Signature:

Meeting Conducted By:

Name Printed Signature

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Weekly Job Site Inspection Checklist

Project Name: ________________________ **Inspection Date**: ______________

Project Supervisor: ________________________

	DESCRIPTION	YES	NO	N/A	If NO Why?
1.0	**Project Administration: 1926, Subpart C**				
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?				
2.0	**General/Trailers/Site Control/Housekeeping**				
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.?				
3.0	**Medical Services and First Aid**				
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?				
4.0	**Sanitation, 1926, Subpart D**				
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?				
5.0	**Hazard Communication**				
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?
6.0	**Personal Protective Equipment: 1926, Subpart E**				
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?				
7.0	**Fire Protection and Prevention: 1926, Subpart F**				
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?				
8.0	**Material Handling and Storage: 1926, Subpart H**				
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 (includind lull) operators trained and licensed?				
9.0	**Tools – Hand and Power: 1926, Subpart I**				
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?				
10.0	**Electrical: 1926, Subpart K**				
10.1	Electrical work performed by qualified persons?				
10.2	Energized work permit in place prior to start of work?				
10.3	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?				
10.7	Flexible cords inspected daily and protected from damage by equipment, materials, or structures?				
10.8	**Scaffolds 1926 Subpart L**				
10.9	Designated scaffold competent person oversees erection, dismantling and moving of scaffold?				
10.10	Scaffolds erected level on base plates and mud sills on a firm foundation?				
10.11	Cross bracing, top rails, mid-rails, toe boards in place?				
10.12	Planks overlap 6”-12” over end with toe boards?				
10.13	Scaffolds > 4 times the height vs. width secured in place or outriggers used?				
10.14	Area beneath scaffold barricaded with “construction area do not enter” signs in place.				
10.15	Safe access provided to each level?				
10.16	Casters on rolling scaffolds locked while in use?				
11.0	**Fall Protection and Roofing 1926 Subpart M**				
11.1	Have all workers above the six foot fall protection threshold been protected from falling to a lower level?				
11.2	Effective rescue plan is in place that uses a buddy system?				
11.3	Employees trained to specific fall protection system in use by competent person?				
11.4	Designated competent person on site?				
11.5	Has a daily inspection been completed by the competent person for roofing work?				
11.6	Kettles a minimum of 25 feet from buildings, tanks etc.				
11.7	Kettle attendant wearing assigned personal protective equipment?				
11.8	Two fire extinguishers located at the kettle?				
11.9	Fuel cylinders at least 10 ft. from open flame?				
11.10	If warning lines used for low slope roofs are they properly installed and maintained?				
12.0	**Excavations 1926 Subpart P**				
12.1	Designated competent person able to demonstrate training, experience, and knowledge of soil analysis and protective systems and authority to stop work.				
12.2	Daily inspection by competent person performed?				
12.3	Ladder provided every 25 feet when trench is over 4 feet deep and 2 means of egress?				
12.4	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?				
13.0	**Stairways and Ladders 1926 Subpart X**				
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?				
14.0	**Others**				
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

PERSONNEL SAFE WORK PRACTICES

	Yes	No	N/A	N/O
1. Only authorized personnel operating drill rig	☐	☐	☐	☐
2. Personnel cleared during rig startup	☐	☐	☐	☐
3. Personnel clear of rotating parts	☐	☐	☐	☐
4. Personnel not positioned under hoisted loads	☐	☐	☐	☐
5. Loose clothing and jewelry removed	☐	☐	☐	☐
6. Personnel instructed not to approach equipment that has become electrically energized	☐	☐	☐	☐
7. Smoking is prohibited around drilling operation	☐	☐	☐	☐
8. Personnel wearing appropriate PPE, per APP/SHSP	☐	☐	☐	☐

Safety and Health Self-Assessment Checklist - DRILLING

SECTION 2	Yes	No	N/A	N/O
GENERAL				
9. Aquifer evaluated for contamination, sole source and wellhead protection	☐	☐	☐	☐
10. Daily safety briefing/meeting conducted with crew	☐	☐	☐	☐
11. Daily inspection of drill rig and equipment conducted before use	☐	☐	☐	☐
DRILL RIG PLACEMENT				
12. Location of underground utilities identified	☐	☐	☐	☐
13. Safe clearance distance maintained from overhead powerlines	☐	☐	☐	☐
14. Drilling pad established, when necessary	☐	☐	☐	☐
15. Drill rig leveled and stabilized	☐	☐	☐	☐
DRILL RIG TRAVEL				
16. Rig shut down and mast lowered and secured prior to rig movement	☐	☐	☐	☐
17. Tools and equipment secured prior to rig movement	☐	☐	☐	☐
18. Only personnel seated in cab are riding on rig during movement	☐	☐	☐	☐
19. Safe clearance distance maintained while traveling under overhead powerlines	☐	☐	☐	☐
20. Backup alarm or spotter used when backing rig	☐	☐	☐	☐
DRILL RIG OPERATION				
21. Kill switch clearly identified and operational	☐	☐	☐	☐
22. All machine guards are in place	☐	☐	☐	☐
23. Rig ropes not wrapped around body parts	☐	☐	☐	☐
24. Pressurized lines and hoses secured from whipping hazards	☐	☐	☐	☐
25. Drill operation stopped during inclement weather	☐	☐	☐	☐
26. Air monitoring conducted per APP/SHSP for hazardous atmospheres	☐	☐	☐	☐
27. Rig placed in neutral when operator not at controls	☐	☐	☐	☐
DRILL RIG MAINTENANCE				
28. Defective components repaired immediately	☐	☐	☐	☐
29. Lockout/tagout procedures used prior to maintenance	☐	☐	☐	☐
30. Cathead in clean, sound condition	☐	☐	☐	☐
31. Drill rig ropes in clean, sound condition	☐	☐	☐	☐
32. Fall protection used for fall exposures of 6 feet or greater	☐	☐	☐	☐
33. Rig in neutral and augers stopped rotating before cleaning	☐	☐	☐	☐
34. Good housekeeping maintained on and around rig	☐	☐	☐	☐
DRILLING WASTE MANAGEMENT				
35. Drill cuttings and purge water managed and disposed properly	☐	☐	☐	☐
DRILLING AT HAZARDOUS WASTE SITES				
36. Waste disposed of according to APP/SHSP and RCRA regulations	☐	☐	☐	☐
37. Appropriate decontamination procedures being followed, per APP/SHSP	☐	☐	☐	☐
FORMS/PERMITS				
38. Driller license/certification and drill rig permit obtained	☐	☐	☐	☐
39. Well development/abandonment notifications and logs submitted and in project files	☐	☐	☐	☐
40. Water withdrawal permit obtained, where required	☐	☐	☐	☐
41. Dig permit obtained, where required	☐	☐	☐	☐

Safety and Health Self-Assessment Checklist - DRILLING

SECTION 3

Complete this section for all items checked “No” in Sections 1 or 2. Deficient items must be corrected in a timely manner.

Item #	Corrective Action Planned/Taken	Date Corrected

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AIR MONITORING LOG

Date	Time	Activity	Location	LEL	02	CO	H2S	VOC

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Project Title: Site Investigation at Small Arms Range Berm Area
Site Identification No. FTSW-006-R-01 Fort Stewart, Georgia
Project Number: E0209.0025

DEFICIENCY TRACKING LOG
CONTRACT NO.

Deficiency Description	Initial Report		Scheduled		When Corrected		Remarks
	Report #	Date*	Report #	Date*	Report #	Date**	

*Include initials of who identified deficiency
**Include initials of who corrected deficiency

Log Prepared By ____

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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 INVENTORY/REGISTER FORM

Location:
Hazard Communication Coordinator (HCC):
☐ Office ☐ Warehouse ☐ Laboratory ☒ Project:
Project No.: E0209.0025

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

MSDS for the listed products will be maintained at:

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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 (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.

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

110-54-3	Hexane	0.5-4

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 nitrocresols that can decompose violently.

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO_2, 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

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.

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

Ethylbenzene (100-41-4)

ACGIH:	20 ppm TWA
OSHA:	100 ppm TWA; 435 mg/m3 TWA 125 ppm STEL; 545 mg/m3 STEL
NIOSH:	100 ppm TWA; 435 mg/m3 TWA 125 ppm STEL; 545 mg/m3 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/m3 TWA
NIOSH:	50 ppm TWA; 180 mg/m3 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.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Translucent, straw-colored or light yellow	**Odor:**	Strong, characteristic aromatic hydrocarbon odor. Sweet-ether like
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	6.4 - 15 RVP @ 100 °F (38 °C) (275-475 mm Hg @ 68 °F (20 °C)	**Vapor Density:**	AP 3-4
Boiling Point:	85-437 °F (39-200 °C)	**Melting Point:**	ND
Solubility (H2O):	Negligible to Slight	**Specific Gravity:**	0.70-0.78
Evaporation Rate:	10-11	**VOC:**	ND
Percent Volatile:	100%	**Octanol/H2O Coeff.:**	ND
Flash Point:	-45 °F (-43 °C)	**Flash Point Method:**	PMCC
Upper Flammability Limit (UFL):	7.6%	**Lower Flammability Limit (LFL):**	1.4%
Burning Rate:	ND	**Auto Ignition:**	>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

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/m3 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.

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.

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]	

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		Conditions
96 Hr LC50 Pimephales promelas	7.19-8.28 mg/L [flow-through]	
48 Hr EC50 Daphnia magna	6.14 mg/L	

Ethyl alcohol (64-17-5)

Test & Species		Conditions
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]	

Ethylbenzene (100-41-4)

Test & Species		Conditions
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]	

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.

* * * 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)

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	Chronic Health	Fire	Sudden Release of Pressure	Reactive
X	X	X	--	--

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.

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

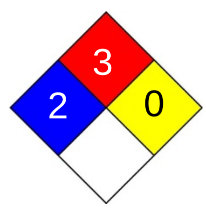
Component Analysis - Inventory

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

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 (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.

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.

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, CO2, 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.

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/m3 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)

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/m3 TWA
NIOSH:	10 ppm TWA; 50 mg/m3 TWA
	15 ppm STEL; 75 mg/m3 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 * * *

Appearance:	Clear, straw-yellow.	**Odor:**	Mild, petroleum distillate odor
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	0.009 psia @ 70 °F (21 °C)	**Vapor Density:**	>1.0
Boiling Point:	320 to 690 °F (160 to 366 °C)	**Melting Point:**	ND
Solubility (H2O):	Negligible	**Specific Gravity:**	0.83-0.876 @ 60°F (16°C)
Evaporation Rate:	Slow; varies with conditions	**VOC:**	ND
Percent Volatile:	100%	**Octanol/H2O Coeff.:**	ND
Flash Point:	>125 °F (>52 °C) minimum	**Flash Point Method:**	PMCC
Upper Flammability Limit (UFL):	7.5	**Lower Flammability Limit (LFL):**	0.6
Burning Rate:	ND	**Auto Ignition:**	494°F (257°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).

* * * 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/m3 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.

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		Conditions
96 Hr LC50 Pimephales promelas	35 mg/L [flow-through]	

Naphthalene (91-20-3)

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]	

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

Acute Health	Chronic Health	Fire	Sudden Release of Pressure	Reactive
X	X	X	--	--

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

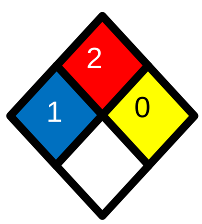
Component Analysis - Inventory

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

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/m3) 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.

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

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

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.

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

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

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

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.

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/m3. The ACGIH short-term exposure limit (STEL) for oil mist is 10 mg/m3.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Amber to dark amber	
Odor: Hydrocarbon - mild	**Vapor Pressure:** No data available
Physical state: Liquid	**Vapor Density (air=1):** No data available
pH: No data available	**Percent Volatile by Volume:** No data available
Boiling Point: No data available	**Volatile Organic Content:** No data available
Melting Point: No data available	**Molecular Weight:** No data available
Specific Gravity: 0.88 - 0.9 @ 16 C / 60 F	**Average Carbon Number:** No data available
Pour Point: -15 F, -26.1 C	**Viscosity @ 100 F:** No data available
	Viscosity @ 40 C: No data available
Solubility in Water: Negligible in water	
Octanol / Water Coefficient: Log K_{ow} = 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

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

12. ECOLOGICAL INFORMATION

Aquatic Toxicity: No information available

Terrestrial Toxicity: No information available

Chemical Fate and Transport: No information available

Other: No information available

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

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 depletors, 33 - CAA HON rule, 34 - CAA Toxic substance for accidental release prevention, 35 - CAA Volatile organic compounds (VOC's) in SOCMI, 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).

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

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/m3 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

Other

No information available

Prepared By:

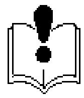
SOPUS Products
P.O. Box 4427
Houston, TX 77210-4453 USA

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

First choice when quality counts.



INSTRUCTIONS

This Data Sheet contains important information.
READ AND KEEP FOR REFERENCE.

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

WARNING!
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.

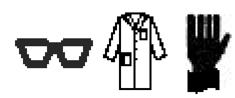
Hazard Rankings

	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

Emergency Information
Health Emergency (RMPC): (303)– 623–5716

Chemical Spills (Chemtrec): (800)– 424–9300

Part Number(s): 218-797

Use: Hydraulic Fluid used in PT2500 electric driver hydraulic pump.

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:

Eye Contact	This product can cause transient mild eye irritation with short-term contact with liquid sprays or mists
Skin Contact	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.
Inhalation	At elevated temperatures or in enclosed spaces, product mist or vapors may irritate the mucous membranes of the nose, the throat, bronchi, and lungs
Ingestion	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.
Chronic Health Effects Summary	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.
Conditions Aggravated by Exposure	Medical conditions aggravated by exposure to this material may include pre-existing skin disorders.
Target Organs	This material may cause damage to the following organs: skin.
Carcinogenic Potential	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**						
Irritant		**Toxic**		**Combustible**		**Explosive**		**Pyrophoric**	
Sensitizer		**Highly Toxic**		**Flammable**		**Oxidizer**		**Water-reactive**	
Corrosive		**Carcinogenic**		**Compressed Gas**		**Organic Peroxide**		**Unstable**	

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.

Eye	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.
Skin	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.
Inhalation	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.
Ingestion	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
Notes to Physician	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

Flashpoint	OPEN CUP: 212°C (414°F) (Cleveland.).
UFL	No Data
LFL	No Data
Autoignition Temperature	Not Available
Flammability Classification	NFPA Class-IIIB combustible material. Slightly combustible!
Extinguishing Media	Use dry chemical, foam, Carbon Dioxide or water fog
Special Properties	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.
Firefighting Equipment	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.
Hazardous Combustion Products	Carbon dioxide, carbon monoxide, smoke, fumes, unburned hydrocarbons and trace oxides of sulfur, phosphorus, zinc and/or nitrogen.

6.0 ACCIDENTAL RELEASE MEASURES

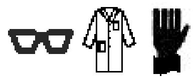
Take proper precautions to ensure your own health and safety before attempting spill control or clean-up. For more specific information, refer to the Emergency Overview on Page 1, Exposure Controls and Personal Protection in Section 8 and Disposal Considerations in Section 13 of this MSDS.

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

Handling	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
Storage	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

Eye	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
Personal Protective Equipment	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. 
Hand Protection	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.
Body Protection	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
Engineering Controls	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
Respiratory Protection	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).
General Comments	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.
Occupational Exposure Guidelines	**Substance**: 1) Oil Mist, Mineral **Applicable Workplace Exposure Levels** **ACGIH (United States).** TWA: 5 mg/m^3 STEL: 10 mg/m^3 **OSHA (United States).** TWA: 5 mg/m^3

9.0 CHEMICAL AND PHYSICAL PROPERTIES

Appearance and Odor	Mild petroleum odor
pH	Not Applicable
Vapor Pressure (mm Hg)	<0.001 kPa (<0.01 mmHg) (at 20°C)
Vapor Density (Air = 1)	>1 (Air = 1)
Boiling Point	Not available
Melting Point	Not available
Solubility in Water	Insoluble in cold water.
Specific Gravity (Water = 1)	0.87 (Water = 1)
Physical State	Liquid
Color	Clear to light amber
Viscosity (cST @ 40°C)	33
Volatile Characteristics	Negligible volatility
Additional Properties	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

Stability	Stable.
Conditions to Avoid	Keep away from extreme heat, sparks, open flame, and strongly oxidizing conditions.
Materials to Avoid	Strong oxidizers.
Hazardous Decomposition	No additional hazardous decomposition products were identified other than the combustion products identified in Section 5 of this MSDS
Hazardous Polymerization	Not expected to occur

11.0 TOXILOGICAL 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

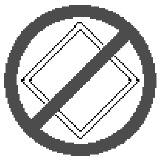
Hazard characteristic and regulatory waste stream classification can change with product use. Accordingly, it is the responsibility of the user to determine the proper storage, transportation, treatment and/or disposal methodologies for spent materials and residues at the time of disposition.

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.

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

CERCLA Sections 102A/103 Hazardous Substances (40 CFR Part 302.4)	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%
SARA Title III Section 302 Extremely Hazardous Substances (40 CFR Part 355)	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
SARA Title III Section 311/312 Hazardous Categorization (40 CFR Part 370)	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.
SARA Title III Sections 313 (40 CFR Part 372)	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.
U.S. Inventory (TSCA)	This product and/or its components are listed on the Toxic Substances Control Act (TSCA) inventory.
CWA	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.
California Proposition 65	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 & Safety Code Section 25249.5): Toluene: 0.001%
New Jersey Right-to-Know Label	Petroleum Oil (Hydraulic Fluid)
Additional Regulatory Remarks	No additional regulatory remarks

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

Prepared By	Graco, Inc.

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

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PRINTED IN U.S.A.

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
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

Components	%	ACGIH TLV	OSHA PEL	OTHER
Polydimethylsiloxane 63148-62-9	<90	None	None	None
Silane, dichlorodimethyl- reaction products with silica 68611-44-9	<9	10mg/m³ TWA	6mg/m³ TWA	None
Polytetrafuoroethylene 9002-84-0	<7	None	None	
Polyglycol 025322-69-4	<1	None	None	AIHA WEEL is 50 ppm Total 10mg/m³ aerosol only

4. FIRST AID MEASURES

Inhalation: Inhalation not likely.

Skin contact: After contact with skin, wash immediately with plenty of water (using soap, if available). Get medical attention if symptoms develop and persist.

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Ingestion: Do not induce vomiting. Get medical attention.

5. FIRE-FIGHTING MEASURES

Flash point: >572° F (300° C) TCC

Auto ignition temperature: Not Determined

Flammable/Explosive limits-lower %: No Data

Flammable/Explosive limits-upper %: No Data

Extinguishing media: Carbon dioxide (CO_2). Dry chemical. Foam.

Special fire fighting procedures: None

Unusual fire or explosion hazards: None

Hazardous combustion products: Oxides of carbon, silica, formaldehyde.

Sensitivity to mechanical impact: 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

Physical state:	Semi-solid
Color:	Translucent
Odor:	Mild
Odor Threshold:	Not available
Vapor pressure:	Not determined
pH:	Not applicable
Boiling point/range:	Not available
Melting point/range:	Not available
Specific gravity:	.96
Vapor density:	Not available
Evaporation rate:	Not available
Solubility in water:	Not soluble
Partition coefficient (n-octano/water):	Not determined
VOC content:	Essentially zero

10. STABILITY AND REACTIVITY

Stability:	Stable
Hazardous polymerization:	Will not occur.
Hazardous decomposition products:	Thermal: Dimethylcyclosiloxanes, Hydrogen fluoride. Oxidative/Thermal: Formaldehyde
Incompatibility:	Oxidizing agents.
Conditions to avoid:	None known

11. TOXICOLOGICAL INFORMATION

Product toxicity data:	Not available
Toxicologically synergistic products:	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
Polytetrafuoroethylene 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
Polytetrafuoroethylene 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.

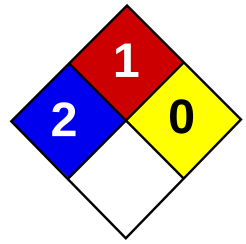
United States Regulatory Information

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

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.

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Last Updated: 05/21/2013 12:00 PM

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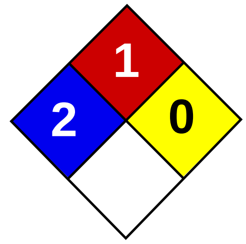

Health	2
Fire	1
Reactivity	0
Personal Protection	E

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

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/m3) 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.

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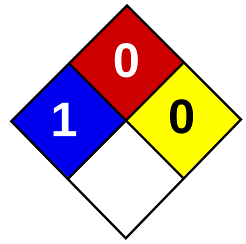


Health	1
Fire	0
Reactivity	0
Personal Protection	E

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

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/m3) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m3) from OSHA (PEL) [United States] TWA: 0.03 (mg/m3) from NIOSH [United States] TWA: 0.05 (mg/m3) [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 lungsby 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 abssorbed 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, deliriuim, 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 cholic), 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

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

ALCONOX

· **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

(Contd. on page 2)

Safety Data Sheet
according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and GHS

(Contd. of page 1)

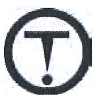
· **Hazard statements**
H315 Causes skin irritation.
H318 Causes serious eye damage.

· **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:**

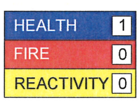
· **WHMIS-symbols:**
D2B - Toxic material causing other toxic effects



· **NFPA ratings (scale 0 - 4)**

Health = 1
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**



Health = 1
Fire = 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%

(Contd. on page 3)

Safety Data Sheet
according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and GHS

Printing date 25.05.2012 Revision: 24.05.2012

Trade name: ALCONOX

(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 Xn R21/22; Xi R36/38 Acute Tox. 4, H302; Acute Tox. 4, H312; Skin Irrit. 2, H315; Eye Irrit. 2, H319	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:**
CO2, 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.

(Contd. on page 4)

(Contd. of page 3)

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/m³
TLV (USA)	TLV withdrawn
EV (Canada)	5 mg/m³

- **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

(Contd. on page 5)

Safety Data Sheet
according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and GHS

Printing date 25.05.2012 | Revision: 24.05.2012

Trade name: ALCONOX

(Contd. of page 4)

· **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/cm³
· **Relative density**	Not determined.
· **Vapour density**	Not applicable.

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Safety Data Sheet
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Trade name: ALCONOX

(Contd. of page 5)

· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with water:**	Soluble.
· **Segregation coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Solvent content:**	
Organic solvents:	0,0 %
Solids content:	100 %
· **9.2 Other information**	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 (SOx)

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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Safety Data Sheet
according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and GHS

Printing date 25.05.2012 | Revision: 24.05.2012

Trade name: ALCONOX

(Contd. of page 6)

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

· **14.1 UN-Number**	
· **DOT, ADR, ADN, IMDG, IATA**	N/A
· **14.2 UN proper shipping name**	
· **DOT, ADR, ADN, IMDG, IATA**	N/A
· **14.3 Transport hazard class(es)**	
· **DOT, ADR, ADN, IMDG, IATA**	
· **Class**	N/A
· **14.4 Packing group**	
· **DOT, ADR, IMDG, IATA**	N/A
· **14.5 Environmental hazards:**	
· **Marine pollutant:**	No

(Contd. on page 8)

Safety Data Sheet
according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and GHS

Printing date 25.05.2012 Revision: 24.05.2012

Trade name: ALCONOX

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· **14.6 Special precautions for user**	Not applicable.
· **14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **UN "Model Regulation":**	N/A

15 Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **United States (USA)**
· **SARA**

· **Section 355 (extremely hazardous substances):**
None of the ingredients is listed.

· **Section 313 (Specific toxic chemical listings):**
None of the ingredients is listed.

· **TSCA (Toxic Substances Control Act):**
All ingredients are listed.

· **Proposition 65 (California):**

· **Chemicals known to cause cancer:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for females:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for males:**
None of the ingredients is listed.

· **Chemicals known to cause developmental toxicity:**
None of the ingredients is listed.

· **Carcinogenic Categories**

· **EPA (Environmental Protection Agency)**
None of the ingredients is listed.

· **TLV (Threshold Limit Value established by ACGIH)**
None of the ingredients is listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
None of the ingredients is listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**
None of the ingredients is listed.

· **Canada**

· **Canadian Domestic Substances List (DSL)**
All ingredients are listed.

· **Canadian Ingredient Disclosure list (limit 0.1%)**
None of the ingredients is listed.

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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

Trade name: ALCONOX

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· **Canadian Ingredient Disclosure list (limit 1%)**	
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

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

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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
SES Staff									
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
Major Drilling Staff									
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
Sterling Staff									
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
SES Staff							
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	
Major Drilling Staff							
Kenneth	Burkhead						
Jim	Chambers						
David	Chamblee						
Brian	Ray						
Sterling Staff							
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
SES Staff						
Greg	Carlson	✓	✓			
Doug	Hawn					
LeAnn	McNeal					
Chris	Napoleon					
Jeff	Williams					
Major Drilling Staff						
Kenneth	Burkhead			✓	12/29/2016	
Jim	Chambers				12/29/2016	
David	Chamblee			✓		
Brian	Ray			✓	12/29/2016	
Sterling Staff						
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
SES Staff					
Greg	Carlson				
Doug	Hawn				
LeAnn	McNeal				
Chris	Napoleon				
Jeff	Williams				
Major Drilling Staff					
Kenneth	Burkhead				
Jim	Chambers				
David	Chamblee				
Brian	Ray				
Sterling Staff					
Peggy	Miller				
Robert	Miller			✓	✓
Rickey	Rudd		✓		
Patrick	Tatman	✓			

Please note: Dates listed indicate expiration date.

45-HOUR HAZARDOUS WASTE WORKER TRAINING COURSE

Name: Gregory Carlson

SS#: 4242

Certificate #: 424241310311

Date Completed: 3/25/11

Refresher Date: 3/25/12

COMPLIES WITH OSHA REGULATION 29 CFR 1910.120

HAZARD COMMUNICATION TRAINING COURSE

This certifies that

Gregory Carlson

has completed the Laborers-AGC Hazard Communication Program for the construction industry, and has been provided with a reference manual that includes a copy of the OSHA Hazard Communication Standard. This course supplies the general information required under CFR 1910.1200. Specific information on the hazards at the work site are the responsibility of the employer.

R.Brice	Henson	3/25/11
Instructor	Training Director	Date

Association of
Bay Area Governments

ABAG Training Center
www.hazmatschool.com

CERTIFICATE OF COMPLETION

Greg Carlson

has successfully completed the course titled

OSHA 8-hr Annual HAZWOPER Refresher

Satisfies 29 CFR 1910.120(e)(8)

on

February 6, 2014

and has earned

0.8 CEUs (Continuing Education Units) (8Course hours) from the program

OSHA Requires recertification every year

Certificate No 108731

(verify at www.hazmatschool.com)

Paul W Gantt

Brian Kirking, Training Director
Chanell Gumbs, Training Coordinator
www.abag.ca.gov; (510) 464-7964

Paul W. Gantt, CSP, CET
Safety Compliance Management, Inc.

Respirator Fit Test

Name: Gregory Carlson Test Date: 2/6/14
ID: 4242 Next Test Due: 6/23/14

Respirator		Results	
Mfg:	3m	Overall FF:	9905
Model:	6000	FF Pass level:	1000
Style:	Full Face	Pass:	yes
Size:	Medium	Operator:	[illegible]

Protocol: OSHA 29CFR1910.134
Fit Test Method: QNFT using TSI PortaCount®
Fit Test provided by MMC HealthWorks

Employee has received basic instruction on proper respirator use.

Respirator	Results
Mfg:	Overall FF:
Model:	FF Pass level:
Style:	Pass:
Size:	Operator:

Protocol: OSHA 29CFR1910.134
Fit Test Method: QNFT using TSI PortaCount®
Fit Test provided by MMC HealthWorks

B78650011 (01/08)

MMC HealthWorks

988 Oak Ridge Turnpike, Ste L-50, Oak Ridge, TN 37830
865.835.4320

Limitations / recommendations:
( ) wear corrective lenses
( ) limit respirator use:
( ) positive pressure respirator only
( ) use hearing protection
( ) use double hearing protection
( ) other:

Examiner: [signature] Date: 6/28/13

B78650012 (01/08)

MMC HealthWorks

988 Oak Ridge Turnpike, Ste L-50, Oak Ridge, TN 37830

Name: Carlson, Gregory SES

as completed medical surveillance for:

( ) Asbestos – 29 CFR 1910.1001 / 1926.58
(X) HAZWOPER – 29 CFR 1910.120 / 1926.65
(X) Resp Protection – 29 CFR 1910.134 / 1926.103
( ) Beryllium – 10 CFR 850
( ) Lead – 29 CFR 1910.1025 / 1926.62
( ) Non-reactor nuclear – DOE O 5480.20A
(X) Confined Space – 29 CFR 1910.146 / 1926.21
(X) Hearing conservation – 29 CFR 1910.95 / 1926.52
(X) Thermal stress
( ) Other:

MMC HealthWorks
988 Oak Ridge Turnpike, Ste L-50, Oak Ridge, TN 37830

Name: Carlson, Gregory SES

has completed medical surveillance for:

- ( ) Asbestos – 29 CFR 1910.1001 / 1926.58
- (X) HAZWOPER – 29 CFR 1910.120 / 1926.65
- (X) Resp Protection – 29 CFR 1910.134 / 1926.103
- ( ) Beryllium – 10 CFR 850
- ( ) Lead – 29 CFR 1910.1025 / 1926.62
- ( ) Non-reactor nuclear – DOE O 5480.20A
- (X) Confined Space – 29 CFR 1910.146 / 1926.21
- (X) Hearing conservation – 29 CFR 1910.95 / 1926.52
- (X) Thermal stress
- ( ) Other:

MMC HealthWorks
988 Oak Ridge Turnpike, Ste L-50, Oak Ridge, TN 37830
865.835.4320

Limitations / recommendations:

- ( ) wear corrective lenses
- ( ) limit respirator use:
- ( ) positive pressure respirator only
- ( ) use hearing protection
- ( ) use double hearing protection
- ( ) other:

Examiner: [signature] Date: 6/28/13

B78650012 (01/08)

HEARTSAVER FIRST AID CPR AED

Heartsaver®
First Aid CPR AED

American Heart Association®

Greg Carlson

This card certifies that the above individual has successfully completed the objectives and skills evaluations in accordance with the curriculum of the AHA Heartsaver First Aid CPR AED Program. Optional completed modules are those **NOT** marked out:

Child CPR AED ~~Infant CPR~~ ~~Written test~~

Oct. 17, 2013	**Oct. 2015**
Issue Date	Recommended Renewal Date

HEARTSAVER FIRST AID CPR AED

Training Center Name	**Cintas Corporation**		TC ID# **OH20246**
TC Info	**Mason OH** City, State	**45040** ZIP	**865-966-4701** Phone
Course Location	**Cintas FAS 248 Knoxville, TN**		
Instructor Name	**Scott Burt**		Inst. ID # **12110064242**
Holder's Signature			

Cintas First Aid and Safety

Certificate of Completion and Certification

American Heart Association

Greg Carlson

Has successfully completed the Bloodborne Pathogen Training Course.

Scott Burt
Occupational Safety Instructor
Cintas First Aid & Safety

October 17, 2013

OSHA Occupational Safety and Health Administration

36-900301864

This card acknowledges that the recipient has successfully completed a 30-hour Occupational Safety and Health Training Course in
General Industry Safety and Health

GREGORY CARLSON

Michael Millsap (Trainer name – print or type)

8/16/2011 (Course end date)

OSHA recommends Outreach Training Courses as an orientation to occupational safety and health for workers. Participation is voluntary. Workers must receive additional training on specific hazards of their job. This course completion card does not expire.

Use or distribution of this card for fraudulent purposes, including false claims of having received training, may result in prosecution under 18 U.S.C. 1001. Potential penalties include substantial criminal fines, imprisonment up to five years, or both.

For OSHA Outreach Training Program go to "Training" at www.osha.gov

Rev. 12/2009

Certificate of Completion

This to certify that

Greg Carlson

has successfully completed

Hazard Communication: Labels, Pictograms and Safety Data Sheets

October 17, 2013

Presented by:

SES Group

Training materials provided by the Southeastern OSHA Training Institute Education Center at North Carolina State University

CERTIFICATE OF COMPLETION

Enhanced Nuclear Biological Chemical
Response Team Training

MCB Camp Pendleton, California

18 January 2005 – 11 February 2005

96 CBRNE Reconnaissance Training Hours provided by Battelle Memorial Institute, Consequence Management Prime Vendor Training Team

Awarded to

Lance Corporal Gregory Carlson

CWO3 Michael O. Wadley
NBC Defense Officer
13th Marine Expeditionary Unit

Mr. James L. Nelson
Program Manager Marine/NBC
Marine Corps Systems Command

CALIFORNIA SPECIALIZED TRAINING INSTITUTE

This is to Certify that

Gregory L. Carlson

Has successfully completed the 16 hour

Hazardous Materials Course

FIRST RESPONDER AWARENESS/OPERATIONS

Certified under Chapter 7 of Division 1 of Title 2
California Government Code 8574.19-23,
California Code of Regulations Title 19 Section 2510-2560

Complies with the Provisions of
California Code of Regulations Title 8 Section 5192(q)(4)
Title 29 Code of Federal Regulations 1910.120(q)

Elieen V. Baumgardner
Director, CSTI

Michael H. Brady
Chief, Haz Mat Section

Outreach Course Manager

02/02/2005
Date

OR219388
Certificate Number

THE GREAT SEAL OF THE STATE OF CALIFORNIA
EUREKA

ERC
Environmental and Energy Services Co.

Certify that

George Douglas Hawn

of

ERCE

Successfully Completed a
40 hour Equivalent Training Course
in

HEALTH AND SAFETY

and is Awarded this Certificate for

HAZARDOUS WASTE OPERATIONS
AND EMERGENCY RESPONSE

July 14, 1989
Date

Dennis L. Daggett, CIH
Instructor

Executive Vice President

Association of
Bay Area Governments

ABAG Training Center
www.hazmatschool.com

CERTIFICATE OF COMPLETION

Doug Hawn

has successfully completed the course titled

OSHA 8-hr HAZWOPER Refresher with Respiratory Protection

Satisfies 29 CFR 1910.120(e)(8)

on

December 5, 2013

and has earned

0.8 CEUs (Continuing Education Units) (8Course hours) from the program

OSHA Requires recertification every year

Certificate No 107250
(verify at www.hazmatschool.com)

Brian Kirking, Training Director
Chanell Gumbs, Training Coordinator
www.abag.ca.gov; (510) 464-7964

Paul W Gantt

Paul W. Gantt, CSP, CET
Safety Compliance Management, Inc.

CLICKSAFETY®

certifies that

Doug Hawn

has successfully completed ClickSafety's web-based training titled

C4 HAZWOPER Supervisor

29CFR 1910.120(e)(4) and 29 CFR 1926.65(e)(4)

January 11, 2013

CLICKSAFETY

Safety. Compliance. Everywhere.

www.ClickSafety.com

7774128

Serial Number

Brian P. Tonry

Executive Vice President and
General Manager

Employee has received basic instruction on proper respirator use.

Doug Hawn 6022

2-6-14
2-6-15

Respirator

Mfg: 3m
Model: 6000
Style: full face
Size: medium

Results

Overall FF: 1004
FF Pass level: 1000
Pass: yes
Operator: K Hogan

Protocol: OSHA 29CFR1910.134
Fit Test Method: QNFT using TSI PortaCount®
Fit Test provided by MMC HealthWorks

B78650011 (01/08)

Respirator Fit Test

Name:
ID:

Test Date:
Next Test Due:

Respirator

Mfg:
Model:
Style:
Size:

Results

Overall FF:
FF Pass level:
Pass:
Operator:

Protocol: OSHA 29CFR1910.134
Fit Test Method: QNFT using TSI PortaCount®
Fit Test provided by MMC HealthWorks

MMC HealthWorks

988 Oak Ridge Turnpike, Ste L-50, Oak Ridge, TN 37830

Name: Hawn, George SES

s completed medical surveillance for:

( ) Asbestos – 29 CFR 1910.1001 / 1926.58
(X) HAZWOPER – 29 CFR 1910.120 / 1926.65
(X) Resp Protection – 29 CFR 1910.134 / 1926.103
( ) Beryllium – 10 CFR 850
( ) Lead – 29 CFR 1910.1025 / 1926.62
( ) Non-reactor nuclear – DOE O 5480.20A
(X) Confined Space – 29 CFR 1910.146 / 1926.21
(X) Hearing conservation – 29 CFR 1910.95 / 1926.52
(X) Thermal stress
( ) Other:

MMC HealthWorks

988 Oak Ridge Turnpike, Ste L-50, Oak Ridge, TN 37830
865.835.4320

Limitations / recommendations:

( ) wear corrective lenses
( ) limit respirator use:
( ) positive pressure respirator only
(X) use hearing protection
( ) use double hearing protection
( ) other:

Examiner: [signature] Date: 6/7/13

B78650012 (01/08)

MMC HealthWorks
Your Health Management Partner

Multiple Medical Surveillance Written Opinion

Name	Employee or SSAN	Today's Date
Hawn, George		06/07/2013
Company	Department	
SES		

The above named employee underwent medical surveillance on 06/07/2013. The employee was informed of the results of this surveillance and any detected conditions that require further evaluation or treatment. Unless otherwise noted, this employee has been found physically suitable for the time period noted below.

☐	This is a temporary clearance; **expiration date:** / /

1. Type of surveillance conducted (mark all that apply):

☐	Asbestos (29 CFR 1910.1001, 29 CFR 1926.58, 40 CFR 763)
X	HAZWOPER: Hazardous Waste Worker / Hazardous Materials Handler (29 CFR 1910.120, 29 CFR 1926.65)
☐	Beryllium (10 CFR 850.34)
☐	OSHA Toxic Substances (29 CFR 1910, Subpart Z) specific substance(s):
☐	Lead (29 CFR 1910.1025, 29 CFR 1926.62) Blood Lead Level: _____ ug/dl
X	Respiratory Protection (29 CFR 1910.134, 29 CFR 1926.103)
X	Hearing conservation (29 CFR 1910.95, 29 CFR 1926.52)
☐	Non-reactor nuclear (DOE O 5480.20A)
X	Confined space entry (29 CFR 1910.146, 29 CFR 1926.21)
X	Thermal stress
☐	Other:

2. Based on this assessment, the employee has the following medical conditions which could result in increased risk of material health impairment from exposure to the occupational hazard (do not reveal conditions unrelated to occupational exposures):

☐	None	☐	Smoking	☐	Pulmonary	X	Hearing Loss	☐	Other:

3. Recommendations:

X	Hearing protection	☐	Remove from _____________ work
☐	Discontinue smoking	☐	Unable to use respirator
☐	Limit respirator use:	☐	Positive pressure respirator only
X	Reevaluation X 12 months ☐ 6months ☐ other:	☐	Wear corrective lenses

4. In the case of asbestos exposure, the employee has been informed of the increased health risk associated with smoking and inhalation of asbestos fibers.

5. Employee and employer are reminded to use all available protective measures appropriately. Should employee health or site work conditions change appreciably, consultation with MMC HealthWorks is recommended.

6. A copy of these recommendations has been provided to the employee: ☐ yes X no

7. Additional comments:

Examiner
(06.10.2005)

HEARTSAVER FIRST AID CPR AED

Heartsaver®
First Aid CPR AED

American Heart Association®

Doug Hawn

This card certifies that the above individual has successfully completed the objectives and skills evaluations in accordance with the curriculum of the AHA Heartsaver First Aid CPR AED Program. Optional completed modules are those **NOT** marked out:

Child CPR AED ~~Infant CPR~~ ~~Written test~~

Issue Date Feb. 7, 2014

Recommended Renewal Date Feb. 2016

HEARTSAVER FIRST AID CPR AED

Training Center Name: Cintas Corporation TC ID # OH20246

TC Info: Mason OH (City, State) 45040 (ZIP) 865-966-4701 (Phone)

Course Location: Cintas FAS 248 Knoxville, TN

Instructor Name: Scott Burt Inst. ID # 12110064242

Holder's Signature

Cintas First Aid and Safety

Certificate of Completion and Certification

American Heart Association

Doug Hawn

Has successfully completed the Bloodborne Pathogen Training Course.

Scott Burt
Occupational Safety Instructor
Cintas First Aid & Safety

February 7, 2014

Certificate of Completion

This to certify that

Doug Hawn

has successfully completed

Hazard Communication: Labels, Pictograms and Safety Data Sheets

November 18, 2013

Presented by:

SES Group

Training materials provided by the Southeastern OSHA Training Institute Education Center at North Carolina State University

U.S. ARMY CORPS OF ENGINEERS

USACE LEARNING CENTER
HUNTSVILLE, ALABAMA

CERTIFICATE

DOUG HAWN

has completed the Corps of Engineers Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS

and is awarded
the continuing education credits indicated
*for **16** hours of organized instruction*

Certified Provider #199309 **1.3** CEUs	Registered Provider #1009 **13** LUs	Registered Provider **13** PDHs

Given at **AGC Mid-TN Branch** **05/6-7/2009**

Location **Date**

Gary F. Anderson
Director, USACE Learning Center

Dennis A. Woodruff

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE

NPDES TRAINING INSTITUTE

NPDES Training Institute

Certificate of Completion

In fulfillment of the
State of Georgia's GASWCC
recertification requirement
for "Certified Personnel"
is hereby granted to

LeAnn McNeal

For Successful Completion of

Permit Requirements, Site Inspections, & "State Waters" for Construction Sites in Georgia

A GASWCC Approved Recertification
Seminar for Level 1A Fundamentals

GASWCC Certified
Instructor

T. Luke Owen, PG

Course Completion Date:

07/06/2011

4

Professional Development Hours

www.npdestraining.com 678-469-5120

GeoLOGIC Environmental Solutions

GSWCC Georgia Soil and Water Conservation Commission

Leann T Mcneal

Level IA Certified Personnel

Certification Number 0000055199

Issued: 08/14/2011 Expires: 08/14/2014

FINDLAY
THE UNIVERSITY OF FINDLAY

Certificate of Achievement

awarded by

THE NATIONAL CENTER OF EXCELLENCE FOR ENVIRONMENTAL MANAGEMENT

ENVIRONMENTAL RESOURCE TRAINING CENTER

to

LEANN M. TAYLOR

for Successful Completion of

OSHA 40-HOUR SAFETY TRAINING WORKSHOP
(FULFILLS THE REQUIREMENTS OF 29 CFR 1910.120 COVERING HAZARDOUS WASTE OPERATIONS)
4.0 CEU'S
AUGUST 10, 2001

J. Rall Van Dyn

EXECUTIVE DIRECTOR

Daniel Hhe

INSTRUCTOR

Association of
Bay Area Governments

ABAG Training Center
www.hazmatschool.com

CERTIFICATE OF COMPLETION

LeAnn McNeal

has successfully completed the course titled

OSHA 8-hr Annual HAZWOPER Refresher

Satisfies 29 CFR 1910.120(e)(8)

on

February 7, 2014

and has earned

0.8 CEUs (Continuing Education Units) (8Course hours) from the program

OSHA Requires recertification every year

Certificate No 108791
(verify at www.hazmatschool.com)

Brian Kirking, Training Director
Chanell Gumbs, Training Coordinator
www.abag.ca.gov; (510) 464-7964

Paul W Gantt

Paul W. Gantt, CSP, CET
Safety Compliance Management, Inc.

Certificate of Completion

This certifies that

LeAnn McNeal

Has Successfully completed

8 Hour HAZWOPER Supervisor Training

This certificate does not in itself indicate initial 24 or 40 Hour HAZWOPER Training

In Accordance With Federal OSHA Regulation 29 CFR 1910.120(e)(4)

And all State OSHA and EPA Regulations As Well

Julius P. Griggs
Julius P. Griggs
Instructor #892

100917437800
Certificate Number

9/17/2010
Issue Date

SAFETY UNLIMITED, Inc.
OSHA Compliant Safety Training Since 1993

690A East Los Angeles Ave Suite 180 Simi Valley, CA 93065
888-309-7233 * 805-306-8027 * 866-869-7097 (F)
www.safetyunlimited.com

Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

Respirator Fit Test

Name: LeAnn McNeal Test Date: 2/6/14
ID: 7607 Next Test Due: 2/6/15

Respirator		Results	
Mfg:	3m	Overall FF:	6953
Model:	6000	FF Pass level:	1000
Style:	Full Face	Pass:	yes
Size:	Small	Operator:	[illegible]

Protocol: OSHA 29CFR1910.134/[illegible]
Fit Test Method: QNFT using TSI PortaCount®
Fit Test provided by MMC HealthWorks

Employee has received basic instruction on proper respirator use.

Respirator		Results	
Mfg:		Overall FF:	
Model:		FF Pass level:	
Style:		Pass:	
Size:		Operator:	

Protocol: OSHA 29CFR1910.134
Fit Test Method: QNFT using TSI PortaCount®
Fit Test provided by MMC HealthWorks
B78650011 (01/08)

Concentra Medical Centers (GA)

109 Minus Avenue, Suite C-10, Garden City, GA 31408

Name: LEANN MCNEAL

Has completed medical surveillance for:

( ) Asbestos – 20 CFR 1910.1001 / 1926.58
(X) HAZWOPER – 29 CFR 1910.120 / 1926.65
(X) Resp Protection – 29 CFR 1910.134 / 1926.103
( ) Beryllium – 10 CFR 850
( ) Non – reactor nuclear – DOE O 5480.20A
( ) Confined Space – 29 CFR 1910.146 / 1926.21
(X) Hearing conservation – 29 CFR 1910.95 / 1926.53
( ) Thermal Stress
( ) Other

Concentra Medical Centers (GA)

109 Minus Avenue, Suite C-10, Garden City, GA 31408

912.966.5445 912.966.5955 FAX

Limitations / recommendations

(✓) Wear corrective lenses
( ) Limit respirator use
( ) Positive pressure respirator only
(✓) Use hearing protection
( ) Use double hearing protection
( ) Other:

X

Examiner: [signature] Date: 9/13/13

Claim Number:

Concentra Medical Centers (GA)

109 Minus Ave Ste C10 GARDEN CITY, GA 31408
Phone: (912) 966-5445 Fax: (912) 966-5955

Service Date: 09/13/2013

Non-Injury Work Status Report

Patient:	McNeal, LeAnn T.						
SSN:	XXX-XX-7607						
Address:	104 Holly Circle	**Employer Location:**	Spec Pro Environmental Serv	**Contact:**	Leah Taylor		
	GUYTON, GA 31312	**Address:**	1006 Floyd Culler Ct	**Role:**	Primary Contact		
Home:	(912) 660-4782		Oak Ridge, TN 378308022	**Phone:**	(865) 481-7837	**Ext.:**	
Work:	(912) 660-4782 **Ext.:**	**Auth. by:**		**Fax:**	(865) 481-0290		

This Visit:

Time In: 08:00 am **Time Out:** 10:38 am **Visit Type:** New

HazMat Physical Annual

Complete Blood Count (CBC) w/Diff 6399SB
Hazardous Material Physical (HazMat)
Non Regulated UDS Random
Chemistry 23 Screen 307818

Result Status:

Able to perform essential functions
No medical restrictions

Remarks:

American Red Cross

This recognizes that
LeAnn McNeal
has completed the requirements for

ADULT FIRST AID/CPR/AED

conducted by

American Red Cross

Date Completed 07/23/2013

The American Red Cross recognizes this certificate as valid for --2-- years(s) from completion date.

redcross.org

Instructor's Signature

Chapter

SAVANNAH

Holder's Signature

S/0211

Stock No. 656798

American Red Cross

Certificate of Completion

Congratulations!

LeAnn McNeal

has completed the online course component
of the blended learning program for

Adult First Aid/CPR/AED

07/23/2013

You must successfully complete the skill session to receive American Red Cross certification.

American Red Cross

CERTIFICATE *of* COMPLETION

This is to certify that:

LeAnn McNeal

successfully completed

Course Title - **Bloodborne Pathogens Training**

Offering Id - **02301009**

Version - **r.2012(n)**

Instructor -

conducted by National Headquarters

on

7/26/2013

Certificate is valid from completion date for 1 Year

OSHA Occupational Safety and Health Administration

36-601055031

This card acknowledges that the recipient has successfully completed a 30-hour Occupational Safety and Health Training Course in
Construction Safety and Health

LeAnn McNeal

Peter Rice 66873
(Trainer name – print or type)

10/9/2013
(Course end date)

OSHA recommends Outreach Training Courses as an orientation to occupational safety and health for workers. Participation is voluntary. Workers must receive additional training on specific hazards of their job. This course completion card does not expire.

Use or distribution of this card for fraudulent purposes, including false claims of having received training, may result in prosecution under 18 U.S.C. 1001. Potential penalties include substantial criminal fines, imprisonment up to five years, or both.

For OSHA Outreach Training Program go to "Training" at www.osha.gov

Rev. 12/2009

Sylvan Enterprises	IDENTIFICATION CARD	Card No. Exc 12 012
Name of Operator *(Not Transferable)*		
McNeal, LeAnn		
Date Issued	Date Expires	
April 23, 2012	April 22, 2015	
Signature *(Not valid until signed, ID required)*		

The holder of this card is qualified as competent person as specified on the reverse of this card. Card must be carried at all times. Valid for three (3) years

QUALIFIED:

Type	Capacity	Size
Excavation competent person	Trenching	Shoring

Signature of Instructor

Sylvan Enterprises (865) 717-8582
PO Box 666, Kingston TN 37763

DISCLAIMER: This document issued by the Issuing Official is only for purposes of attesting to the satisfactory completion of classroom training with written examination as prescribed by OSHA and ASME as of the issue date.

THE NATIONAL ENVIRONMENTAL TRAINERS

Chris Napoleon

has satisfactorily passed an exam and completed a 40 hour training course entitled
Hazardous Waste Operations and Emergency Response
meeting the requirements identified in Title 29 CFR 1910.120 (OSHA HAZWOPER Regulations).
This course has been awarded 5.0 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is eligible for 3.33 Continuance of Certification (COC) points from the Board of Certified Safety Professionals.

NATIONAL
ENVIRONMENTAL
TRAINERS, Inc.

June 23, 2005

Course Number 1003, Awarded 40 PDH's
Florida Board of Professional Engineers CEU Provider Number 0004284

www.nationalenvironmentaltrainers.com

Signature of Instructor

Clay A. Bednarz, MS, RPIH

Association of
Bay Area Governments

ABAG Training Center
www.hazmatschool.com

CERTIFICATE OF COMPLETION

Christopher Napoleon

has successfully completed the course titled

OSHA 8-hr Annual HAZWOPER Refresher

Satisfies 29 CFR 1910.120(e)(8)

on

November 13, 2013

and has earned

0.8 CEUs (Continuing Education Units) (8Course hours) from the program

OSHA Requires recertification every year

Certificate No 106808

(verify at www.hazmatschool.com)

Paul W Gantt

Brian Kirking, Training Director
Chanell Gumbs, Training Coordinator
www.abag.ca.gov; (510) 464-7964

Paul W. Gantt, CSP, CET
Safety Compliance Management, Inc.

International Union of Operating Engineers

National HAZMAT Program

Christopher R. Napoleon

has successfully completed an

8-HOUR MANAGEMENT AND SUPERVISOR TRAINING PROGRAM

specifically designed for managers and supervisors in accordance with OSHA at 29 CFR 1910.120(e)(4).

Completion Date: **07/17/2008**

Respirator Fit Test

Name: Christopher Napoleon Test Date: 10/11/13
ID: 2482 Next Test Due: 10/11/14

Respirator		Results	
Mfg:	3m	Overall FF:	4/620
Model:	6000	FF Pass level:	100
Style:	Full Face	Pass:	Yes
Size:	Large	Operator:	Connie

Protocol: OSHA 29CFR1910.134

Fit Test Method: QNFT using TSI PortaCount®

Fit Test provided by MMC HealthWorks

Employee has received basic instruction on proper respirator use.

Respirator		Results	
Mfg:		Overall FF:	
Model:		FF Pass level:	
Style:		Pass:	
Size:		Operator:	

Protocol: OSHA 29CFR1910.134

Fit Test Method: QNFT using TSI PortaCount®

Fit Test provided by MMC HealthWorks

B78650011 (01/08)

MMC HealthWorks
988 Oak Ridge Turnpike, Ste L-50, Oak Ridge, TN 37830

Name: Napoleon, chris SES

Has completed medical surveillance for:

( ) Asbestos – 29 CFR 1910.1001 / 1926.58
(X) HAZWOPER – 29 CFR 1910.120 / 1926.65
(X) Resp Protection – 29 CFR 1910.134 / 1926.103
( ) Beryllium – 10 CFR 850
( ) Lead – 29 CFR 1910.1025 / 1926.62
( ) Non-reactor nuclear – DOE O 5480.20A
(X) Confined Space – 29 CFR 1910.146 / 1926.21
(X) Hearing conservation – 29 CFR 1910.95 / 1926.52
(X) Thermal stress
( ) Other:

MMC HealthWorks
988 Oak Ridge Turnpike, Ste L-50, Oak Ridge, TN 37830
865.835.4320

Limitations / recommendations:

( ) wear corrective lenses
( ) limit respirator use:
( ) positive pressure respirator only
( ) use hearing protection
( ) use double hearing protection
( ) other:

Examiner: [signature] Date: 10/11/13

B78650012 (01/08)

HEARTSAVER FIRST AID CPR AED

Heartsaver®
First Aid CPR AED

American Heart Association®

Chris Napoleon

This card certifies that the above individual has successfully completed the objectives and skills evaluations in accordance with the curriculum of the AHA Heartsaver First Aid CPR AED Program. Optional completed modules are those **NOT** marked out:

Child CPR AED ~~Infant CPR~~ ~~Written test~~

Issue Date Oct. 17, 2013

Recommended Renewal Date Oct. 2015

HEARTSAVER FIRST AID CPR AED

Training Center Name	Cintas Corporation	TC ID #	OH20246
TC Info	Mason OH (City, State)	45040 (ZIP)	865-966-4701 (Phone)
Course Location	Cintas FAS 248 Knoxville, TN		
Instructor Name	Scott Burt	Inst. ID #	12110064242
Holder's Signature			

Cintas First Aid and Safety

Certificate of Completion and Certification

American Heart Association

Chris Napoleon

Has successfully completed the Bloodborne Pathogen Training Course.

Scott Burt
Occupational Safety Instructor
Cintas First Aid & Safety

October 17, 2013

OSHA Occupational Safety and Health Administration

36-600949623

This card acknowledges that the recipient has successfully completed a 30-hour Occupational Safety and Health Training Course in
Construction Safety and Health

CHRISTOPHER NAPOLEON

Tavlor Sikes Taylor Alan Sikes 12/07/2011

(Trainer name – print or type) (Course end date)

THE NATIONAL ENVIRONMENTAL TRAINERS

Christopher Napoleon

has satisfactorily passed an exam and completed a training course entitled

Competent Person for Excavation Trenching and Shoring

meeting the requirements identified in Title 29 CFR 1926.650.
This course is also eligible for .08 Continuance of Certification
(COC) points from the Board of Certified Safety Professionals

NATIONAL
ENVIRONMENTAL
TRAINERS, Inc.

February 23, 2012

Course Number 1011, Awarded 3 PDH's
Florida Board of Professional Engineers
CEU Provider Number 0004284

www.nationalenvironmentaltrainers.com

Signature of Instructor

Clay A. Bednarz, MS, RPIH

Certificate of Completion

This to certify that

Christopher Napoleon

has successfully completed

Hazard Communication: Labels, Pictograms and Safety Data Sheets

October 17, 2013

Presented by:

SES Group

Training materials provided by the Southeastern OSHA Training Institute Education Center at North Carolina State University

The Environmental Institute

Christopher R. Napoleon

Social Security Number - XXX-XX-2412

SES Construction & Fuel Services - 1006 Floyd Culler Court - Oak Ridge, Tennessee 37830

Has completed coursework and satisfactorily passed an examination that meets all criteria required for EPA/AHERA/ASHARA (TSCA Title II) Approved Reaccreditation, NESHAP Regulations Training, and OSHA Competent Person

Asbestos in Buildings: Abatement Project Supervisor Refresher

December 16, 2013
Course Date

11942
Certificate Number

December 16, 2013
Examination Date

December 15, 2014
Expiration Date

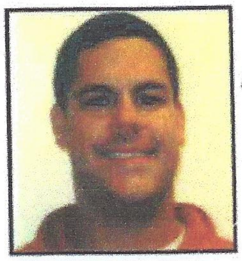
David W. Hogue - Principal Instructor / Training Manager

Rachel G. McCain - Exam Administrator

(Approved by the ABIH Certification Maintenance Committee for 1 CM point - Aprroval #11-583)

(Florida Provider Registration Number FL49-0001342 - Course #FL49-0004693)

TEI - 1841 West Oak Parkway, Suite F - Marietta, Georgia 30062 - (770) 427-3600 - www.tei-atl.com



Completed Course & Examination
Requirements for EPA-Model Accreditation

**ASBESTOS IN BUILDINGS:
ABATEMENT PROJECT SUPERVISOR
REFRESHER**

December 16, 2013

Sponsored By

The Environmental Institute

www.tei-atl.com

December 16. 2013
Examination Date

Christopher Napoleon
Name

David W. Hogue
TEI Director/Training Manager

11942
Certificate Number

Seaver Environmental

**Proudly Presents This
Certificate to**

Jeffrey C. Williams

for completing the initial 40-hour training in
Hazardous Waste Operations and Emergency Response
at Oak Ridge, Tennessee on 06 Apr. 92
to satisfy OSHA rules, 29 CFR Part 1910.120

Certificate Number: 4
SSAN: 413-04-2904

Gary V. Seaver
Gary Seaver, Trainer

Seaver Environmental
Rt. 1, Box 18
Ridge Road
Lancing, TN 37770
615-346-7459

Association of Bay Area Governments

ABAG Training Center
www.hazmatschool.com

CERTIFICATE OF COMPLETION

Jeffrey Williams

has successfully completed the course titled

OSHA 8-hr Annual HAZWOPER Refresher

Satisfies 29 CFR 1910.120(e)(8)

on

July 25, 2013

and has earned

0.8 CEUs (Continuing Education Units) (8Course hours) from the program

OSHA Requires recertification every year

Certificate No 104639
(verify at www.hazmatschool.com)

Brian Kirking, Training Director
Chanell Gumbs, Training Coordinator
www.abag.ca.gov; (510) 464-7964

Paul W. Gantt

Paul W. Gantt, CSP, REA
Safety Compliance Management, Inc.

LABORERS-AGC
EDUCATION AND TRAINING FUND

37 Deerfield Road
P.O. Box 37
Pomfret Center, CT 06259

HAZARDOUS WASTE SUPERVISOR
TRAINING COURSE

NAME:
JEFFREY C WILLIAMS

S.S.#:
413-04-2904

CERTIFICATE #:
41304290441341001

DATE COMPLETED:
10/15/01

REFRESHER DATE:
10/15/02

COMPLIES WITH OSHA REGULATION 29 CFR 1910.120

MMC HealthWorks
988 Oak Ridge Turnpike, Ste L-50, Oak Ridge, TN 37830

Name: Jeffrey Williams

Has completed medical surveillance for:

( ) Asbestos – 29 CFR 1910.1001 / 1926.58
(X) HAZWOPER – 29 CFR 1910.120 / 1926.65
(X) Resp Protection – 29 CFR 1910.134 / 1926.103
( ) Beryllium – 10 CFR 850
( ) Lead – 29 CFR 1910.1025 / 1926.62
( ) Non-reactor nuclear – DOE O 5480.20A
(✓) Confined Space – 29 CFR 1910.146 / 1926.21
(✓) Hearing conservation – 29 CFR 1910.95 / 1926.52
(✓) Thermal stress
( ) Other:

MMC HealthWorks
988 Oak Ridge Turnpike, Ste L-50, Oak Ridge, TN 37830
865.835.4320

Limitations / recommendations:

(X) wear corrective lenses
( ) limit respirator use:
( ) positive pressure respirator only
(X) use hearing protection
(✓) use double hearing protection
( ) other:

Examiner: [signature] Date: 10-31-13

B78650012 (01/08)

HEARTSAVER FIRST AID CPR AED

Heartsaver®
First Aid CPR AED

American Heart Association®

Jeffrey Williams

This card certifies that the above individual has successfully completed the objectives and skills evaluations in accordance with the curriculum of the AHA Heartsaver First Aid CPR AED Program. Optional completed modules are those **NOT** marked out:

Child CPR AED ~~Infant CPR~~ Written test

April 24, 2013	**April 2015**
Issue Date	Recommended Renewal Date

Cintas First Aid and Safety

Certificate of Completion and Certification

American Heart Association

Jeffrey Williams

Has successfully completed the Bloodborne Pathogen Training Course.

Scott Burt
Occupational Safety Instructor
Cintas First Aid & Safety

February 7, 2014

OSHA Occupational Safety and Health Administration

36-601050094

This card acknowledges that the recipient has successfully completed a 30-hour Occupational Safety and Health Training Course in
Construction Safety and Health

JEFFREY WILLIAMS

Marie Athey
(Trainer name – print or type)

8/12/2013
(Course end date)

OSHA recommends Outreach Training Courses as an orientation to occupational safety and health for workers. Participation is voluntary. Workers must receive additional training on specific hazards of their job. This course completion card does not expire.

Use or distribution of this card for fraudulent purposes, including false claims of having received training, may result in prosecution under 18 U.S.C. 1001. Potential penalties include substantial criminal fines, imprisonment up to five years, or both.

For OSHA Outreach Training Program go to "Training" at www.osha.gov Rev. 12/2009

Sylvan Enterprises	IDENTIFICATION CARD	Card No. Exc 12 015
Name of Operator *(Not Transferable)*		
Williams, Jeffrey C.		
Date Issued	Date Expires	
April 23, 2012	April 22, 2015	
Signature *(Not valid until signed, ID required)*		

The holder of this card is qualified as competent person as specified on the reverse of this card. Card must be carried at all times. Valid for three (3) years

QUALIFIED:

Type	Capacity	Size
Excavation competent person	Trenching	Shoring

Signature of Instructor

Sylvan Enterprises (865) 717-8582
PO Box 666, Kingston TN 37763

DISCLAIMER: This document issued by the Issuing Official is only for purposes of attesting to the satisfactory completion of classroom training with written examination as prescribed by OSHA and ASME as of the issue date.

Certificate of Completion

This to certify that

Jeff Williams

has successfully completed

Hazard Communication: Labels, Pictograms and Safety Data Sheets

November 18, 2013

Presented by:

SES Group

Training materials provided by the Southeastern OSHA Training Institute Education Center at North Carolina State University

U.S. ARMY CORPS OF ENGINEERS

ABC Associated Builders and Contractors, Inc.
Georgia Chapter

PROFESSIONAL DEVELOPMENT SUPPORT CENTER
HUNTSVILLE, ALABAMA

NAVFAC

CERTIFICATE

This is to certify that

Jeff Williams

has completed the Corps of Engineers Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS

Given at	By			
ABC of Georgia Training Center	NAVFAC-SE	09 Dec 2009	John E. Parker III, PMP	843-834-0173
Location	Instructional District	Date	Facilitator	

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE

Chief, USACE Professional Development Support Center

This will certify that

Kenneth W. Burkhead, Jr.

has completed the 40 Hour Program
per Regulation 29CFR1910.120

HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE

Certification Expiration 06/24/2010

Andy Green

Director of Professional Development Training

HazMat Training

Certificate of Completion

This certifies that

Kenneth Burkhead

Has Successfully completed

8 Hour HAZWOPER Refresher Training

Refresher certification does NOT necessarily indicate initial 24 or 40 Hour HAZWOPER certification

In Accordance W/Federal OSHA Regulation 29 CFR 1910.120(e), (p) & (q)

And all State OSHA and EPA Regulations As Well

This course is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) issued by Safety Unlimited, Inc. (Accreditation # 044)

Julius P. Griggs
Julius P. Griggs
Instructor #892

131201570279
Certificate Number

12/1/2013
Issue Date

SAFETY UNLIMITED, Inc.
OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley, CA 93063
888 309-SAFE (7233) or 805 306-8027 866-869-7097 (fax)
www.safetyunlimited.com

Proof of initial certification and subsequent refresher training is NOT required to take refresher training
Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

MAJOR
Drilling Environmental, LLC

Major Drilling Environmental
Physician's Written Opinion for Hazardous Waste site Work

Date:	11/14/13	EID:	
Employee:	Kenneth W. Burkhead Jr.		

Respirator Use

In accordance with 29 CFR 1910.134 and CCR Title 8 Section 5144, it is my medical opinion that this employee is:

☒ Medically qualified for respirator use.

☐ Not medically qualified for respirator use.

Comments:

Hazardous Materials / Emergency Response

In accordance with 29 CFR 1910.120, it is my medical opinion that this employee:

☒ Does not have a medical condition

☐ Has a medical condition

That would place him / her at increased risk when performing work in Hazardous Materials / Emergency Response activities.

Comments:

Clinic:	WORKWELL OCCUPATIONAL HEALTH CENTER
Address:	7736 MADISON BLVD., HUNTSVILLE, AL 35806
Phone:	256-830-8930

Physician:	Kristopher N. Jones, MD, MPH		
Signature:	[signature]	Date:	11/14/13

MAJOR
Drilling Environmental, LLC

RESPIRATOR FIT TEST RECORD

NAME: Kenneth Burkhead DATE: 2 / 22 / 13

LOCATION OF TEST: Huntsville, AL

MASK INFORMATION	TEST TYPE	RESULT
MANUFACTURE: SURVIVAIR MASK TYPE: FF/HF MODEL: OPTI-FIT S/M/L	ISOAMYL ACETATE IRRITANT SMOKE	PASS/ FAIL PASS/ FAIL
MANUFACTURE: MSA MASK TYPE: FF/HF MODEL: 3000 S/M/L	ISOAMYL ACETATE IRRITANT SMOKE	PASS/ FAIL PASS/ FAIL

COMMENTS:

MEDICAL EXAMINER'S CERTIFICATE
PART 1 OF 2

I certify that I have examined **Kenneth Wayne Burkhead Jr** in accordance with the federal Motor Carrier Safety Regulations (49 CFR 391.41-391.49) and with knowledge of the driving duties, I find this person is qualified; and, if applicable, only when:

- ☐ wearing corrective lenses
- ☐ wearing hearing aid
- ☐ accompanied by a ____________________ waiver/exemption
- ☐ driving within an exempt intracity zone (49 CFR 391.62)
- ☐ accompanied by a Skill Performance Evaluation Certificate (SPE)
- ☐ qualified by operation of 49 CFR 391.64

The information I have provided regarding this physical examination is true and complete. A complete examination form with any attachment embodies my findings completely and correctly, and is on file in my office.

SIGNATURE OF MEDICAL EXAMINER	DATE
[signature]	11/14/13

MEDICAL EXAMINER'S CERTIFICATE
PART 2 OF 2

MEDICAL EXAMINER'S NAME (PRINT) Kristopher N. Jones, MD, MPH	☒ MD ☐ DO ☐ Chiropractor ☐ Physician Assistant ☐ Advanced Practice Nurse
ADDRESS OF MEDICAL EXAMINER WorkWell Occupational Health Center 7736 Madison Blvd Ste 1 Huntsville, AL 35806	MED. LICENSE OR CERT. NO./ISSUING STATE MD.28234 Alabama 192 Cemetary Rd Lawrenceburg, TN 38964
Medical Examiner's Telephone (256)830-8930	Driver's License 087269426 TN
MEDICAL CERTIFICATE EXPIRATION DATE 11/14/15	DRIVER'S SIGNATURE Kenneth Wayne Burkhead Jr.

Certification Card

BasicPlus

G 2010

CPR, AED, and First Aid For Adults

Kenneth W. Burkhead Jr.

has successfully completed and competently performed the required knowledge and skill objectives for this program.

MEDIC First Aid

Chance Densley
Authorized Instructor (Print Name)

174888
Registry No.

12-29-13
Class Completion Date

12-29-15
Expiration Date

801-908-1055
Training Center Phone No.

172321
Training Center I.D.

This card certifies the holder has demonstrated the required knowledge and skill objectives to a currently authorized MEDIC First Aid Instructor. Certification does not guarantee future performance, or imply licensure or credentialing. Course content conforms to the 2010 AHA Guidelines for CPR and ECC, and other evidence-based treatment recommendations. Certification period may not exceed 24 months from class completion date. More frequent reinforcement of skills is recommended.

MAJOR DRILLING

JAN 10 2014

SALT LAKE CITY

MAJOR
Drilling America, Inc.

Certificate of Completion

This certifies that

Kenneth Burkhead

has successfully completed Liberty Mutual's

Decision Driving Course

December 29, 2013

Chance Densley
Certified Trainer

MAJOR

Forklift Safety Certification Card

Kenneth Burkhead

Operator Name

12/29/13 CD

Issued

This card is valid for up to 3 years from date of issue.

Boart Longyear

Drilling Services

This Certificate acknowledges that:

Jim Chambers

Completed 40 Hour HAZWOPER
Training on:

12/22/2006
@
Huntsville, AL
in compliance with OSHA Standard CFR 1910.120

Derrick McNeal
Instructor

Certificate of Completion

This certifies that

Jim Chambers

Has Successfully completed

8 Hour HAZWOPER Refresher Training

Refresher certification does NOT necessarily indicate initial 24 or 40 Hour HAZWOPER certification

In Accordance W/Federal OSHA Regulation 29 CFR 1910.120(e), (p) & (q)

And all State OSHA and EPA Regulations As Well

This course is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) issued by Safety Unlimited, Inc. (Accreditation # 044)

Julius P. Griggs

Julius P. Griggs
Instructor #892

131211568158
Certificate Number

12/11/2013
Issue Date

SAFETY UNLIMITED, Inc.
OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley, CA 93063
888 309-SAFE (7233) or 805 306-8027 866-869-7097 (fax)
www.safetyunlimited.com

Proof of initial certification and subsequent refresher training is NOT required to take refresher training
Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

Fax Stamp:
Date/Time: 11/27/13
To: majordrilling
By: TMR

MAJOR Drilling Environmental, LLC

Major Drilling Environmental
Physician's Written Opinion for Hazardous Waste site Work

Date:	11/27/2013	EID:	
Employee:	James L. Chambers III		

Respirator Use

In accordance with 29 CFR 1910.134 and CCR Title 8 Section 5144, it is my medical opinion that this employee is:

- [x] Medically qualified for respirator use.
- [ ] Not medically qualified for respirator use.

Comments:

Hazardous Materials / Emergency Response

In accordance with 29 CFR 1910.120, it is my medical opinion that this employee:

- [x] Does not have a medical condition
- [ ] Has a medical condition

That would place him / her at increased risk when performing work in Hazardous Materials / Emergency Response activities.

Comments:

Clinic:	WORKWELL OCCUPATIONAL HEALTH CENTER
Address:	7736 MADISON BLVD., HUNTSVILLE, AL 35806
Phone:	256-830-8930

Physician:	Kristopher N. Jones, MD, MPH		
Signature:	Kny	Date:	11/27/2013

MAJOR
Drilling Environmental, LLC

RESPIRATOR FIT TEST RECORD

NAME: James Chambers DATE: 11 / 26 / 13

LOCATION OF TEST: Huntsville AL

MASK INFORMATION	TEST TYPE	RESULT
MANUFACTURE: SURVIVAIR MASK TYPE: FF/HF MODEL: OPTI-FIT S/M/L	ISOAMYL ACETATE IRRITANT SMOKE	PASS/ FAIL PASS/ FAIL
MANUFACTURE: MSA MASK TYPE: FF/HF MODEL: 3000 S/M/L	ISOAMYL ACETATE IRRITANT SMOKE	PASS/ FAIL PASS/ FAIL

COMMENTS:

MAJOR

Forklift Safety Certification Card

James Chambers

Operator Name

12/29/13 CD

Issued

This card is valid for up to 3 years from date of issue.

MAJOR DRILLING

JAN 13 2014

CD

SALT LAKE CITY

MEDICAL EXAMINER'S CERTIFICATE
PART 1 OF 2

I certify that I have examined **James Lowell Chambers, III** in accordance with the federal Motor Carrier Safety Regulations (49 CFR 391.41-391.49) and with knowledge of the driving duties. I find this person is qualified, and, if applicable, only when:

- ☐ wearing corrective lenses
- ☐ wearing hearing aid
- ☐ accompanied by a ____________________ waiver/exemption
- ☐ driving within an exempt intracity zone (49 CFR 391.62)
- ☐ accompanied by a Skill Performance Evaluation Certificate (SPE)
- ☐ qualified by operation of 49 CFR 391.64

The information I have provided regarding this physical examination is true and complete. A complete examination form with any attachment embodies my findings completely and correctly, and is on file in my office.

SIGNATURE OF MEDICAL EXAMINER	DATE
	11/27/13

MEDICAL EXAMINER'S CERTIFICATE
PART 2 OF 2

MEDICAL EXAMINER'S NAME (PRINT)	☒ MD ☐ DO ☐ Chiropractor ☐ Physician Assistant ☐ Advanced Practice Nurse
Kristopher N. Jones, MD, MPH	
ADDRESS OF MEDICAL EXAMINER	MED. LICENSE OR CERT. NO./ISSUING STATE
WorkWell Occupational Health Center 7736 Madison Blvd Ste 1 Huntsville, AL 35806	MD.26234 Alabama 314 Lincoln Road Fayetteville, TN 37334
Medical Examiner's Telephone	Driver's License
(256)830-8930	084359726 TN
MEDICAL CERTIFICATE EXPIRATION DATE	DRIVER'S SIGNATURE
11/27/14	

Certification Card **BasicPlus** G2010

CPR, AED, and First Aid For Adults

James L. Chambers III

has successfully completed and competently performed the required knowledge and skill objectives for this program.

MEDIC First Aid

Chance Densley
Authorized Instructor (Print Name)

174888
Registry No.

12-29-13	12-29-15
Class Completion Date	Expiration Date
801-908-1055	172321
Training Center Phone No.	Training Center I.D.

This card verifies the holder has demonstrated the required knowledge and skill objectives to a curre authorized MEDIC First Aid Instructor. Certification does not guarantee future performance, or imply licensure or credentialing. Course content conforms to the 2010 AHA Guidelines for CPR and ECC, & other evidence-based treatment recommendations. Certification period may not exceed 24 months fro class completion date. More frequent reinforcement of skills is recommended.

MAJOR DRILLING
JAN 10 2014
CD
SALT LAKE CITY

MAJOR
Drilling America, Inc.

Certificate of Completion

This certifies that

David Chamblee

has successfully completed Liberty Mutual's

Decision Driving Course

December 29, 2013

Chance Densley
Certified Trainer

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BOART LONGYEAR

Environmental & Infrastructure Drilling Services

This Certificate acknowledges that:

Brian Ray

Completed OSHA 40 Hour
Hazardous Waste Site Worker Training

August 20th 2009
@
Huntsville, Alabama
in compliance with OSHA Standards

Eric M. Geiger

Eric M. Geiger

Michael C Rice

Mike Rice
Instructor

Certificate of Completion

This certifies that

Brian Ray

Has Successfully completed

8 Hour HAZWOPER Refresher Training

Refresher certification does NOT necessarily indicate initial 24 or 40 Hour HAZWOPER certification

In Accordance W/Federal OSHA Regulation 29 CFR 1910.120(e), (p) & (q)

And all State OSHA and EPA Regulations As Well

This course is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) issued by Safety Unlimited, Inc. (Accreditation # 044)

Julius P. Griggs	131201594579	12/1/2013
Julius P. Griggs Instructor #892	Certificate Number	Issue Date

SAFETY UNLIMITED, Inc.
OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley, CA 93063
888 309-SAFE (7233) or 805 306-8027 866-869-7097 (fax)
www.safetyunlimited.com

Proof of initial certification and subsequent refresher training is NOT required to take refresher training
Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

MAJOR Drilling Environmental, LLC

Major Drilling Environmental
Physician's Written Opinion for Hazardous Waste site Work

Date:	3/28/13	EID:	
Employee:	Robert B. Ray		

Respirator Use

In accordance with 29 CFR 1910.134 and CCR Title 8 Section 5144, it is my medical opinion that this employee is:

☑ Medically qualified for respirator use.

☐ Not medically qualified for respirator use.

Comments:

Hazardous Materials / Emergency Response

In accordance with 29 CFR 1910.120, it is my medical opinion that this employee:

☑ Does not have a medical condition

☐ Has a medical condition

That would place him / her at increased risk when performing work in Hazardous Materials / Emergency Response activities.

Comments:

Clinic:	WORKWELL OCCUPATIONAL HEALTH CENTER
Address:	7736 MADISON BLVD., HUNTSVILLE, AL 35806
Phone:	256-830-8930

Physician:	Kristopher N. Jones, MD, MPH		
Signature:	[signature]	Date:	3/28/13

MAJOR
Drilling Environmental, LLC

RESPIRATOR FIT TEST RECORD

NAME: Brian Ray DATE: 2 / 22 / 13

LOCATION OF TEST: Huntsville, AL

MASK INFORMATION	TEST TYPE	RESULT
MANUFACTURE: **SURVIVAIR**	ISOAMYL ACETATE	PASS/ FAIL
MASK TYPE: **FF/HF**	IRRITANT SMOKE	PASS/ FAIL
MODEL: **OPTI-FIT S/M/L**		
MANUFACTURE: **MSA**	ISOAMYL ACETATE	PASS/ FAIL
MASK TYPE: **FF/HF**	IRRITANT SMOKE	PASS/ FAIL
MODEL: **3000 S/M/L**		

COMMENTS:

MEDICAL EXAMINER'S CERTIFICATE
PART 1 OF 2

I certify that I have examined **Robert Brian Ray** in accordance with the federal Motor Carrier Safety Regulations (49 CFR 391.41-391.49) and with knowledge of the driving duties, I find this person is qualified; and, if applicable, only when:

- [x] wearing corrective lenses
- [ ] wearing hearing aid
- [ ] accompanied by a ____________________ waiver/exemption
- [ ] driving within an exempt intracity zone (49 CFR 391.62)
- [ ] accompanied by a Skill Performance Evaluation Certificate (SPE)
- [ ] qualified by operation of 49 CFR 391.64

The information I have provided regarding this physical examination is true and complete. A complete examination form with any attachments embodies my findings completely and correctly, and is on file in my office.

SIGNATURE OF MEDICAL EXAMINER	DATE
Kjn	03/28/2013

MEDICAL EXAMINER'S CERTIFICATE
PART 2 OF 2

MEDICAL EXAMINER'S NAME (PRINT) Kristopher N. Jones, MD, MPH	☒ MD ☐ DO ☐ Chiropractor ☐ Physician Assistant ☐ Advanced Practice Nurse
ADDRESS OF MEDICAL EXAMINER WorkWell Occupational Health Center 7736 Madison Blvd Ste 1 Huntsville, AL 35806	MED. LICENSE OR CERT. NO./ISSUING STATE MD.26234 Alabama
	105 Amy Circle Madison, AL 35758
Medical Examiner's Telephone (256)830-8930	Driver's License 4793131 AL
MEDICAL CERTIFICATE EXPIRATION DATE 03/28/2015	DRIVER'S SIGNATURE Robert B. Ray

MAJOR
Drilling America, Inc.

Certificate of Completion

This certifies that

R. Brian Ray

has successfully completed Liberty Mutual's

Decision Driving Course

December 29, 2013

Chance Densley
Certified Trainer

Certification Card **BasicPlus**

G 2010

CPR, AED, and First Aid For Adults

Brian Ray

has successfully completed and competently performed the required knowledge and skill objectives for this program

MEDIC First Aid

Chance Densley

Authorized Instructor (Print Name)

174888

Registry No.

12-29-2013

Class Completion Date

12-29-2015

Expiration Date

801-908-1055

Training Center Phone No.

172321

Training Center I.D.

This card certifies the holder has demonstrated the required knowledge and skill objectives to a currently authorized MEDIC First Aid Instructor. Certification does not guarantee future performance, or imply licensure or credentialing. Course content conforms to the 2010 *AHA Guidelines for CPR and ECC*, and other evidence-based treatment recommendations. Certification period may not exceed 24 months from class completion date. More frequent reinforcement of skills is recommended.

MAJOR DRILLING

MAJOR DRILLING

JAN 10 2014

CD

SALT LAKE CITY

MAJOR

Forklift Safety Certification Card

Brian Ray

Operator Name

12/29/13 CD

Issued

This card is valid for up to 3 years from date of issue.

MAJOR DRILLING

JAN 13 2014

CD

SALT LAKE CITY

CERTIFICATE
OF
TRAINING

UXB INTERNATIONAL

this certifies that

Peggy Shirley

has completed the requirements for
40 Hour Training
Hazardous Waste Operations
in accordance with **OSHA 29 CFR 1910.120 (e) (9)**

______________________ 1/23/98
Certifying Official Date

CERTIFICATE OF TRAINING

Presented to

Peggy Miller

STERLING GLOBAL OPERATIONS, INC

For Having Successfully Met the
Training Requirements for the

29 CFR 1910.120 (e) (8), and 1910.10 Hazardous Waste Operations And Emergency Response General Worker/ Supervisor 8-Hour Refresher

Henry M Kight

Henry Kight
Corporate Safety and Health

STERLING GLOBAL OPERATIONS, INC

April 29, 2013
Date

The Texas A&M University System

Texas Engineering Extension Service

National Emergency Response and Rescue Training Center

Peggy S. Miller

has successfully completed

Unexploded Ordnance Technician Level I

May 7, 2004
200 Hours
A DOD Certified Course

Division Head, National Emergency Response and Rescue Training Center

Director, Texas Engineering Extension Service

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Certificate
of
Training

UXB

International, Inc.

this certifies that

Robert Miller

has completed the requirements for
40 Hour Training
Hazardous Waste Operations
in accordance with **OSHA 29 CFR 1910.120 (e) (9)**

Willi[illegible] Batt — Certifying Official

25 April 1995 — Date

Certificate of Training

Presented to

Robert Miller

STERLING
GLOBAL OPERATIONS, INC

For Having Successfully Met the
Training Requirements for the

29 CFR 1910.120 (e) (8), and 1910.10 Hazardous Waste Operations And Emergency Response General Worker/Supervisor 8-Hour Refresher

Henry Kight
Corporate Safety and Health

STERLING
GLOBAL OPERATIONS, INC

September 28, 2013
Date

04/27/95 16:57 ☎703 8039353 UXB INTL INC ☑011

Naval School
Explosive Ordnance Disposal
Detachment

This Certificate is awarded to

A1C ROBERT L. MILLER

for the successful completion of the prescribed course of study for

G5AQN46430-000 Explosive Ordnance Disposal Specialist, Phase I, PDS Code 8Z1

Explosive Ordnance Disposal Assistant

on this 13TH *day of* SEPTEMBER 19 90

BY: Geo Demetropolis

G. J. DEMETROPOLIS, CDR, USN
Officer in Charge

NAVSCOLEODDET 1500/1 (REV. 11-88)

EXPLOSIVE ORDNANCE DISPOSAL
US NAVAL SCHOOL
PER SCIENTIAM SERVITIA

Naval School
Explosive Ordnance Disposal

Certificate of Completion

Presented To

Airman First Class
Robert L. Miller, USAF

For having successfully completed
the prescribed course of study for

EXPLOSIVE ORDNANCE DISPOSAL PHASE II

6 February 1991

Date

M. G. MATHEWS, CDR, USN

Commanding Officer

The National Association of Safety Professionals

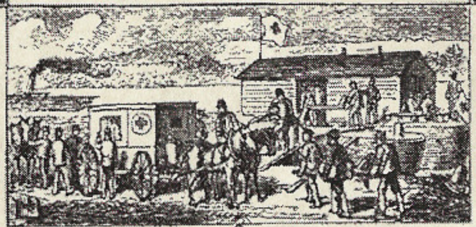
The National Association of Safety Professionals Certified Trainer, whose signature and certification number appear below, hereby certifies that the below named person did attend and satisfactorily complete the course of study herein named.

Rickey G. Rudd

40 hour HAZWOPER training in compliance with 29 CFR 1910.120 for operations in Level C and D Ensemble.

The signatory below further certifies that he/she has attained the certification from the National Association of Safety Professionals appropriate to provide the training herein specified and that the signatory is solely responsible for the content of said training. NASP does not warrant the quality nor content of said training.

0625576055		10/22/03
Trainer Certification Number	Trainer Signature	Date



NASP

CERTIFICATE OF TRAINING

Presented to

Rickey Rudd

EODT
EOD TECHNOLOGY, INC.

For Having Successfully Met The
Training Requirements for the

29 CFR 1910.120 (e) (8), and 1910.10 Hazardous Waste Operations And Emergency Response General Worker/ Supervisor 8-Hour Refresher

Henry Kight
Corporate Safety and Health

EODT

September 8, 2012
Date

ORDNANCE
EXPLOSIVE DISPOSAL
U.S. NAVAL SCHOOL
PER SCIENTIAM SERVITIA

Naval School
Explosive Ordnance Disposal

Certificate of Completion

Presented To

Sergeant
Rickey G. Rudd, USMC

For having successfully completed
the prescribed course of study for

SURFACE BASIC EXPLOSIVE ORDNANCE DISPOSAL

22 June 1989

Date

M. G. Mathews

M. G. MATHEWS, CDR, USN

Commanding Officer

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New Jersey / New York Hazardous Materials Worker Training Center

Partially supported by the National Institute of Environmental Health Sciences and the National Institute for Occupational Safety and Health

This is to certify that

Patrick Rex Tatman

Certificate #UMD1 02933

has successfully completed the course entitled

Health and Safety for Hazardous Waste Site Investigation Personnel

40 Hour
(4.0 CEU's for 40 contract hour)
conducted by the
Office of Public Health Practice
UMDNJ- School of Public Health
in collaboration with the Environmental and Occupational Health Sciences Institute

UMDNJ
SCHOOL OF
PUBLIC HEALTH
University of Medicine & Dentistry of New Jersey

Audrey R. Gotsch
Audrey R. Gotsch, DrPH
Center Director

June 6-10, 2005

Training Renewal Date: June 10, 2006

John M. Malool
John M. Malool, MS
Course Director

CERTIFICATE OF TRAINING

Presented to

Patrick Tatman

STERLING GLOBAL OPERATIONS, INC

For Having Successfully Met the
Training Requirements for the

29 CFR 1910.120 (e) (8), and 1910.10 Hazardous Waste Operations And Emergency Response General Worker/ Supervisor 8-Hour Refresher

Henry M Kight
Henry Kight
Corporate Safety and Health

STERLING
GLOBAL OPERATIONS, INC

March 4, 2013
Date

Naval School Explosive Ordnance Disposal

This is to certify that

AW2 Patrick R. Tatman, USN

has successfully completed the

Basic EOD Course

Class 50B-95

14 June 1996

In witness thereof, this certificate has been signed and given under my hand at Naval School Explosive Ordnance Disposal, Eglin AFB, Florida

This 22th day of February in the Year of Our Lord, Two Thousand Two

Commanding Officer
Acting

NAVSCOLEOD 1500/26
REV (2-00)

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Attachment 4

Hospital Location Map

Local Non-Emergency Occupational Medical Provider Information

Emergency Contacts List

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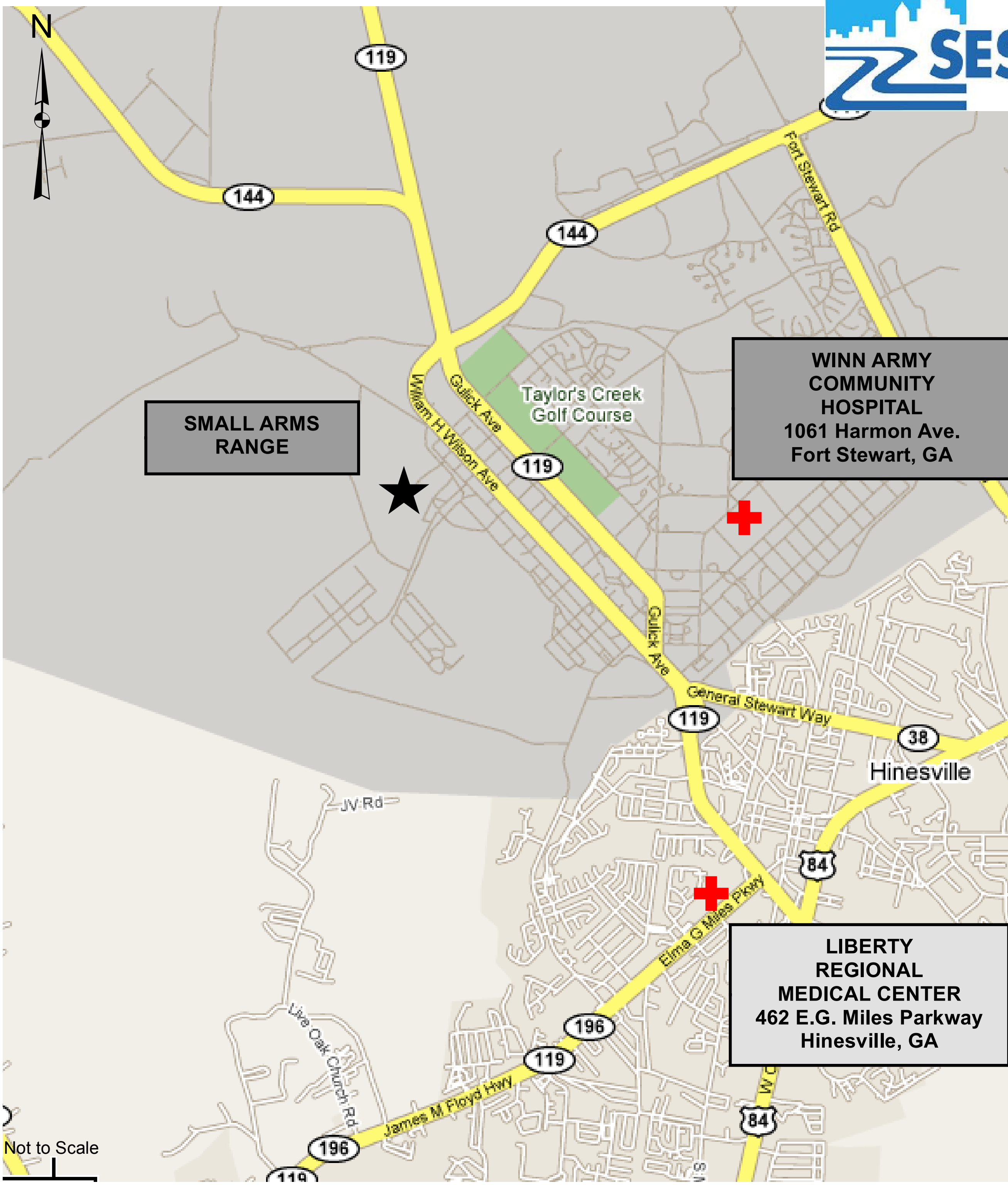

LEGEND

★ Site Location

✚ Hospital Locations

Job Title: Site Investigation
at the Small Arms Range Berm Area
Fort Stewart, Georgia

Attachment 4: Route to Hospitals Map

R:E0209.0025\Graphics\Route to Hospitals Map.mxd (10/22/13)

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**

Fort Stewart 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) 652-6060
Range Control	(706) 791-5008
Environmental Compliance	(706) 791-6327
SES – Jim Madaj	(865) 481-7837
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 – Leah Taylor, Human Resources Manager	(865) 481-7837 ext. 227 (865) 388-9593 (cell)

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Attachment 5

Designation of Competent Person and SSHO

and Resumes of Key Personnel

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October 21, 2013

Subject: Site Investigation Small Arms Range Berm Area
Fort Stewart, Georgia
Construction Safety Competent Person Designation
LeAnn McNeal

This letter is to certify that LeAnn McNeal is designated as an OSHA 30 Hour Construction Safety competent person for SpecPro Environmental Services LLC (SES) on the Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia, project.

Ms. McNeal will be on site at the project at all times when work is being performed. Ms. McNeal will have full-time responsibility for managing, implementing, and enforcing the SES Safety and Health Program in accordance with the accepted APP and AHAs.

Having completed the OSHA 30 Hour Construction Industry Outreach Training as required by the USACE, she also has the experience and training to fulfill the designation of construction safety competent person as required by 29 CFR 1926.20(b)(2) and as defined in 29 CFR 1926.32(f).

In serving as the designated construction safety competent person per EM 385-1-1 01.A.12.a. Ms. McNeal will conduct documented frequent safety inspections of the work site, materials, and equipment to ensure compliance with the APP and EM 385-1-1. She is capable of identifying existing and predictable hazards in the workplace surroundings or working conditions that have the potential to create unsanitary, hazardous, or dangerous situations to employees. In addition to this training and experience, she has the authority to take prompt corrective measures to eliminate and/or implement corrective actions to control any employee health or safety concerns that arise during the course of this project work. This authority includes any actions necessary relating to employees or subcontractor personnel assigned to the project site.

Please contact me if there are any questions or concerns.

Thank you.

Richard N. Rathnow, MS, CIH, CSP
Corporate Safety and Health Manager
SpecPro Environmental Services LLC
1006 Floyd Culler Ct.
Oak Ridge TN 37830

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LeAnn Taylor McNeal
Environmental Scientist/SSHO

Summary of Qualifications

Ms. McNeal is an environmental scientist with over thirteen years of experience providing technical and field support for multiple environmental and construction projects on U.S. Army and Air Force sites in the southeast region. She prepares, reviews, and analyzes documents, work plans, and site, safety and health plans; conducts environmental sampling of surface water, storm water, groundwater and soil; and assists in the installation of groundwater monitor wells, and various soil and groundwater remedial actions on cleanup sites. Ms. McNeal coordinates activities with subcontractors and vendors and regularly interfaces with the U.S. Army Corps of Engineers (USACE). She has been instrumental in the successful completion of underground storage tank (UST) projects at Fort Stewart and Hunter Army Airfield (HAAF), Georgia, and in support of an environmental impact statement (EIS) at Fort Stewart where she provided valuable coordination with business and public entities and the news media.

Since 2001, Ms. McNeal has supported site safety and health (SSHO) initiatives, regularly reviewing health and safety plans to ensure regulatory compliance, and is fully conversant with all aspects of health and safety codes and practices.

Education

- BS, Earth Science, Eastern Michigan University, 2000

Training

- OSHA 40-Hour HAZWOPER and 8-Hour Refreshers
- OSHA 40-Hour HAZWOPER for Site Workers
- OSHA 8-Hour HAZWOPER Site Supervisor
- OSHA Excavation Safety
- Environmental Compliance Officer
- Unexploded Ordnance Basic
- Georgia Soil and Water Conservation Commission, Level 1A Certification
- Environmental Restoration Liabilities
- Remedial Action Cost Engineering & Requirements (RACER)
- The Effective Facilitator
- Army Environmental Database-Restoration and Compliance-Related Cleanup Systems
- Underground and Aboveground Storage Tank Inspection
- Hazard Communications
- First Aid/CPR/AED

Experience

SES group of companies, 2008–Present
Oak Ridge, Tennessee
Environmental Scientist/SSHO

2012–Present: Heating Oil Spill Site Investigation at Building 419, Fort Stewart, GA. SSHO and environmental scientist providing site support during a site delineation and extraction of free product from a heating oil spill site: performed groundwater monitoring; provided site oversight during monthly vacuum extraction events; and prepared Site Investigation report. Project also involves disposal of investigative-derived waste, and preparation of a CAP Part A.

2013–Present: Site Investigations of Aqueous Fire-Fighting Foam (AFFF) Usage at Various U.S. Air Force Bases. SSHO and environmental scientist assisting with field investigations at 10 installations to identify AFFF usage.

2013–Present: Remedial Action, Site A, at Former Turner AFB, GA. SSHO and environmental scientist performing field efforts and sampling activities during the installation of three new monitoring wells at the site of a former fuel distribution center.

2012–Present: UST Corrective Action Plan (CAP)–Part A and Part B at Victory Shoppette, Fort Stewart, GA. Acting as SSHO and environmental scientist, providing field assistance with well development, slug testing and semi-annual groundwater monitoring at USTs 208 and 209 near Building 939 on Fort Stewart.

2012–Present: Site Investigation at Small Arms Range Berm, Fort Stewart, GA. SSHO and environmental scientist, preparing a work plan and safety plan for a site investigation to delineate contaminants of concern.

2012–2013: Groundwater Investigation Services, Redstone Arsenal, AL. As environmental scientist and SSHO, performed well development, piezometer readings and waste sampling in support of groundwater investigation services being performed by Shaw E&I for the U.S. Army Environmental Command.

2012–2013: Corrective Action Plan (CAP) Part B and Free Product Extraction, Fort Gordon, GA. Provided SSHO guidance during the installation of soil borings and groundwater monitoring wells used to delineate free petroleum product and contamination in soil and groundwater at UST Site 15 during which one surfactant injection and free product extraction event was performed. Also assisted with the public notice process for the CAP B.

2012: Evaluation of Soil and Groundwater at Potential Construction Sites, Fort Stewart and HAAF, GA. Environmental scientist and SSHO on the rapid response evaluation, over a two-year period, of soil and groundwater at five proposed construction sites. Wrote work plan and health and safety plan; coordinated utility clearances and drilling activities and conducted groundwater sampling at wells that were installed on a site-by-site basis.

2011–2013: Building 7009 Sampling and Maintenance Support, HAAF, GA. Project manager providing environmental services including groundwater and air sampling in support of an SAIC contract on a multiphase remediation system at the airfield.

2011–2012: Direct Push Technology (DPT) Borings, Borehole Drilling, and Monitoring Well Installation, Redstone Arsenal, AL. Assisted with groundwater monitor well development and performed piezometer/soil boring sampling in support of Shaw Environmental's contract to install temporary wells, collect groundwater samples from temporary wells, install overburden, overburden/bedrock interface, and shallow bedrock wells at Redstone Arsenal.

2011–2012: Heating Oil Spill Site Investigation at Building 419, Fort Stewart, GA. Environmental scientist: installed soil borings, groundwater monitor wells, and performed soil and groundwater sampling to delineate contaminants of concern at the site; provided site oversight during monthly vacuum extraction events; and prepared Site Investigation report.

2011–2012: UST Corrective Action Plan–Part A at Victory Shoppette, Fort Stewart, GA. Environmental scientist: installed soil borings and groundwater monitor wells and performed soil and groundwater sampling to delineate contaminants of concern at an Army and Air Force Exchange site; and prepared Corrective Action Plan-Part A report.

2011: Fort Stewart 4th IBTC Land Use Controls. Supported the installation of land use controls in the form of 3,000 linear feet of chain link fencing. Coordinated with installation personnel and venders to obtain utility clearances, and provided support to field supervisors and crew.

2011: Interim Removal Action at USTs 208 and 209, Fort Stewart, GA. Environmental scientist and SSHO: performed groundwater sampling and free product recovery at USTs 208 and 209; installed soil borings and groundwater monitor wells; performed soil and groundwater sampling to delineate contaminants of concern at the site; performed health and safety compliance; and wrote project reports.

2011: EIS for Training Land Expansion Program, Fort Benning, GA. Provided support in public scoping meetings related to an environmental impact study.

2010–2011: Disposal of Contaminated Soil, Fort Bragg and Pope Air Force Base (AFB), NC. Field manager on the removal and disposal of 3,700 cubic yards of stockpiled petroleum-contaminated soil: responsible for collecting one soil sample for every 200 cubic yards removed and, following analysis results, for overseeing the final disposal at a local soil farm.

2010–2011: Excavation at Golf Pro Shop, Install Shredder and Upgrade Paint Booth, Fort Bragg, NC. Prepared the Accident Prevention Plan and the Site Safety and Health Plan for the removal and proper disposal of debris from the basement of a former building that was covered with a parking lot, demolition of an incinerator, and installation of a bulk paper shredder and a paint spray booth.

2010: Oil-Water Separator (OWS) Closures, Robins AFB, GA. Environmental scientist and SSHO at three OWS closures: performed closure sampling, and prepared the work plan, health and safety report and closure report.

2009–2011: Site Investigation at Small Arms Range, Fort Stewart, GA. Environmental scientist and SSHO: performed soil and water sampling on delineation of contaminants of concern at a former small arms firing range, and supported the project's safety and health initiatives.

2009–2011: RCRA Facility Investigation (RFI) at Former Skeet Range, Fort Gordon, GA. Prepared RFI report for a soil delineation project at solid waste management unit (SWMU) 046 in Fort Gordon.

2009–2010: Curb Washrack Implementation and Hazardous Waste Satellite Covers, Fort Stewart, GA. Provided project support during installation of concrete curbing to divert storm water away from washracks and to provide secondary containment at tanker parking areas, and installation of hazardous waste satellite covers. Coordinated with installation personnel and venders to obtain utility clearances and provided support to field supervisors and crew.

2009: Diamond Head Avenue Low Impact Development (LID), Fort Stewart, GA. Environmental specialist responsible for storm water sampling activities during rain events and for measuring turbidity.

2009: UST Removals, Building 1330, Fort Stewart, GA. Environmental scientist and SSHO at the removal site of two unregistered USTs: performed soil sampling; health and safety oversight and compliance; and prepared project reports.

2008–2010: Training Range and Garrison Support Facilities Construction and Operation EIS, Fort Stewart, GA. Responsible for coordination of public scoping meetings and media announcements related to an environmental impact study at Fort Stewart.

2008–2010: Renovation of Fuel Purging Facility, Ft. Stewart, GA. Environmental scientist and SSHO at an environmental upgrade of the fuel purging facility: coordinated with installation personnel and obtained utility clearances; performed closure sampling and closure reports for two OWS; and performed safety and health oversight and compliance duties.

2008–2009: Remedial Action Pilot Study, Camp Blanding, FL. Environmental scientist and SSHO at a pilot study investigating two remedial methods and the delineation of a trichloroethylene plume. Performed groundwater sampling and provided health and safety oversight and compliance.

2008–2009: USTs 208, 209, 210 and Well Installation at SWMU 13, Fort Stewart, GA. Environmental scientist and SSHO: performed groundwater sampling at USTs 208, 209 and 210; monitored well installation; performed free product recovery at USTs 208 and 209; provided health and safety oversight and compliance; and prepared project reports.

2008–2009: LID Projects, Fort Stewart, GA. Coordinated with installation personnel and obtained utility clearances for two LID projects. Provided support to field supervisors and crew and wrote project reports.

2008: UST Closure and Aboveground Storage Tank (AST) Replacement, Robins AFB, GA. Performed closure sampling at a UST closure and monitored the installation of a replacement 2,000 gallon AST. Prepared work plan, health and safety report and closure report.

Engineering and Environment, Inc., 2004–2007
Virginia Beach, Virginia
Facilitator/Technical Coordinator for U.S. Army Environmental Command (USAEC)

- Coordinated with Army installations and USAEC prior to the environmental cleanup workshop. Generated agendas, timelines, facilitated meetings, and after-action reports that were used to track the entire progress of the Installation Action Plan (IAP) document;
- Prepared cost estimates for Army installations and National Guard Bureau environmental cleanup sites;
- Reviewed relevant site documentation and prepared cost estimates for site investigations, feasibility studies, remedial designs, remedial actions, and long term management projects. Assisted installations with uploading cost estimates and backup documentation into the Department of the Army's databases of record (AEDB-R and AEDB-CC);
- Created draft IAP documents prior to the workshop, updated/finalized IAP documents following the workshop. Gathered and compiled IAP document comments from the installations, accessed AEDB-R and AEDB-CC for data input, reviewed and finalized IAP documents.

Engineering and Environment, Inc., 2001–2004
Virginia Beach, Virginia
Installation Restoration Program Manager at Fort Stewart and HAAF, Georgia

- Contractor to Fort Stewart and HAAF Directorate of Public Works, Environmental and Natural Resources Division;
- Provided technical expertise and program management to the USAEC on various aspects of the Installation Restoration Program (IRP), Compliance Related Cleanup Program, and the Military Munitions Rule Program (MMRP) at Fort Stewart and HAAF, Georgia;
- Assisted with the implementation of a Performance Based Contract at HAAF: reviewed work plans and schedules, analyzed short and long term implications, assisted with the development of selection criteria;
- Oversaw the cleanup of numerous environmental restoration sites, resulting in the modification of the Installation's Hazardous Waste Permit for approval of 28 sites for No Further Action and another six sites for Institutional Controls;
- Prepared, reviewed, and analyzed documents, plans, scopes of work (SOWs), databases, and tracked the financial status and progress of the environmental programs at the two installations;

- Prepared and submitted reports regarding site investigations and cleanup activities to environmental regulatory agencies. Prepared correspondence and met with representatives of federal and state environmental regulatory agencies, Department of the Army personnel, and contractors;
- Prepared and submitted project funding requests, SOWs, work plans, and updated Army databases for site investigations, remedial actions, and long-term management projects;
- Reviewed reports and work plans generated by contractors, prepared and submitted written comments;
- Served as SSHO: reviewed health and safety plans, ensuring compliance with all regulations; provided safety and health oversight for subcontractor activities including inspections, incident investigation and reporting, implementation of corrective actions, and program communications.

Hull and Associates, Inc., 2000–2001
Toledo, Ohio
Scientist I

- Provided technical support for various environmental engineering projects ranging from groundwater sampling of petroleum release sites to quality control and safety inspections during the construction of state regulated landfills;
- Prepared correspondence to, and met with, state regulators and local citizens;
- Collected soil and groundwater samples for laboratory analysis, and worked with various groundwater remediation units on cleanup sites.

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October 21, 2013

Subject: Site Investigation Small Arms Range Berm Area
Fort Stewart, Georgia
Alternate Construction Safety Competent Person Designation
Chris Napoleon

This letter is to certify that Chris Napoleon is designated as an OSHA 30 Hour Construction Safety alternate competent person for SpecPro Environmental Services LLC (SES) on the Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia, project.

Mr. Napoleon will be on site at the project at all times when work is being performed. Mr. Napoleon will have full-time responsibility for managing, implementing, and enforcing the ASL Safety and Health Program in accordance with the accepted APP and AHAs.

Having completed the OSHA 30 Hour Construction Industry Outreach Training as required by the USACE, he also has the experience and training to fulfill the designation of alternate construction safety competent person as required by 29 CFR 1926.20(b)(2) and as defined in 29 CFR 1926.32(f).

In serving as the designated construction safety competent person per EM 385-1-1 01.A.12.a. Mr. Napoleon will conduct documented frequent safety inspections of the work site, materials, and equipment to ensure compliance with the APP and EM 385-1-1. He is capable of identifying existing and predictable hazards in the workplace surroundings or working conditions that have the potential to create unsanitary, hazardous, or dangerous situations to employees. In addition to this training and experience, he has the authority to take prompt corrective measures to eliminate and/or implement corrective actions to control any employee health or safety concerns that arise during the course of this project work. This authority includes any actions necessary relating to employees or subcontractor personnel assigned to the project site.

Please contact me if there are any questions or concerns.

Thank you.

Richard N. Rathnow MS, CIH, CSP
Corporate Safety and Health Manager
Aerostar SES LLC
1006 Floyd Culler Ct.
Oak Ridge TN 37830
865-481-7837

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SES

Chris Napoleon
Project Geologist/SSHO

Summary of Qualifications

Mr. Napoleon is a geologist with over eight years of experience in geotechnical, environmental, and construction projects. His specialties and responsibilities include: health and safety; trenching and excavations; field coordination and project planning; soil treatment and dewatering; Phase I and Phase II projects; Geoprobe® direct-push and hollow-stem auger rig operation; air rotary rig operation, rotosonic rig operation, soil boring and monitoring well installation, sampling, and development; soil sampling/logging; field surveys; global positioning system equipment; and water treatment and monitoring including surface, storm water, and activated carbon treatment and system monitoring and maintenance.

Education

- BS, Geography and Geology, East Tennessee State University, 2005

Certifications

- Underground Petroleum Storage Tank Remover, Kentucky: LUG0009636

Training

- 40-Hour HAZWOPER and 8-Hour Refreshers
- OSHA 30-Hour Outreach Training for the Construction Industry
- OSHA Competent Person for Excavation Trenching and Shoring
- 8-Hour HAZWOPER Management and Supervisor
- 40-Hour Asbestos Supervisor
- Respirator Fit Test
- OSHA Bloodborne Pathogens
- CPR/First Aid/AED

Mr. Napoleon's Geoprobe® experience includes familiarity with both deep and shallow probing methods and appropriate tooling for sampling. He is experienced in groundwater sampling at different intervals through the Geoprobe® dual-tube sampler. In addition, he is capable of taking soil gas readings from Geoprobe® soil screens, is proficient in design and placement of temporary monitoring wells and boring placement, and has geotechnical experience with cone penetrometer testing. His hollow-stem auger, air-rotary, and rotosonic drilling experience includes driller oversight, logging soils and core and well installation. Mr. Napoleon is familiar with the operation and appropriate tooling for many styles of drill rigs, including hollow-stem auger, air rotary, mud rotary, rotosonic, and DPT, and is able to identify and test for soil type and determine proper hazard control measures for sloping/shoring. He performs daily excavation inspections to verify safety, regularly trains and briefs workers on potential excavation hazards, and assures safe placement of spoil pile operation of equipment and activities of persons working in, and operating around, excavation sites.

Mr. Napoleon has performed soil sampling ranging from large-scale excavation sites to split-spoon and Geoprobe® liners. He tests for soil classifications using an approved method, i.e. pocket pentrometer, plasticity/wet threadtest or visually. In the area of groundwater sampling, he is proficient in both low-flow and bailer-type sampling and is experienced with Grundfos®, air bladder, Whale® and parastaltic pumps. Mr. Napoleon's monitoring well installation experience includes development by airlift, pumping, surging, and bailing. He is familiar with sampling protocol for temporary and permanent wells.

Mr. Napoleon is also proficient in stormwater and process water treatment. He has experience in setup and operation of activated carbon water treatment systems ranging from treatment systems for small-scale operations up to 1,000 gallon per minute systems.

Mr. Napoleon has over five years of experience in health and safety oversight, trenching and excavation oversight, and he is the site safety and health officer (SSHO) with responsibility for project safety orientation, safety training, daily tailgate meetings, site safety inspections and incident investigation and reporting. Mr. Napoleon is experienced with area and personal air monitoring using instruments such as personal air pumps, Draeger Tubes, and vacuum air canisters, and is responsible for inspection of excavations, trench boxes, and trench installations.

Experience

SES Group of Companies, 2011–Present
Oak Ridge, Tennessee
Project Geologist

2013: Geothermal Test Bore, Redstone Arsenal, AL. Project geologist for installation of one geothermal test borehole for the testing of formation thermal conductivity for the development of geothermal heating and cooling at Redstone Arsenal.

2013–Present: Groundwater Monitoring at USTs 208 and 209, Fort Stewart, GA. Field Manager/Alternate SSHO on a two-year groundwater monitoring project of nine wells where long term monitoring will be used to ensure contamination associated with former UST has been removed.

2013–Present: UST Corrective Action Plan, Part A and B, at Victory Shoppette, Fort Stewart, GA. Field Manager/Alternate SSHO during semi-annual groundwater monitoring activities at Victory Shoppette. Groundwater wells were installed to ensure contamination associated with former fuel line piping has been removed during excavation activities.

2013–Present: Remedial Action at Site A, Turner AFB, GA. Alternate SSHO on the installation of multiple new monitoring wells at a former fuel distribution center associated with former air field fueling operations.

2012–Present: Evaluation of Soil and Groundwater at Potential Construction Sites, Fort Stewart and HAAF, GA. Field manager on the rapid response evaluation, over a two-year period, of soil and groundwater at five proposed construction sites: groundwater wells were installed on a site-by-site basis with up to three sediment samples and three surface water samples to be collected from each site as applicable.

2011–Present: Redstone Arsenal Drilling and Monitoring Well Installation, Huntsville, AL. Project geologist and SSHO, providing drilling and health and safety coordination and oversight during a $1.9 million drilling and monitoring deep bedrock and shallow well installation program at Redstone Arsenal under contract to Shaw Environmental. Evaluated potential project safety and health hazards and communicated awareness of, and/or mitigated concerns as necessary.

2011–Present: Former Skeet Range Polynuclear Aromatic Hydrocarbon (PAH) and Lead Testing, Fort Gordon, GA. Project geologist and SSHO providing Geoprobe® soil sampling support on a former skeet range: performed 26 soil borings over a two-week period while also providing health and safety site actions to identify, mitigate and/or correct potential safety risks.

2013: Vertical Test Bores and Formation Thermal Conductivity Testing, Fort Campbell, KY. Project geologist on the installation of three vertical test borings to 300 ft. bgs, and the testing of formation thermal conductivity to determine the average thermal conductivity.

2012: Storm Water, Erosion, Sediment Controls Mirror Lake, Fort Gordon, GA. Performed SSHO duties on the repair to the standpipe and outlet pipe system at Mirror Lake, to properly convey storm water in compliance with state and federal regulations: conducted daily pre-task safety meetings, briefed employees on AHA requirements, and weekly site condition inspections and equipment inspections, and also acted in the capacity of excavation competent person.

2011–2012: Kelley Hill Debris Removal, Fort Benning, GA. Project geologist and SSHO on the removal activities of 11,000 cubic yards of debris from a highly eroded area at a closed inert landfill. Identified and mitigated potential health and safety issues during landfill excavation activities and conducted daily pre-task safety meetings, briefed employees on activity hazard analysis (AHA) requirements, and performed weekly site condition inspections and equipment inspections

Previous Experience

Tetra Tech, Inc., 2007–2011
Oak Ridge, Tennessee
Geologist/Site Superintendent

2010: Pond Liner Installation, McGuire Nuclear Station, Huntersville, NC. Site Superintendent and SSHO at the installation of a pond liner for a waste water treatment facility at Duke Energy's active McGuire Nuclear Station. Conducted daily safety tailgate meetings and oversight of excavation of radiological contaminated soils where he ensured slopes, compaction, and grade were within acceptable tolerances of engineer's design. During the project he supervised installation of 15 feet deep trenches and trench box installation for the new underground utilities and circulation piping associated with the pond. Subsequently provided oversight for an HDPE pond liner and oversight for testing procedures associated with plastic welding on the HDPE liner.

2010: Water Treatment, Iowa Army Ammunition Plant, Middletown, IA. Geologist and SSHO supervising water treatment, landfill excavation, trenching and capping, installation of carbon water filtration systems, treatment and dewatering of sludge at a former army ammunition plant. Conducted daily safety tailgate meetings and oversight of all project activities for safety and health concerns. Supervised the capping of an inert disposal landfill where he supervised trenching for characterization, and ensured all slopes, compaction, and grades were within acceptable tolerances of the engineer's design.

2008–2011: Groundwater Sampling, Volunteer Army Ammunition Plant, Chattanooga, TN. Lead Geologist and SSHO for semi-annual sampling activities at a former Army ammunition plant with TNT, DNT and metals contaminated groundwater. Performed sampling at both monitoring wells and underwater springs while maintaining crew's compliance with health and safety regulations through daily safety tailgate meetings

2007–2009: Soil Remediation, Volunteer Army Ammunition Plant, Chattanooga, TN. At this former Army ammunition plant contaminated with TNT, DNT, and metals, Mr. Napoleon's activities included worker oversight, trenching and excavation oversight, health and safety monitoring and evaluation of safety hazards, field coordination, sampling, water treatment, storm water monitoring, and rainfall monitoring. Provided excavation oversight of large scale three-acre by 20-feet deep excavations where soil was removed for treatment with alkaline hydrolysis. Mr. Napoleon also supervised the trenching for removal of contaminated process sewer lines. He was responsible for ensuring worker safety and maintaining a safety program for proper trenching procedures.

MACTEC Engineering and Consulting, 2005–2007
Knoxville, Tennessee
Geologist

2007: Core Sample Drilling, Dominion Power Plant, Castlewood, VA. Geologist providing safety oversight and guidance for drilling to obtain 500-ft. core samples to compile data to determine how an area would support a 300-ft. deep ash pile. Activities included logging core, packer testing, running and maintaining water lines for winter coring conditions, and driller oversight.

2005–2007: Semi-annual Groundwater Sampling, Former Textron Plant, Textron; Cookeville, TN. Geologist sampling multiple monitoring wells once per quarter. Wells were multiple levels, including residuum and bedrock level. Sampling styles included bladder pumps and parastaltic pumps. Activities included sampling, labeling, and shipping samples.

2005–2007: Semi-annual Groundwater Sampling, Poplar View Landfill, Knoxville, TN. Provided biannual sampling expertise for multiple bedrock wells. Sampling was by Grundfos pumps. Activities included sampling, labeling, and shipping samples.

2007: Drilling Oversight at John Sevier Fossil Plant, Tennessee Valley Authority (TVA); Rogersville, TN. Provided oversight of drillers installing monitoring wells and collected geotechnical data from core and soil drilling. Wells were installed by hollow-stem auger and air-rotary drill rigs. Activities included soil logging, driller oversight, and relaying information to the TVA project manager.

2006–2007: Drilling Oversight, Cumberland Fossil Plant, TVA, Cumberland City, TN. Performed drilling oversight on ash piles with activities including: directing placement of monitoring wells; oversight of drillers; and relaying of information from drilling events back to the TVA project manager.

2006: Installation of Granite and Sand Pillars, Bull Run Steam Plant, TVA; Oak Ridge, TN. Provided oversight for installation of granite sand pillars in fly ash landfills to promote more efficient dewatering of ash piles. Activities included worker oversight, soil logging, geosynthetic fabric installation oversight, and implementation design. Provided oversight for all excavation work completed on this project to maintain acceptable tolerances with the engineer's designs.

2005–2006: Deep Soils Sampling, Volunteer Army Ammunition Plant, Chattanooga, TN. In his capacity as geologist, assisted with deep soils Geoprobing. Work included deep soil borings to depths of 110 feet below ground surface, sampling, soil logging and decontamination of equipment. As site safety officer ensured compliance with site safety and health activities and procedures.

Doug Hawn
Project Manager/Environmental Scientist

Summary of Qualifications

Mr. Hawn has over 24 years of diversified experience as an environmental scientist. He specializes in environmental assessments, regulatory compliance audits, field investigation, and environmental remediation. He has worked in 26 states as well as Guam, Midway Island, Germany, and Canada. Many of the regulatory audits were for active manufacturing facilities to determine compliance with appropriate environmental regulations. He has performed many Phase I environmental assessments which typically involved site visits, record searches at regulatory agencies, and reviews of aerial photographs and old maps: many of these assessments have been used to support property transfer agreements.

In addition to his field investigation and remediation experience, Mr. Hawn also serves as the SES analytical coordinator for all company projects. He is responsible for planning sampling requirements, and coordinating with field staff, laboratory personnel, and validators to ensure that samples are collected, shipped, and analyzed for the appropriate parameters.

Mr. Hawn has supported numerous projects for Department of Defense (DoD) clients, including the U.S. Corps of Engineers (USACE) and the Naval Facilities Engineering Command (NAVFAC), on both construction and demolition activities, Resource Conservation and Recovery Act (RCRA) facility investigations (RFIs), and remedial actions. For these projects, his responsibilities have included peer review of project documents, management of field activities, conducting confirmatory sampling, oversight of monitoring well installation, laboratory coordination and management of analytical data, and quality assurance/quality control (QA/QC). He has also prepared project deliverables such as work plans, Corrective Action Plans (CAPs) and reports, sampling and analysis plans, and QA plans. In addition, as the Task Manager for underground storage tank (UST) projects, he has managed monitoring activities and the installation of groundwater monitoring wells, UST excavation and removal, and soil sampling during closure activities.

Additional highlights of Mr. Hawn's experience include:

- Building material characterization (asbestos, lead-based paint, polychlorinated biphenyls [PCBs], radioactivity) prior to the decontamination and decommissioning of several Department of Energy (DOE) buildings in Oak Ridge, TN;
- Preparation of preliminary assessments/site investigations for numerous contaminated areas at the DOE Savannah River Site for which he reviewed environmental assessments, investigated historical data, developed a sampling and analysis plan, and evaluated analytical data;
- Regulatory compliance for a feasibility study at a DOE facility, which included wetlands and floodplains assessments, threatened and endangered species surveys, cultural and archaeological resources assessments, and ecological risk assessments.

Education

- BS, Wildlife and Fisheries Science, University of Tennessee, 1988

Training

- Asbestos Inspector
- OSHA 40-Hour HAZWOPER and 8-Hour refreshers
- HAZWOPER Supervisor
- USACE Construction Quality Management for Contractors
- Asbestos in Buildings: Inspector Training and refreshers
- Emergency Response
- First Aid/CPR/AED

Experience

SES Group of Companies, 1994–Present
Oak Ridge, Tennessee
Environmental Scientist/Project Manager

2013–Present: Outdoor Small Arms Range Berm Clearance, Marine Corps Recruit Depot (MCRD), Parris Island, SC. Project manager for the removal of the top three feet of a small arms range berm, the screening for projectiles and other debris, and appropriate disposal of all hazardous materials including projectile-damaged wooden timbers. The berm will be reconstructed to an approximate 2:1 slope, utilizing additional fill and topsoil as needed from an off-site source and erosion control matting on the berm face, followed by complete restoration of the disturbed site.

2013–Present: Time-Critical Removal Action at Former Camp Wheeler, GA. Project manager overseeing subcontractor's removal of Munitions and Explosives of Concern (MEC) to a depth of detection on 52 acres within a former firing range at the former Camp Wheeler, in preparation for surface-mining the area.

2012–Present: Response to Regulatory Review Comments and CAP, Fort Benning, GA. Project manager overseeing groundwater monitoring at two UST sites.

2012–Present: Heating Oil Spill Site Investigation at Building 419, Fort Stewart, GA. Project manager conducting a site delineation and extraction of free product from a heating oil spill site, and conducting a two-year groundwater monitoring program, disposal of investigative-derived waste, and preparation of a CAP Part A and Part B.

2012: Waste Management Support at Navy Operational Support Center (NOSC), Amarillo, TX. Project manager overseeing the safe containerization, labeling and disposal of excess waste materials at the NOSC facility.

2011–2013: Non Time-Critical Removal Action (NTCRA) at Former Camp Wheeler, GA. Project manager overseeing subcontractor's removal of MEC to a depth of detection at the Power Line Corridor and the Layfield Property within a former firing range that was part of the former Camp Wheeler.

2011–Present: RFI Interim Removal Action at Former Skeet Range, Fort Benning, GA. Project manager currently investigating potential contaminants at solid waste management unit (SWMU) FBSB-102, a former rod and gun club skeet range: a groundwater monitor well will be installed using Geoprobe® direct push technology, and soil samples will be collected from borings and analyzed for polycyclic aromatic hydrocarbons (PAHs) and total lead.

2011–Present: Site Investigation at Small Arms Range Berm, Fort Stewart, GA. Project manager for follow-on work to further delineate contaminants of concern in areas of the project site not yet delineated and to remove an estimated 2,500 cubic yards of soils. An Interim Removal Action will be developed containing detailed documentation of all completed work and disposal details of the berm material.

2010–2013: Environmental Impact Statement (EIS) for Training Land Expansion Program, Fort Benning, GA. Project manager responsible for the preparation of an EIS to address a proposed 82,800 acre expansion of army training activities. Of the needed total acreage, 60,000 acres would support maneuver training for heavy battalions. The remaining 22,800 acres would support the Army

Reconnaissance Course (ARC) and other training that could be moved off the 2009 footprint of Ft. Benning. The immediate need is the acquisition of land to allow the ARC to conduct the field training tasks off the Installation footprint by October 2016.

2011–2012: Removal of Unpermitted Debris from Kelley Hill Site, Fort Benning, GA. Project manager on the removal of approximately 16,500 cu. yds. of debris from a highly eroded area. After examination and sorting for hazardous materials, which were removed, approximately 2,500 cubic yards of clean soil and 750 tons of clean concrete were recovered for reuse. After backfilling, the site was graded to form three terraces downsloping to the point of natural drainage and best management practices (BMPs) in the form of "micro" pools and a drainage channel system were created to transition stormwater flow from the site.

2011–2012: Mobile Indoor Firing Range Lead Removal, Naval Air Station (NAS), Joint Reserve Base (JRB), Fort Worth, TX. Project manager for removal of lead-contaminated range material, disposal, cleaning, sampling, and decontaminating activities at the Base's mobile indoor firing range.

2011–Present: Indoor Firing Range Lead Removal and Maintenance, NAS JRB, Fort Worth, TX. Project manager organizing the 2-phase removal of lead-contaminated materials and maintenance activities on both halves of the indoor firing range at NAS JRB Fort Worth. In the 50-feet wide, 12-lane section of the range, the bullet trap Grantex rubber was removed and replaced, and lead/bullet fragments disposed of; subsequently lead residue was removed from the interior range surfaces, vacuumed and wet-washed; sampling was performed to ensure lead remediation goals were achieved. Waste disposal, material replacement, patching and reinstallation activities completed the work. From both sides of the range, a total of approximately 60 cu. yds. of material was removed, including the spent Grantex.

2011–2012: Mobile Indoor Firing Range Cleanup and Dental Clinic Closure, Naval Support Activity (NSA), New Orleans, LA. Project manager for removal of lead contaminated material at a mobile indoor firing range where ceiling, tiles, the ventilation system, bullet backstop components and soundproofing materials were removed and disposed of as hazardous waste. Confirmatory sampling in the firing range resulted in re-cleaning to achieve remedial goals. Also included in the scope was the cleanup at the dental clinic prosthetics laboratory where all contaminated equipment was removed and waste materials were characterized.

2011–2012: Evaluation of Soil and Groundwater at Potential Construction Sites, Fort Stewart and HAAF, GA. Project manager on the rapid response evaluation of soil and groundwater at five proposed construction sites.

2011: Excavation and Soil Screening at Former Gas Station, Fort Benning, GA. Project manager responsible for the completion of an excavation of potentially contaminated soil at the site of Building 3763, a demolished gas station where the USTs and all associated piping had already been removed. Approximately 1,000 cubic yards of soils were removed, to a depth of approximately 29 feet, and screened for disposal purposes, and confirmatory sampling was performed.

2010–2012: Heating Oil Spill Site, Fort Stewart, GA. Project manager overseeing a site investigation of 4,500 gallons of heating oil spilt near Building 419 at Fort Stewart.

2008–2011: Site Investigation of Small Arms Range Berm Area, Fort Stewart, GA. Project manager responsible for the delineation of contaminants of concern at a former small arms firing range. A volume of contaminated soil was identified and removed and the investigation indicated the need to extend the area of delineation beyond the extent of the berm.

2010: UST Removal at Building 95, Fort Campbell, KY. Subcontracting laboratory coordinator overseeing the sampling activities for the closure by removal of a 6,000-gallon unregulated heating oil UST associated with Building 95 in the Kentucky portion of Fort Campbell.

2008–2010: Training Range and Garrison Support Facilities Construction and Operation EIS, Fort Stewart, GA. Project manager for the preparation of an EIS that addresses the resulting environmental and socioeconomic effects of proposed military activities at Fort Stewart beginning in Fiscal Year (FY) 11 and extending through FY14. The purpose of the proposed action is to provide modern training capabilities, build facilities to support stationing changes, and enhance management of land and infrastructure of Fort Stewart to support current and future missions while sustaining its stewardship of natural and cultural resources.

2008: Soil Remediation at Central Energy Facility, Fort Campbell, KY. Project manager overseeing the permanent closure of a fuel oil system, which had previously served as an auxiliary fuel system for boilers in the Central Energy Facility (Building 3902) at Fort Campbell.

2007–2008: Remedial Action at Former UST Sites, Fort Campbell, KY. Environmental scientist on project using oxygen release compound to treat source area petroleum, oil and lubricant (POL) contamination in the soil and groundwater. RegenOx™ was injected into the subsurface as a relatively high-volume aqueous solution that oxidizes contaminants and generates free radicals, which provide further oxidation. SES collected confirmation samples at three and six months to evaluate the effectiveness of the treatment.

2007–2008: Lubrication Rack Sites Investigations and Demolition, Fort Campbell, KY. Project manager for investigations to determine extent of soil contamination at multiple former lubrication rack sites throughout the installation, utilizing direct push technology to install several borings at each site, and collecting surface and subsurface soil samples for analysis for PAHs and total metals. Also oversaw the demolition of two lubrication racks.

2007–2008: Remedial and Investigative Activities at Helicopter Crash Site, Skyline, AL. Project manager responsible for project to conduct emergency response activities at a helicopter crash site, including: delineation of a crash site area of approximately 10,000 square feet; identification of 19 impacted areas; soil sampling at impacted areas to assess for Total Petroleum Hydrocarbons (TPHs) and RCRA metals; excavation and proper disposal of approximately196 cubic yards of TPH impacted soil; collection and disposal of helicopter fragments; sampling of perched water; confirmatory soil sampling post-soil removal activities to assess adequacy of the removal effort; repair of a culvert damaged by the Army during crash removal activities; and site restoration and reseeding.

2007: Phase I Environmental Audit, Knoxville, TN. Performed a Phase I environmental audit at two adjoining parcels of property to provide client with information needed to make cost-effective and timely decisions regarding potential environmental liabilities associated with the properties.

2006–2009: Slurry Wall and Environmental Pilot Studies at South Central Landfill, Fort Stewart, GA. Analytical coordinator assisting in the development of a barrier wall to protect personnel from explosive amounts of methane, generated by the South Central Landfill at Fort Stewart, which was potentially gathering in low-lying areas near a tank trail used by military personnel.

2006–2007: Free Product Recovery at Campbell Army Airfield (CAAF), FY06, Fort Campbell, KY. Environmental scientist overseeing the sampling and analysis of effluent from the two treatment systems at CAAF as part of a project to provide eight months of support for the fixed multi-phase vacuum extraction system at the airfield.

2006–2007: Removal of a 30,000 Gallon Diesel UST at Building 7008, Fort Campbell, KY. Project manager overseeing the removal of a 30,000 gallon petroleum underground storage tank (UST) at a former energy facility in accordance with state requirements. The related piping, concrete ducts and cement block pump house were also demolished and removed. The UST and other metal components were properly disposed or recycled after asbestos abatement on the piping conduit insulation, contaminated soil was characterized and disposed, and the excavated area was restored.

2006: Corrective Measures Study for SWMU 170Z11, Fort Campbell, KY. Provided peer review of the corrective measures study for the site of a former lubrication rack where free project and dissolved groundwater contaminants were a concern. Provided regulatory guidance during development of site-specific, qualitative cleanup goals to address contamination and protect human health and the environment. Five remedial alternatives were evaluated, and passive skimmers were selected as a cost-effective remedial strategy to meet remedial goals.

2005–2006: UST Removals at Ellyson Army Airfield, Sites 3 and 6, Pensacola, FL. Analytical Coordinator on a project that called for the removal and closure of four small USTs located at Site 3, and 14 500-gallon lube oil USTs, 47 fuel dispensing pits/dispensers, one oil water separator and wash rack, four valve pits, three junction pits, and approximately 6,000 feet of piping runs at Site 6.

2005–2006: Tier II and Tier III Risk Assessment for the Old Hospital Complex, Fort Campbell, KY. Environmental scientist and project manager responsible for directing risk assessment and data management personnel during a large-scale human health risk assessment involving over 600 soil samples. Work included analysis of risks to future residents and recreational users of the site from pesticide, metals, and semi-volatile organic compounds in soil.

2005: Preliminary Site Investigation, Loudon, TN. Project manager responsible for an investigation of an old convenience store in support of a property transfer. Performed a site inspection, historical record search, and interviews of prior site tenants to determine the potential for future environmental problems. Prepared the Phase I report.

2004; Sinkhole Verification, Fort Campbell, KY. Environmental scientist during a project to verify the existence of over 90 sinkholes that were referenced in historical documents at Fort Campbell. Visited each site to assess whether storm water flowed into the sinkholes, photograph each area, install markers, and collect survey data using GPS equipment.

2004; Bryan Village CAP A, Fort Stewart, GA. Analytical coordinator and member of the field team during installation of four groundwater wells, well sampling, and soil sampling around a former tank pit where fuel related contamination had been detected in the groundwater. Coordinated all sampling during the 2-week effort and performed the majority of fieldwork at night to minimize disruption to the active fueling facility. Prepared the project work plan and provided peer review of other project documents.

2003–2004; Soil Removal at SWMU 15, Millington, TN. Analytical coordinator during a large-scale removal action of over 57,000 tons of petroleum-contaminated soil at a former fuel farm. Coordinated with laboratory personnel and the field team during collection and analysis of over 50 soil samples to ensure that all contaminated soil was removed.

2003-2004; Site Investigation at the Old Hospital Complex, Fort Campbell, KY. Environmental scientist responsible for leading the field-sampling team during an investigation to determine the presence and extent of contamination from previous activities at the Old Hospital Complex. Managed collection of both surface and subsurface soil samples using both direct push technology (Geoprobe) as well as stainless steel spoons and trowels. Over 600 samples were collected and submitted to the analytical laboratory for analysis in accordance with Fort Campbell Standard Operating Procedures. Soil was also examined visually and field-screened using a MiniRAE 2000 photoionization detector with a 10.6 eV lamp.

2002–2003; AIMTech; RCRA Facility Investigation at SWMU 39, Fort Stewart, GA. Environmental scientist responsible for oversight during Geoprobe boring and monitoring well installation. Sampled existing and new wells, and soil for PAH and VOC analysis. Sampling was performed to investigate boundaries of a waste oil plume at the site. Assisted with preparation of the RFI report.

2002; AIMTech; UST/Heating Oil Tank Investigation, Fort Stewart, GA. Environmental scientist during a subsurface investigation of underground fuel storage systems at Fort Stewart. Responsible for oversight of drilling personnel during installation of 32 monitoring wells. Collected soil and groundwater samples, and coordinated with laboratory and data validation personnel.

2002; AIMTech; RCRA Facility Investigation at SWMU 27, Open Burn/Open Detonation Unit, Fort Campbell, KY. Task manager responsible for a RCRA Facility Investigation to determine whether residual contamination from explosives was present at the site. The task included developing and sampling 16 existing wells, and collecting 35 surface soil samples and 21 subsurface samples from 7 Geoprobe borings. Samples were analyzed for VOCs, SVOCs, energetics, sulfites, nitrates/nitrites, and total phosphorous. Coordinated transfer of lab data and with validation personnel. Also responsible for coordinating field efforts with UXO specialists to ensure that all project activities were conducted safely. Prepared the final project report.

2002; Phase I Environmental Audit for the Former Custom Pak Meats Property. Task manager responsible for a Phase I audit in support of a property transfer for the Former Custom Pak Meats property in Knox County. Completed a site visit, personnel interviews to determine site history, and research at regulatory agencies to determine any past environmental problems at the site or with adjacent properties. Authored final phase I report.

2001; Phase I Environmental Assessment for 17 Property Parcels in Knox County, TN. Task manager responsible for a Phase I Environmental Assessment covering approximately 5.5 acres. Reviewed topographic maps of the area, property boundary information, environmental databases incorporating federal and state lists of contaminated sites, and local tax maps. Also contacted local fire and health departments to obtain information regarding underground storage tanks, spills, and reported health problems at the site or in the area. Reviewed historic aerial photographs of the site and vicinity, to obtain soil information, wetlands maps, and floodplain maps. Conducted a site visit to inspect the site for any evidence of environmental impairment, and identified building materials that could potentially contain lead based paint and asbestos. Phase II sampling was recommended.

2001; USACE–Mobile District; IDIQ Base Environmental Support Contracts. Analytical coordinator for two $3M Base Environmental Support Contracts. Responsible for arranging laboratory analysis, coordinating with the data validator, and management of electronic databases containing results. Task orders under these contracts have included a deconstruction feasibility study, removal of asbestos and lead based paint-contaminated housing, a preliminary site assessment; removal of lead-contaminated waste piles; design of a waste treatment system; a RCRA facility investigation, and compilation of a yearly groundwater summary report.

2001; Environmental Site Assessment for the Bungalow Market Site, Maryville, TN. Task manager for a Phase I Environmental Site Assessment. to determine whether potentially adverse environmental conditions were present. Reviewed local, state, and federal databases for listings of the property or of properties in the immediate area. Contacted local officials and employees of the facility to inquire about environmental conditions, and reviewed the history of the site. Authored final report.

2000–2001; USACE–Nashville District; Update to the Fort Campbell Generic Work Plan and Sampling and Analysis Plan. Task manager responsible for the Generic Work Plan, and Sampling and Analysis Plan update. These documents are used by both Fort Campbell and subcontractor personnel. Mr. Hawn was lead author responsible for incorporation of new regulatory information, sampling techniques, and environmental investigation procedures.

1999–2003; USACE–Nashville District; Groundwater Summary Report, Fort Campbell, KY. Data manager responsible for preparation of the annual report summarizing analytical data collected from over 100 wells at various solid waste management units, one area of concern, and the Campbell Army Airfield. The report was used as a planning document to determine whether contaminant concentrations were increasing or decreasing, and to help determine future remedial strategies.

1999–2001; Stokely/National Park Service; LeConte Lodge Wilderness Camp, Gatlinburg, TN. Lead environmental scientist during the inspection and sampling of kerosene-impacted soil within the fuel storage area. Responsibilities included coordination for approval with the State of Tennessee, Remediation Division of Solid Waste and the National Park Service on the Sampling and Analyses Plan and remediation alternatives.

1998–2001; USACE–Nashville District; ID/IQ Contracts at Fort Campbell, KY. Environmental scientist on over 30 tasks at Fort Campbell carried out under HTRW IDIQ contracts. Work included sampling and analysis, ecological risk assessments, data validation and interpretation, and environmental compliance studies and regulatory interface. Acted as laboratory and electronic data management coordinator for all Fort Campbell HTRW tasks. Part of the team that received the Fort Campbell Corporate Performance Award.

2000; USACE–Nashville District; Environmental Assessment at the WJCW Site, Gray, TN. Environmental scientist responsible for sampling the WJCW radio station site where leaks from an old UST had impacted groundwater. Project activities included sampling three groundwater wells and surface water from a nearby stream. Samples were analyzed for TPH EPH.

2000; Environmental Audits, Alltrista Corporation. Lead environmental auditor responsible for routine environmental compliance and permit reviews at Alltrista facilities in FL, TN, IN, AK, IA, and SC. Responsible for site visits, interviews with key personnel, and review of analytical data. Ensured that all hazardous waste, solid waste, and wastewater management activities were in compliance with local, state, and Federal regulations.

2000; USACE–Nashville District; AOC H, Fort Campbell, KY. Environmental scientist during collection phase of additional sediment and surface water samples (7 pairs, 14 total); updated the existing Tier I Human health risk evaluation, updated the existing Tier I Ecological Risk Assessment and conducted a Tier III Baseline Ecological Risk Assessment. Managed sampling activities and was responsible for coordination with the laboratory and data validator.

2000; Solid Waste Management Unit 149x and 149y, Fort Campbell, KY. Analytical coordinator responsible for sampling equipment, tracking, and electronic data deliverables. Reviewed all analytical data and served as primary point of contact with laboratory personnel.

2000; Underground Storage Tank Investigation, Fort Stewart, GA. Environmental scientist responsible for the construction oversight of eight groundwater monitoring wells at potentially contaminated sites. Conducted soil and groundwater sampling in accordance with the work plan, and served as primary point of contact for laboratory personnel.

1999–2000, Drakes Creek Project, Hendersonville, TN. Environmental scientist responsible for set up of sampling procedures and equipment during the Drakes Creek restoration project. Restoration was performed by dredging the creek in most areas to a depth of five feet, installing geotubes to contain dredged material, and use of bioengineering and conventional techniques for site restoration. Sampling was conducted to monitor the turbidity of the water in the creek.

1999–2000; Skeet Range, Fort Campbell, KY. Project manager for the Phase I RFI. Responsible for sediment, surface water, and soil sampling to address lead and PAH contamination at the site. Coordinated data analysis and validation in accordance with the project work plan. Also responsible for report preparation, and an ecological assessment of the site based on EPA guidance.

1999–2000; USACE–Nashville District; Wastewater Treatment Plant Demolition and Characterization, Fort Campbell, KY. Environmental scientist for the characterization and demolition of an abandoned wastewater treatment plant. Responsibilities included review of SOW with regard to regulatory issues (e.g., analytical methods, sampling techniques and decontamination), supporting the preparation of the Work Plan (reviewed and approved by the USACE, Environmental Protection Agency [EPA], and the Commonwealth of Kentucky), management of the field activities (e.g., sampling, decontamination and coordination with Post personnel), coordination with the laboratories, management of analytical data, and report preparation.
Other representative projects at Fort Campbell with similar responsibilities included: Subsurface Investigation of SWMU 149 Oil Pits, Area of Concern D, and Fort Campbell CAAF Groundwater Sampling.

1999; US Slate & Marble, Morristown, TN. Lead auditor during an Environmental Audit. US Slate & Marble was vacating a site for a new owner. Responsibilities included an on-site visit, review of documentation and existing environmental data, and interviewing key personnel.

1999; Lockheed Martin Energy Systems, Inc., Hazardous Wastes Remedial Action Program, Oak Ridge, TN. Environmental scientist and regulatory specialist for remediation at Fort Campbell, Kentucky. Prepared work plan for Pumphouses 1 and 2 at Area of Concern A. The area was suspected to have fuel contamination. Work plan included Geoprobe sampling, soil borings, sampling existing monitoring wells, and installing new monitoring wells. Conducted field QA/QC, laboratory coordination, data analysis, and report preparation for a RCRA facility investigation at 8 sites. Prepared the work plan, QA plan, and sampling and analysis plan for the removal and demolition of a battery shop. The site was suspected to have lead contamination. This project was especially challenging because it involved a combination of environmental investigation and construction activities. Coordinated the revegetation efforts for two landfill sites. Also responsible for coordinating laboratory activities and revegetation of a former landfill site that was used for building a new troop medical and dental clinic. This project was successfully completed in a very short time to allow construction of the building to begin.

1998–1999; USACE–Nashville District; Fort Campbell Battery Shop, Fort Campbell, KY. Regulatory specialist/environmental scientist for confirmatory sampling at SWMU 163, Maintenance Battery Shop. Prepared the Work Plan, QA Plan, and Sampling and Analysis Plan for the removal/demolition of a battery shop.

1998–1999; Frederickson Truck Terminal, Knoxville, TN. Project manager and lead environmental scientist for the removal of a 10,000 gallon UST which contained 2,400 gallons of diesel fuel. After excavation and removal of the tank, soil samples were collected from inside the pit and from the stockpiled soil. The Tennessee Department of Environment and Conservation approved the UST closure report for this site.

1997–1999; Rice Oil Company, Caryville, TN. Project manager and lead environmental scientist for the installation of groundwater monitoring wells and soil sampling for an Environmental Assessment of underground storage tanks. Completed a CAP for the remediation of the site and negotiated with the UST Division of Tennessee Department of Environment and Conservation (TDEC) during all phases of the assessment and corrective action.

1995–1998; Westinghouse Savannah River Company (WSRC), Inc.; Aiken, SC. Project manager and lead environmental scientist responsible for preparing preliminary assessments/site investigations at the DOE Savannah River Site. Investigated past uses of sites, developed and implemented sampling and analysis plan for three sludge application sites totaling over 70 acres, evaluated analytical data, and prepared reports. Managerial responsibilities included cost and schedule control, billing, interacting with the WSRC technical representative. Reduced costs to the client by providing a more extensive review of existing data instead of conducting more sampling.

1995–1997; Ridgeview Landfill, Knoxville, TN. Environmental scientist during the planning, investigation, design, and permitting of a 16 acre Subtitle D construction/demolition landfill in Knox County, Tennessee. Investigations included a hydrogeologic study with the associated modeling; a threatened and endangered survey, an archeological survey, and zoning surveys. Responsible for topographic surveying, quarterly groundwater sampling, and annual stormwater sampling.

1995–1997; Dutton Motors, Lenoir City, TN. Environmental scientist for the UST project which included monitoring of 2 unpermitted UST pits in order to bring them into compliance. Two wells were installed, and the stockpiled soil was monitored. Clean closure approval was received following monitoring activities.

1996; Lockheed Martin Energy Systems, Inc., Oak Ridge, TN. Project scientist for building material characterization (asbestos, lead-based paint, PCBs, radioactivity) prior to D&D of the K-25 Power House, Building 1401, Building 1200, Building 1001, and Building 1037. This project was completed very rapidly (6 days per week, 10 hours per day) to save the client money by allowing the demolition team on the adjacent location to begin work on the site without the need for remobilization costs.

1994–1996; Lockheed Martin Energy Systems, Inc., Oak Ridge, TN. Environmental scientist responsible for regulatory compliance for the Bear Creek Valley feasibility study at the DOE Y-12 Plant. This investigation included wetlands and floodplains assessments, threatened and endangered species surveys, cultural and archaeological resources assessments, and ecological risk assessment.

This project was the pilot for the watershed approach to investigation and remediation and resulted in substantial savings to the client.

1994; Geotek Drilling Company, Oak Ridge, TN. Project manager responsible for soil sampling during the closure in place of ten USTs at Oak Ridge National Laboratory.

Ogden Environmental and Energy Services Company, Inc., 1989–1994
Knoxville and Oak Ridge, Tennessee
Environmental Scientist

1993–1994; U.S. Navy, Pacific Naval Facilities Command, Honolulu, HI. Field manager for inspections at three U.S. Naval facilities in Guam, Midway Island, and Hawaii. Inspected 900 structures for asbestos and lead-based paint in six weeks. Results were used for D&D of the buildings. This project, which was completed in a very short timeframe, involved extensive travel, and included both active and inactive facilities.

1993; Stone and Webster, Oak Ridge, TN. Environmental scientist for wastewater sampling at the Radford Army Ammunition Depot, Virginia. Determined sampling locations, set up continuous samplers, and collected samples. Used SW-846 methodology and maintained chain-of-custody. All field activities were conducted within an active ammunition facility.

1991–1992; Ebasco Environmental, State of Mississippi. Environmental scientist on a team that conducted compliance surveys of more then 100 National Guard Armories in Mississippi. Survey assessed facilities for compliance with RCRA, the Comprehensive Environmental Response, Compensation and Liability Act, Toxic Substances Control Act, Clean Air Act, and other Federal regulations. This project was completed in a very short timeframe, and daily results of the investigation were sent via modem to a central location for concurrent incorporation into a report.

1991; Ogden Environmental Services Co., San Diego, CA. Environmental scientist for a PCB remediation project at an active oil field in remote areas in the Kenai National Wildlife Refuge in Alaska. This project involved sampling areas before, during, and after remediation and included more than 600 soil, water, oil, and wipe samples. Successfully coordinated activities of remediation contractor, oil field engineers, laboratory personnel, and U.S. Fish and Wildlife Services, Region 7.

1989–1993; OSCO, Inc., Nashville, TN. Asbestos specialist in charge of asbestos surveys, bulk sampling, quantification of asbestos-containing materials, and cost estimates for asbestos abatement planning and removal for more than 15 million square feet of private, commercial, industrial properties in numerous states. This project involved extensive travel and difficult working conditions, sometimes in active hospitals.

Professional Affiliations

Society of Wetlands Scientists

Richard Rathnow
Corporate Health & Safety Manager

Summary of Qualifications

Mr. Rathnow has more than 29 years of professional health and safety program management experience including management of successful, large-scale health and safety programs for both commercial and government clients including the U.S. Navy, U.S. Army Corps of Engineers (USACE), Environmental Protection Agency (EPA), Air Force Civil Engineer Center (AFCEC), Department of Energy (DOE), Dow Chemical, Kinder Morgan and Lyondell Chemical. This experience has involved assuring Health and Safety Program (HASP) compliance with the USACE EM 385-1-1, Safety and Health Requirements Manual, as well as 29 Code of Federal Regulations (CFR) 1926, 29 CFR 1910, and other referenced standards.

Highlights of Mr. Rathnow's career include:

- Safety Manager for $380 million in task orders contracted by USACE to deliver construction renovation projects at U.S. Air Force Bases throughout the U.S. and overseas: in five years these have been completed without a single lost-time accident;
- Achieved more than half a million hours without a lost-time injury;
- Experience Modification Rate (EMR) reduced from 0.92 to 0.74 progressively over the past five years.
- Contributed significantly as a site safety engineer to the achievement of more than one million safe work hours without a lost time injury at the DOE's Waste Isolation Pilot Plant;
- Achieved more than one million safe work hours as the program health and safety engineer/coordinator without a lost time injury at the Battelle Columbus Laboratories Decommissioning Project.

Education

- MS, Safety Management, University of Tennessee, 1994
- BS, Occupational Safety/Health & Industrial Technology, Illinois State University, 1983

Registrations/Certifications

- Certified Industrial Hygienist (CIH) #6813, 1995
- Certified Safety Professional (CSP) #9829, 1990

Training

- OSHA 500 Construction Outreach Trainer
- OSHA 40-Hour HAZWOPER and 8-Hour Refreshers
- USACE Construction Quality Management for Contractors
- 30-Hour Construction Safety
- Confined Space Entry Supervisor
- First Aid/CPR/AED
- Bloodborne Pathogens

Experience

SpecPro Environmental Services LLC, 2009–Present
Oak Ridge, Tennessee
Corporate Safety and Health Manager

Mr. Rathnow is responsible for the development and implementation of a safety management system using the American National Standards Institute (ANSI)–Z10, Occupational Health and Safety Management System approach with a risk reduction continual improvement emphasis along with a *zero incidents* culture philosophy. Under his direction the company's EMR has declined from .97 to .00 over a two-year period and achieved over 500,000 work hours without a Days Away/Restricted Time (DART) injury. He has been responsible for the development and implementation of the behavior/people-based loss prevention program, and he has developed an accident prevention approach to address the incident frequency element of accident prevention as well as focusing on risk reduction for prevention of serious consequence events.

Mr. Rathnow has established a subcontractor health and safety qualification system and enhanced safety language for contract documents; he has revised the corporate health and safety program manual; he has helped ensure project specific implementation and compliance with the USACE EM 385-1-1, Safety and Health Requirements Manual, as well as with 29 CFR 1926, 29 CFR 1910, and other referenced standards; he is responsible for the review, revision, and approval of project accident prevention plans and activity hazard analyses; he has mentored subcontractors on health and safety program development and implementation; and he develops and implements safety training program for all facets of construction health and safety.

CH2M HILL, 1997–2009
Knoxville, Tennessee

Verified that construction and remediation programs/projects were conducted in compliance with federal and state occupational safety and health regulations, often exceeding minimum health and safety regulatory requirements. Identified program and project HSSE requirements during the project scoping phase, including training, medical monitoring, and written program requirements. Played a key role in the determination of bid or no-bid decisions based on safety and health risks, reviewed subcontract language and reviewed subcontractor health and safety qualifications and submittals for acceptability and HSSE quality. Managed professional health and safety personnel for program and project support as well as field/project health and safety coordinators to assure appropriate project HSSE implementation. Managed Southeast Region's Environmental Services 2009 HSSE budget of more than $700,000.

Southeast Region Environmental Safety and Health Operations Manager, 2001–2008: Navy Remedial Action Contract (RAC) U.S. Navy, Southeastern United States

Implemented and directed the company's RAC Health Safety Security Environment (HSSE) program, resulting in over 1,000,000 man-hours with a 1.1 OSHA-recordable incident rate and a 0.3 OSHA Lost Workday Case Rate. Implemented and managed an innovative and highly effective Behavior-Based Loss-Prevention System, conducted regular HSSE audits, and was accountable to achieving corporate zero-incident goals. Developed and implemented the HSSE Program Plans and performed program health and safety training for multiple programs. Served as the health and safety program auditor for the Dow contract HSSE program. Managed other large-scale health and safety programs including AFCEE's Worldwide Environmental Restoration and Construction program, EPA Region 6, Dow Chemical Construction and Kinder Morgan projects. Project work included: clean construction; large-scale environmental investigation and remediation; demolition; asbestos removal; lead-based paint removal; chlor-alkalai plant dismantling with mercury exposure; and dredging.

Health and Safety Manager, 2005–2006: Hurricane Ivan Response, Multiple Award Construction Contract, U.S. Navy Southern Division, Naval Air Station (NAS) Pensacola, Florida

Provided HSSE program development and implementation for response to Hurricane Ivan at NAS Pensacola. Work involved repairing and refurbishing military base roofs that were damaged by the hurricane. Responsible for the remediation of asbestos that had been dispersed widely over several areas near the future demolition site of a boiler/powerhouse building. Performed an HSSE audit and provided project support.

Certified Industrial Hygienist (CIH)/Safety and Health Auditor, 2001: Air National Guard Environmental Safety and Health Camp contract

Performed industrial safety and occupational health audits at ANG base facilities including industrial safety aspects (lockout tagout, confined space entry, machine guarding, material handling, etc.) and industrial hygiene aspects (respiratory protection, hazard communication, hearing conservation, medical surveillance, etc.). Assessed conditions and prepared formal reports.

CIH/Site Environmental HSSE Representative, 2001: Environmental Management Waste Management Facility Project, Duratek, Oak Ridge, Tennessee

HSSE program implementation at construction of waste cell landfill. Implemented HSSE program for relocating aboveground storage facilities for radioactive wastes resulting from cleanup. Managed safety concerns for subcontractor construction personnel. Performed air monitoring for exposure to concrete sealing solvents and nuisance dust exposures.

CIH/Site HSSE Officer, 1999–2000: GCL Tie and Treating Superfund Site, USACE, Sidney, New York

Coordinated HSSE program for soil remediation project. Developed HSSE plan and exposure monitoring strategy for USACE-managed site. Performed personal air sampling and site perimeter monitoring for air contaminant concerns including naphthalene, coal tar pitch volatiles, benzene, silica, and nuisance dust. Managed HSSE concerns related to onsite thermal treatment of contaminated soil. Achieved 750,000 work hours without an OSHA recordable injury, for which CH2M HILL was awarded the USACE New York District's 2001 Safety Contractor of the Year Award.

Northeast/Great Lakes Region HSSE Manager, 1997–1999, Milwaukee, Wisconsin

Developed site HSSE programs/plans for hazardous waste investigation, remediation, and construction projects, including those performed under the EPA Alternative Remedial Contracting Strategy (ARCS) and RAC programs. Ensured that projects were conducted in compliance with federal and state OSHA regulations and in a safe, healthy manner. Performed HSSE audits for projects. Provided specific larger scale project support for:

CIH, Chevron Refinery, Chevron, Port Arthur, TX

Developed air monitoring strategy, performed personal/area air sampling, and interpreted results for worker exposure to benzene, toluene, ethyl benzene, xylene, and Portland cement contaminants during waste stabilization activities.

CIH/Site Safety Coordinator, Reichhold Chemicals, Ferndale, MI

Managed HSSE efforts (including excavation safety and air sampling for worker exposure) for soil remediation and installation of groundwater collection system at former chemical processing plant. Directed safe and successful use of Level B personal protective equipment (PPE) where vinyl chloride levels in soil exceeded exposure limits.

CIH/HSSE Manager, Lockheed Martin, Paducah, KY

Coordinated HSSE program elements for large-scale environmental investigation and remediation involving trichloroethylene contamination. Evaluated hazards and identified PPE and other hazard control measures and requirements, which included organic solvents, radiological concerns, physical and biological hazards. Developed air monitoring/sampling plan and coordinated monitoring and interpretation of results. Performed HSSE audits.

Battelle Memorial Institute, 1993–1997
Oak Ridge, Tennessee and Columbus, Ohio

Senior Health and Safety Engineer

- Coordinated industrial hygiene and safety support services for decontamination and decommissioning (D & D) projects on the Battelle Columbus Laboratories Decommissioning Project. Performed exposure monitoring for lead, mercury, beryllium, polychlorinated biphenyls (PCBs), organic vapors, heat stress, and noise for employees performing D & D activities. Work involved removal of radiological contamination and associated health physics concerns during D & D of laboratories, research, and support facilities. Assisted in performing gap analysis for health and safety program for Chemical Manufacturer Association ResponisibleCare® Program.

- Managed environmental, safety, and health support services contract to Waste Management and Remedial Action Division. Environmental impact statements, safety, and health qualitative risk assessment for hazardous waste treatment, storage, and disposal facility. Risk assessment and safety analysis. Team Leader in enriched uranium operations training department.

- Conducted a chemical hazard analysis and an industrial ventilation needs assessment for hazardous waste sampling activities at the DOE's Pantex Plant. Developed contractor hazardous and mixed waste management standards.

- Performed an environmental, safety, and health qualitative risk assessment for an environmental impact statement developed for a hazardous waste treatment, storage, and disposal facility.

- Performed probabilistic risk assessment and safety analysis work for the Safety Analysis Report Program at the Y-12 Plant. The work included scenario and basic event development, assigning of frequency and probability values, equation derivation, fault-tree development and quantification. Served as team leader in Enriched Uranium Operations training department at the Y-12 Plant to coordinate training development. Work emphasized nuclear criticality safety concerns for resumption of operations in receipt shipping and storage operations and in rolling and machining operations.

- Contributed significantly to the development of a RCRA Part B Permit Application for hazardous waste treatment units at the Pacific Northwest Laboratories.

M.K. Ferguson, 1990–1993
Oak Ridge, Tennessee
Environmental, Safety and Health Manager/Construction Safety and Fire Protection Manager

Promoted to role of environmental, safety, and health manager during time at M. K. Ferguson, a construction management company contracted to DOE. Coordinated environmental safety and health administrative activities for the company and directed a staff of eight. Work included accident investigations, trend analysis for injuries and illnesses and safety and industrial hygiene inspection findings, procedure developing, training, worker's compensation, records and statistical analysis, occurrence reporting, root-cause analysis, lessons learned, emergency preparedness, and safety incentives.

As Construction Safety and Fire Protection Manager, managed a staff of 12**.** Responsible for construction safety, fire protection, emergency preparedness, and occupational health programs. Developed and implemented more than 40 safety, industrial hygiene, fire protection, and emergency preparedness procedures and programs. Directed the preparation for the DOE's Tiger Team visits at two facilities, resulting in minimal findings. Helped ensure that project achieved nearly one million employee hours without a lost-time injury. Construction and remediation work was frequently conducted in radiologically-contaminated manufacturing facilities.

Chemical Waste Management, 1989–1990
Chicago, Illinois
Health and Safety Manager

Managed industrial hygiene and safety programs at a hazardous waste incinerator. Evaluated hazardous waste streams to determine health and safety control requirements. Performed exposure monitoring for PCBs, volatile organic compounds, noise and heat stress for employees handling and processing hazardous waste streams. Implemented industrial hygiene and safety programs, including chemical hazard evaluations, air sampling programs, a hearing conservation program, medical evaluation and surveillance programs, contamination control, machine guarding, fire protection, and contractor safety. Improved the facility's safety audit rating from *"needs significant improvement"* to *"excellent"* within one year.

Westinghouse Electric Corporation, 1987–1989
Carlsbad, New Mexico
Senior Safety Engineer

Developed and implemented safety and health programs and procedures at a DOE defense-generated nuclear waste repository. Coordinated industrial and construction safety and health oversight efforts for support of all surface and underground operations to ensure that all safety programs, procedures, policies, regulations, and codes were enforced. Performed industrial safety and health inspections, construction safety and health inspections, accident investigations, and air sampling for contaminants. Reviewed procedures, design and specifications, and engineering work packages for technical safety and health concerns.

Georgia Pacific Corporation, 1984–1987
Taylorville, Illinois
Safety Supervisor

Developed and implemented manufacturing safety and industrial hygiene programs for a paper mill. Performed detailed accident trend analysis and prepared job hazard analysis for high hazard/frequency tasks. Performed industrial hygiene field surveys, including air monitoring and noise assessments. Managed asbestos abatement engineering project. Established many OSHA-required safety training programs, including hazard communication program, industrial forklift safety training, and hearing conservation training. Processed worker's compensation claims and assumed all accident-reporting responsibilities. Responsible for contractor safety and plant security, and plant emergency organization operations.

Professional Organizations/Affiliations

- American Society of Safety Engineers Member
- American Industrial Hygiene Association Member
- Board of Certified Safety Professionals Member
- American Board of Industrial Hygiene Member

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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

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

Severity		Probability				
		Frequent	Likely	Occasional	Seldom	Unlikely
	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.	• 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. • Institute and maintain good housekeeping practices.	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	• 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. • 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 (> 50 lbs.) or awkward loads. Use heavy equipment to transfer heavy or awkward loads when possible. • Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear before lifting. • Avoid carrying heavy objects above shoulder level.	* 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

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
	Working in areas where noise levels exceed 85 dBA without hearing protection properly worn.	• Personnel exposed to loud working environments must wear hearing protection. • 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. **Guideline**: 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.	RAC-L (see table at beginning)
	Working in temperature extremes – high temperatures	• Provide fluids to prevent worker dehydration. • Monitor for heat stress in accordance with APP (maintain use of buddy system). • Institute a conservative work-break regimen that complies with OSHA and ACGIH to avoid heat stress symptoms and overexertion. • Document physiological measurements (radial pulse rates, rest times, work times, and results) in SSHO daily log book. • Workers must minimize or avoid alcohol intake the night before working in heat stress situations. • Shift work to early hours or evenings/nights if possible to avoid peak outdoor temperature times.	Standard Level D PPE (light-colored clothing) RAC - M
	Working in temperature extremes – low temperatures	• Workers are trained to recognize cold stress and appropriate actions to take. • Workers must watch others for signs and symptoms of cold stress (shivering, numbness, sluggishness). • Take breaks in heated shelters. • Drink warm liquids to reduce the susceptibility to cold stress. • Wear layered clothing. • Cover extremities -- such as ears, fingers, nose -- during very low temperature situations. • Remove outer layer of clothing and loosen other layers to promote evaporation of perspiration upon entering shelter.	Standard Level D PPE – layered clothing with high thermal properties RAC - M
	Working in the vicinity of heavy equipment or vehicles	• Wear ANSI Type II reflective warning vests or high-visibility clothing. • Isolate equipment swing areas from workers, fixed objects, or other equipment. • Make/maintain eye contact with operators before approaching equipment. Do not approach equipment from rear or from blind spot of operator. • Understand and review hand signals. Designate one person to provide hand signals to equipment operators.	Standard Level D PPE 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
	Working near untrained operators Working while under a suspended load	• Ensure equipment has operable back-up alarms. • Avoid standing or walking between fixed objects and operating equipment. • 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.	
	Walking or working near or in biological elements native to the work environment	• Observe ground surfaces, especially in wet or grassy areas, tree trunks, and rock piles for evidence and presence of snakes (poisonous). • Observe ground surfaces or surrounding vegetation or structures for presence of fire ants, spiders, bee/wasp hives, etc. • Observe areas for presence of stinging insects. **Notify supervisors of known allergies to stinging insects and location of antidotes.** • 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. • Use permythrin-containing insect repellents on exterior of clothing and PPE only. Do NOT use permythrin directly on skin. • Use a buddy system to check for ticks. • Avoid potential exposure to bloodborne pathogens. Have bloodborne pathogen kit available with first aid kit. • Watch for snakes in tall grass. If working in tall grass or other habitat where snakes are prone to be, wear snake chaps.	Standard Level D PPE RAC - L
Electrical equipment and tools operation	Working with electrical equipment in outdoor or wet locations.	• If/when electrical extension cords are required to complete work, extension cords must be - Equipped with third-wire grounding; - Covered, elevated, or protected from damage when passing through work areas; - Protected from pinching if routed through doorways; - Not fastened with staples, hung from nails, or suspended with wire; and - Rated to handle the voltage/amperage of equipment. • Extension cords and electrical power tools must have ground fault circuit interrupters.	Standard Level D PPE RAC - M

Site Investigation Small Arms Range Berm Area
Fort Stewart, Georgia
ACTIVITY HAZARD ANALYSIS – Mobilization/Site Preparation

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
Refueling equipment and motors,	Improperly storing or handling flammable liquids. Use of smoking materials in no-designated areas.	• Use only metal safety cans to store and transfer fuel. • Use funnels and nozzles during fueling operations. • Allow warm engine parts (generator motor) to cool before refueling. • Appropriately sized, easily accessible ABC fire extinguisher in work area. • Review and be cognizant of base fire prevention procedures and requirements. • Designated and safe smoking areas will be established. NO SMOKING while working in wooded or brushy areas.	Standard Level D PPE RAC - L
Driving vehicles	Operation of vehicles too fast for conditions, disobeying traffic control devices. Operating during extreme weather or hazardous road conditions. Operating under the influence of alcohol or drugs.	• 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. • Operate vehicles cautiously and with regard to wet, icy, or snowy conditions. • 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. • Ensure that vehicle maintenance schedule is followed. • First aid kit and fire extinguisher in vehicle • 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. • Enforce alcohol and drug testing protocol.	RAC - L
• Site preparations	Failure to identify underground utilities prior to the start of soil intrusive operations Working during extreme weather phenomenon,	• Verify underground utilities locations and ensure utilities are not in areas impacted by mobilization activities. • Shut down operations in heavy rain and/or lightning. • Buddy system maintained for all phases of work. • Base Emergency Dispatch numbers programmed into SES personnel cellular phones. Have hospital route maps readily available. • Report all unsafe conditions and acts, injury/illness, or property damage to supervisors immediately.	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**
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools. • Miscellaneous rigging. • Direct push drill rig	• Inspection of all emergency equipment (such as first aid kits, fire extinguishers) • Daily equipment inspections and maintenance. • Inspections of hand tools (power) and extension cords if used. • Inspect work area daily for changes in work conditions that may pose new physical hazards.	• Review AHA with all task personnel. • Review accident prevention plan for new site personnel. • Review operations/safety manuals for all equipment used. • CPR/first aid training for supervisors. • HAZWOPER supervisor training for SSHO.

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:__________
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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: 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

		Probability				
		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 – 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.	• 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. • Institute and maintain good housekeeping practices. • Wear sturdy leather safety-toe boots with slip-resistant soles. • Avoid areas with extreme slope and loose soil. Emphasize personal awareness of uneven walking and working surfaces.	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	• Locate underground utilities before excavating and coordinate with Installation utility locating service. • 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. • Utility mark-out locations should be photo documented in relation to the location of where penetrations to the ground surface will be made. • Determine if an installation excavation permit is required before performing excavation operations. Secure excavation permit if required. • Review available installation records, plans, or drawings for presence of underground utilities in the designated work area.	Modified Level D RAC - L
Direct Push Geoprobe drilling activities refueling equipment	Drilling Rig Operation: • Positioning and operating drill rig • Operating drill rig in an unauthorized manner (no training, PPE missing, ignoring established protocol) • Operating rig with poor communication and coordination of activities • Improper refueling of drill rig	• Hard hats worn at all times. • Protective eyewear with side shields that meet the ANSI Z-87.1 standards worn at all times. • Hearing protection worn when noise levels exceed 85dBA. • Sturdy, leather safety-toe footwear required. • Leather gloves worn when handling sharp, rough, or slippery materials. • Basic housekeeping requirements must apply to all construction sites. Cords covered or elevated when crossing pathways. • Only trained and authorized personnel operate and/or assist in drilling operations. • Drill rigs have protective guarding on all rotating shafts, belts, and pulleys. • No loose-fitting clothing or jewelry worn that can become entangled in machinery. • Long hair secured to prevent entanglement in machinery. • Drill rods and drill bit stabilizer transported properly either by a rack, the rig, or a utility trailer. • If transported on a trailer, the rods or stabilizers held securely in place. • Rig and wheeled equipment have chocks placed under the wheels to prevent rolling. • Rigs inspected daily and documented by the equipment operator. • Wire inspected daily, and cables with broken strands, weak spots, kinks, or mashed areas replaced prior to use. • Driller inspects thread connections prior to start of fieldwork and weekly thereafter. • The mast and cables capable of supporting all equipment and drill rods.	Level D Modified 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**
		• Rigs must be maintained in good working order. • All rotating shafts, pulleys, or chains covered with protective guards. • 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. • Rig shut down during refueling operations. • Rig refueled using an OSHA-compliant portable fuel container. • Personnel performing refueling operations exercise caution to avoid spillage. • Fire extinguishers fully charged and inspected monthly and recorded on inspection tag. • Fuels stored in appropriate containers. • Sampling stops when rain or other weather factors interfere with the safety of the operators. • Activities stop during lightning, and personnel will take shelter in vehicles. • For work near an overhead line, caution taken to ensure when raising the mast. • While working near power lines, drill rods not be leaned against the mast.	
	Working in areas where noise levels exceed 85 dBA without hearing protection properly worn.	• Wear hearing protection when noise levels exceed 85 decibels. • 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.	Modified Level D RAC - L
	Using utility knives or razor knives to cut materials	• 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). • Avoid use of razor knives. When cutting with knives, cut away from the body and never towards another worker.	Modified Level D RAC - L
	Working with electrical equipment in outdoor or wet locations.	• Do not set tools on/in mud, water, soil, or other surfaces that could damage tools. • Tools are inspected before use. Maintain all tools in a safe condition. • Electric cords are free from defects. • All required guards are in place and functional. • Hand-held powered tools equipped with constant pressure switch. • Electric power-actuated tools are double-insulated and properly grounded. • Hoses or cords are not used to lower or hoist tools.	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**
		• Disconnect tools from energy source when not in use. • Only personnel qualified by training or experience should use power tools.	
	Handling cores, drill rods or IDW during monitor well installation and abandonment Handling IDW using inadequate procedures Handling IDW without proper training	• 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. • All personnel working with potential exposure to the COCs shall have been trained on chemical properties, exposure symptoms, and hazard control measures. • Follow PPE task hazard analysis and air monitoring action level requirements identified in the APP and SSHP. • 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. • Exercise good hygiene practices. Always wash hands before eating, drinking, smoking, and leaving site. Only eat, drink, smoke, or chew tobacco in designated areas. • 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. • ANSI-approved eyewash station will be provided on site and maintained in the event there is an accidental splash of materials to the eyes • Use dust control methods during excavation and other soil-intrusive activities where there will be dust generation.	Modified Level D RAC - L
	Working in a hot environment without preparation – High temperatures -	• Provide adequate water with clean disposable cups and collection means to prevent worker dehydration. • Monitor for heat stress in accordance with APP and SSHP (maintain use of buddy system). • Institute a conservative work-break regimen that complies with OSHA and ACGIH to avoid heat stress symptoms and overexertion. • Document all physiological measurements (pulse rates, break times, work times, results of program) on Heat Stress Monitoring data sheet.	Modified Level D RAC - H
	Working in a cold environment	• Workers will be trained to recognize cold stress and appropriate actions to take.	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	• Workers will watch others for signs and symptoms of cold stress (shivering, numbness, sluggishness). • Take breaks in heated shelters. • Drink warm liquids to reduce the susceptibility to cold stress. • Wear layered clothing. • Be certain to cover extremities -- such as ears, fingers, nose -- during very low temperature situations. • Remove outer layer of clothing and loosen other layers to promote evaporation of perspiration upon entering shelter.	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	• 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. • 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 (> 50 lbs.) or awkward loads. Use heavy equipment to transfer heavy or awkward loads when possible. • Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear before lifting. • Avoid carrying heavy objects above shoulder level.	Modified Level D RAC - L
	Improperly storing or handling flammable liquids. Use of smoking materials in no-designated areas.	• Use only metal safety cans to store and transfer of fuel. • Use funnels and nozzles during fueling operations. • Allow warm engine parts (generator motor) to cool 15 minutes before refueling. • 10 lb ABC fire extinguisher in work area. • Review and be cognizant of base fire prevention procedures and requirements. • Designated and safe smoking areas will be established. There will be NO SMOKING while working in wooded or brushy areas.	Standard Level D RAC - L
	Walking or working near or in biological elements native to the work environment	• Observe ground surfaces, especially in wet or grassy areas, tree trunks, and rock piles for evidence and presence of snakes (poisonous). • Observe ground surfaces or surrounding vegetation or structures for presence of fire ants, spiders, bee/wasp hives, etc. • Observe areas for presence of stinging insects. **Notify supervisors of known allergies to stinging insects and location of antidotes.**	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
		• Use insect repellant. Tape pant legs to boots. Frequently check body and clothing for ticks, chiggers, spiders. • Avoid possible exposure to bloodborne pathogens. Have a bloodborne pathogens kit available with first aid kit.	
	Working with electrical equipment in outdoor or wet locations.	• If/when electrical extension cords are required to complete work, extension cords must be - Equipped with third-wire grounding; - Covered, elevated, or protected from damage when passing through work areas; - Protected from pinching if routed through doorways; - Not fastened with staples, hung from nails, or suspended with wire; and - Rated to handle the voltage/amperage of equipment. • Extension cords and electrical power tools must have ground fault circuit interrupters (GFCIs).	Modified Level D RAC - M
	Generating dust while performing site operations.	• In dust-generating activities, suppression methods will be used to avoid causing visible dust.	Standard Level D RAC - L
	Operation of vehicles too fast for conditions, disobeying traffic control devices Operating during extreme weather or hazardous road conditions Operating under the influence of alcohol or drugs	• 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. • Operate vehicles cautiously and with regard to wet, icy, or snowy conditions. • 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. • First aid kits and fire extinguishers in all vehicles. • Ensure that vehicle maintenance schedule is followed. • 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.	RAC - M
	Working during extreme weather phenomenon	• Shut down operations in heavy rain and lightning. • Maintain buddy system for all phases of work.	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	• Base Emergency dispatch numbers programmed into SES personnel cellular phones. Have hospital route maps readily available. • Report all unsafe conditions and acts, injury/illness, or property damage to supervisors immediately.	
Equipment decon	Pressure washing and wiping down equipment to remove potentially contaminated material.	• Wear chemical protective Tyvek boots, gloves, and face shield for splashes. • Only direct spray at object to be cleaned. • Collect decon water and store for disposal or collect in designated area for future remediation and transport. • Decon areas are part of contamination reduction zone with access to boot wash and PPE disposal containers. • Allow engine to cool 15 minutes before refueling. • Have metal gas cans with spring closing cap and flash arrestor.	Modified Level D RAC - L

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools. • Miscellaneous rigging. • Direct push drill rig	• Inspection of all emergency equipment (i.e.: first aid kits, fire extinguishers) • Daily Equipment inspections and maintenance. • Inspections of hand tools (power) and extension cords if used. • Inspection of work area daily for changes in work conditions that may pose new physical hazards.	• Review AHA with all task personnel. • Review accident prevention plan for new site personnel. • Review operations/safety manuals for all equipment used. • CPR/first aid training for supervisors. • HAZWOPER supervisor training for SSHO.

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:
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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: 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

		Probability				
		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 – Soil and Groundwater Sampling and IDW Management

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.	• 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. • Institute and maintain good housekeeping practices.	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)

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**
	Performing soil and groundwater monitoring and IDW management	• All personnel performing this task trained in accordance with 29 CFR 1910.120 and deemed "fit for duty" by a licensed occupation physician. • All personnel working with potential exposure to the COCs shall have been trained on chemical properties, exposure symptoms, and hazard control measures. • Follow PPE task hazard analysis and air monitoring action level requirements identified in the SSHP. • Follow PPE and action level requirements identified in the SSHP. • 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). • Use good hygiene. Always wash hands before eating, drinking, smoking, leaving site. Only eat, drink, smoke, or chew tobacco in designated areas.	Modified Level D RAC - L
	Working in a hot environment without preparation – high temperatures	• Provide fluids to prevent worker dehydration. • Monitor for heat stress in accordance with APP and SSHP (maintain use of buddy system). • Institute a conservative work-break regimen that complies with OSHA and ACGIH to avoid heat stress symptoms and overexertion. • Document all physiological measurements (pulse rates, break times, work times, results of program) in SSHO daily logbook.	Modified Level D Light-colored cotton clothing RAC - L
	Working in a cold environment - low temperatures without preparation	• Workers are trained to recognize cold stress and appropriate actions to take. • Workers trained to watch others for signs and symptoms of cold stress (shivering, numbness, sluggishness). • Take breaks in heated shelters. • Drink warm liquids to reduce the susceptibility to cold stress. • Wear layered clothing. • Be certain to cover extremities -- such as ears, fingers, nose -- during very low temperature situations. • Remove outer layer of clothing and loosen other layers to promote evaporation of perspiration upon entering shelter.	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	• 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. • 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 (> 50 lbs.) or awkward loads. Use heavy equipment to transfer heavy or awkward loads when possible. • Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear before lifting. • Avoid carrying heavy objects above shoulder level.	Modified Level D RAC - L
	Walking or working near or in biological elements native to the work environment	• Observe ground surfaces, especially in wet or grassy areas, tree trunks, and rock piles for evidence and presence of snakes (poisonous). • Observe ground surfaces or surrounding vegetation or structures for presence of fire ants, spiders, bee/wasp hives, etc. • Observe areas for presence of stinging insects. **Notify supervisors of known allergies to stinging insects and location of antidotes.** • Use insect repellant. 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. Permythrin should be worn on external clothing; however, do NOT use permythrin directly on skin. • Avoid potential exposure to bloodborne pathogens. Have bloodborne pathogen kit available with first aid kit. • Avoid possible exposure to bloodborne pathogens. Have a bloodborne pathogens kit with the first aid kit.	Modified Level D RAC - L
	Operation of vehicles too fast for conditions, disobeying traffic control devices. Operating during extreme weather or hazardous road conditions.	• 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. • Operate vehicles cautiously and with regard to wet, icy, or snowy conditions. • Inspect vehicles before use. Adjust and check mirrors to ensure maximum visibility. Perform visual shoulder check as well as use mirror for lane changes. • Ensure that vehicle maintenance schedule is followed. • 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	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	• Shut down operations in heavy rain and lightning. • Maintain buddy system for all phases of work. • Base Emergency Dispatch numbers programmed into SES personnel cellular phones. Have hospital route maps readily available. • Report all unsafe conditions and acts, injury/illness, or property damage to supervisors immediately.	RAC - L

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools. • Miscellaneous rigging. • Direct push drill rig	• Inspection of all emergency equipment (such as first aid kits, fire extinguishers). • Daily equipment inspections and maintenance. • Inspections of hand tools (power) and extension cords if used. • Inspection of work area daily for changes in work conditions which may pose new physical hazards.	• Review AHA with all task personnel. • Review accident prevention plan for new site personnel. • Review operations/safety manuals for all equipment used. • CPR/first aid training for supervisors. • HAZWOPER supervisor training for SSHO.

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

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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: 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

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H = High Risk
M = Moderate Risk
L = Low Risk

Severity	Probability: Frequent	Likely	Occasional	Seldom	Unlikely
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.	• Dropping bag of bentonite or grout/cement with silica content. • Tearing bag of bentonite or grout/cement with silica content • Failure to wear or properly wear required PPE while handling materials with silica content. • Lifting or twisting while handling material bags	• Administrative and engineering controls are to be used as priority control measures. • Avoid generation of any airborne dust from bags of bentonite or grout/cement • Water and water spray used in mixing process for airborne dust suppression • Have portable eye wash station and washing facility in the direct vicinity. • All non-essential personnel for the mixing process will remain upwind of mixing operations and at least 20 feet away. • Keep all mixing operations a minimum of 50 ft. from pedestrian traffic areas. • 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.	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

Site Investigation Small Arms Range Berm Area
Fort Stewart, Georgia
ACTIVITY HAZARD ANALYSIS –Well Abandonment

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
• Over-drill top 5 feet of well	Drilling Rig Operation: • Positioning and operating drill rig • Operation of drill rig in an unauthorized manner (no training, PPE missing, ignoring established protocol) • Operating rig with poor communication and coordination of activities • Improper refueling of drill rig	• Equipment shall only be operated by personnel qualified by prior training or experience. • Inspect equipment daily. • Maintain eye contact with operator. • Use water spray for over drilling to suppress dust. • Do not wear loose fitting clothing or jewelry near drill operations. • Wear ANSI Type II safety vest when working in vicinity of heavy equipment. • Avoid operator blind spots. • Wear hearing protection when noise levels exceed 85 decibels and in identified noise exclusion area. • 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. • Discuss details of operation and worker roles in the daily Pre-Task Safety Plan. • Allow equipment to cool for 15 minutes prior to refueling. • Bond all containers of flammable liquids to the grounded tank system prior to transfer of liquids. • No smoking in any work areas. No spark producing equipment or other potential ignition sources in immediate vicinity of flammable liquid transfer.	NIOSH Approved P100 Rated Particulate Filtering Face piece Respirator, impact resistant goggles, hearing protection, hard hat, and safety toed boots. RAC – L
• Pour concrete into top of well.	• Dropping bag of bentonite or grout/cement with silica content. • Tearing bag of bentonite or grout/cement with silica content • Failure to wear or properly wear required PPE while	• Administrative and engineering controls are to be used as priority control measures. • Avoid generation of any airborne dust from bags of bentonite or grout/ cement. • Water and water spray used in mixing process should be used for airborne dust suppression. • Have portable eye wash station and washing facility in the direct vicinity • All nonessential personnel for the mixing process will remain upwind of mixing operations and at least 20 feet away. • Keep all mixing operations a minimum of 50 ft. from pedestrian traffic areas.	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

Site Investigation Small Arms Range Berm Area Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS –Well Abandonment			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
	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

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools • Miscellaneous rigging • Direct push drill rig	• Inspection of all emergency equipment (such as first aid kits, fire extinguishers) • Daily equipment inspections and maintenance • Inspections of hand tools (power) and extension cords if used. • Inspection of work area daily for changes in work conditions that may pose new physical hazards.	• Review AHA with all task personnel. • Review accident prevention plan for new site personnel. • Review operations/safety manuals for all equipment used. • CPR/first aid training for supervisors. • Hazardous waste supervisor training for SSHO.

E0209.0025

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

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Supervisor's Name:	______________________	______________________	Date/Time:__________
Safety Officer Name:	______________________	______________________	Date/Time:__________
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2/24/14

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

E = Extremely High Risk
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		Probability				
		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 – Brush Clearing

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
• Remove brush with hand tools	• MEC • Noise • Ergonomic hazards • Slips, trips, and falls • Temperature extremes • Explosions/ fires • Biological hazards (insects, snakes, poison oak, or poison ivy) • Inclement weather, including high winds and lightning strikes	• Avoid unnecessary contact with MEC. Only authorized personnel allowed in controlled area. • Level D PPE required, including the following: o Standard light-colored work clothes except during hunting season; o Hearing protection (ear plugs) if > 85 dBA and double protection (ear plugs and ear muffs) if > 105 dBA; o Hard hats and reflective vests will be worn around operating equipment and as required by SSHO; o Leather gloves; o Eye protective glasses with side shield or dust goggles; o Leather boots, ANSI-approved safety boots when within 25 feet of earth moving machinery; o Disposable dust respirators as employee option unless required by SSHO;	H/L M/L M/L M/L H/L H/L
		o PPE as required by SSHO; and	

Site Investigation Small Arms Range Berm Area
Fort Stewart, Georgia
ACTIVITY HAZARD ANALYSIS – Brush Clearing

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
		o Snake leggings as needed or required by SSHO. • Inspect the area to detect and identify poisonous snakes or insects. • Periodically monitor heat/cold stress, ensure ample fluids are available, and observe coworkers for signs/symptoms of heat/cold stress. • Equipment operators shall follow manufacturer’s operating instructions, and carefully inspect equipment and tools prior to use. • Wash hands as soon as practical after stopping work. • 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.	
Operate weed eater Operate bush hog	• Cuts, burns, equipment leaks, damaged parts, and equipment malfunction • Injury from flying debris	• Operators shall wear hard hats with mesh screen face shields (ANSI approved). • The SSHO will certify workers in use of weed eater and/ or bush hog in accordance with the manufacturer’s operator manual.	M/L M/L
Fuel weed eater or bush hog	• Fire or burns • Spill of fuel	• 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. • Use spill pan to minimize spill while fueling hand held equipment. Spill kit should be on hand.	H/L M/L

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Weed eater • Bush hog • Hand tools • Noise monitor if required	• Daily maintenance. • SSHO inspections.	• Certification according to operator's manual. • Hazard communications. • 40-hour HAZWOPER. • 8-hour HAZWOPER refresher as required. • Heat/cold stress awareness • OE safety. • Initial Site-specific training as required. • Personnel must attend daily safety briefings. • 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. • Additional site-specific training in accordance with SSHP and as required by SSHO.

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

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Supervisor's Name:	______________________	______________________	Date/Time:__________
Safety Officer Name:	______________________	______________________	Date/Time:__________
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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: 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

E = Extremely High Risk
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Severity	Probability: Frequent	Likely	Occasional	Seldom	Unlikely
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
• Use survey equipment to map area	• MEC • Noise • Ergonomic hazards • Slips, trips, and falls • Temperature extremes • Explosions/ fires • Biological hazards (insects, snakes, poison oak, or poison ivy) • Inclement weather, including high winds and lightning strikes	• Level D PPE required to include the following:	H/L
		o Standard light-colored work clothes except during hunting season;	M/L
		o Hearing protection (ear plugs) if > 85 dBA and double protection (ear plugs and ear muffs) if > 105 dBA;	M/L
		o Hard hats and reflective vests will be worn around operating equipment and as required by SSHO;	M/L
		o Leather gloves;	H/L
		o Eye protective glasses with side shield or dust goggles;	M/L
		o Leather boots, ANSI-approved safety boots when within 25 feet of earth moving machinery;	
		o Disposable dust respirators as employee option unless required by SSHO;	H/L
		o PPE as required by SSHO	
		o Snake leggings as needed or required by SSHO.	

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
		• Inspect the area to detect and identify poisonous snakes or insects. • 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. • Follow manufacturer's operating instructions, and carefully inspect equipment and tools prior to use. • Wash hands as soon as practical after stopping work. • 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. • Use anomaly avoidance techniques. See anomaly avoidance AHA. Use UXO technician to sweep surface and subsurface area for anomalies prior to placement. • Ensure physical fitness through regular exams, sufficient diet, and sleep. Pace yourself during work.	

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Noise monitor if required	• Inspect prior to use using operator's manual	• Hazard communication training on MSDS. • 40-hour HAZWOPER. • 8-hour HAZWOPER refresher as required. • Heat/cold stress awareness. • MEC safety. • Initial site-specific training as required. • Personnel must attend daily safety briefings. • 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. • Additional site-specific training in accordance with SSHP and as required by SSHO.

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:__________
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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: MEC Location and Avoidance	
Prepared By: Henry M. Kight	
Construction Safety Competent Person: LeAnn McNeal	
SSHO: LeAnn McNeal	
Reviewed By: Rich Rathnow CIH CSP	

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	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
• Locate MEC	• MEC • Ergonomic hazards • Slips, trips, and falls • Temperature extremes • Explosions/ fires • Biological hazards (insects, snakes, poison oak, or poison ivy) • Inclement weather, including high winds and lightning strikes	• Avoid unnecessary contact with MEC. Only authorized personnel are allowed in controlled areas	H/L
		• Level D PPE required to include the following:	H/L
		o Standard light-colored work clothes except during hunting season;	M/L
		o Hearing protection (ear plugs) if > 85 dBA and double protection (ear plugs and ear muffs) if > 105 dBA;	M/L
		o Hard hats and reflective vests will be worn around operating equipment and as required by SSHO;	M/L
		o Leather gloves;	H/L
		o Eye protective glasses with side shield or dust goggles;	M/L
		o Leather boots, ANSI-approved safety boots when within 25 feet of earth moving machinery;	
		o Disposable dust respirators as employee option unless required by SSHO;	H/L
		o Other PPE as required by SSHO	

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
		o Snake leggings as needed or required by SSHO. • Periodically monitor heat/cold stress, ensure ample fluids are available, and observe coworkers for signs/symptoms of heat/cold stress. • 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. • Do not wear steel-toe boots when performing magnetometer surveys.	
• Mark MEC location	• MEC • Ergonomic hazards • Slips, trips, and falls • Temperature extremes • Explosions/ fires • Biological hazards (insects, snakes, poison oak, or poison ivy) • Inclement weather, including high winds and lightning strikes	• Avoid unnecessary contact with MEC. Only authorized personnel are allowed in controlled areas	H/L
		• Level D PPE required to include the following:	H/L
		o Standard light-colored work clothes except during hunting season;	M/L
		o Hearing protection (ear plugs) if > 85 dBA and double protection (ear plugs and ear muffs) if > 105 dBA;	M/L
		o Hard hats and reflective vests will be worn around operating equipment and as required by SSHO;	M/L
		o Leather gloves;	H/L
		o Eye protective glasses with side shield or dust goggles;	M/L
		o Leather boots, ANSI-approved safety boots when within 25 feet of earth moving machinery;	
		o Disposable dust respirators as employee option unless required by SSHO;	H/L
		o Other PPE as required by SSHO	
		o Snake leggings as needed or required by SSHO. • Periodically monitor heat/cold stress, ensure ample fluids are available, and observe coworkers for signs/symptoms of heat/cold stress. • 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.	
• 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
	• Ergonomic hazards • Slips, trips, and falls • Temperature extremes • Explosions/ fires • Biological hazards (insects, snakes, poison oak, or poison ivy) • Inclement weather, including high winds and lightning strikes	• Level D PPE required to include the following:	H/L
		o Standard light-colored work clothes except during hunting season;	M/L
		o Hearing protection (ear plugs) if > 85 dBA and double protection (ear plugs and ear muffs) if > 105 dBA;	M/L
		o Hard hats and reflective vests will be worn around operating equipment and as required by SSHO;	M/L
		o Leather gloves;	H/L
		o Eye protective glasses with side shield or dust goggles;	M/L
		o Leather boots, ANSI-approved safety boots when within 25 feet of earth moving machinery;	
		o Disposable dust respirators as employee option unless required by SSHO;	H/L
		o Other PPE as required by SSHO	
		o Snake leggings as needed or required by SSHO.	
		• Periodically monitor heat/cold stress, ensure ample fluids are available, and observe coworkers for signs/symptoms of heat/cold stress.	
		• 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.	

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Hand tools • Hand held magnetometers • Flagging pins • Noise monitor if required	• Geophysical test plot required. • A magnetometer response check must be performed and recorded at the start and finish of each workday. • Other inspections or tests based on site work plan and/ or as required by the SSHO. • SSHO daily inspections.	• Hazard communication. • 40-hour HAZWOPER. • 8-hour HAZWOPER refresher as required. • Heat/cold stress awareness. • MEC safety. • Initial site-specific training as required. • Additional site-specific training in accordance with SSHP and as required by the SSHO. • Personnel must attend daily safety briefings.

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:___________
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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: 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

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

		Probability				
		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 – Geophysical Survey

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
• Mobilization of equipment to survey area	• Lifting hazards	• Use proper lifting technique. Request assistance when lifting heavy equipment. Use dolly to transport equipment as necessary.	M
	• Awkward body positions and twisting	• 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	L
	• Trip and fall hazards from uneven ground or restricted view when carrying equipment	• 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.	L
• Set up survey grid and control	• Crush hazard or contact stress to hands/ fingers from	• Wear leather gloves when inserting pins, flagging, or stakes into the ground. Do not hurry task if hammering.	L

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		
	• Repetitive stress from repeated bending or squatting during construction	• Use job rotation when a hazard exists. • Stretch before performing work activity. • Use paint device that allows employee to stand up while spraying.	L
• Performing survey	• Noise hazards from survey equipment using percussion devices	• Wear hearing equipment. • Keep unnecessary workers away from devices when activated.	L
	• Ergonomic injury from improper or prolonged use of carried devices that are long or bulky	• Use proper lifting technique. • Request assistance when lifting heavy equipment. • Use job rotation to reduce potential for injury.	L
• Demobilization and cleanup	• Muscle strain from removing pins or stakes	• Use devices that maintain neutral body positions to remove pins when practical. • Do not bend at waist when removing pins or stakes.	L
	• Pinch hazards to fingers from equipment cases	• Identify hazard and avoid. • Pack equipment properly, so no wires or cables protrude from case requiring fingers to push into case when closing.	L
•	• Lifting hazards from demobilizing equipment from work area	• Use proper lifting technique. • Request assistance when lifting heavy equipment. • Use dolly to transport equipment as necessary.	M

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Geophysical survey equipment • Level D PPE	• Inspect equipment daily prior to use.	• Certification based on operator’s manual. • Hazard communication. • 40-hour HAZWOPER. • 8-hour HAZWOPER refresher as required. • Initial site-specific training as required.

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:__________
	____________________	____________________	Date/Time:__________
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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

Prepared By:	CIH CSP Richard Rathnow, CIH, CSP Corporate Safety and Health Manager SpecPro Environmental Services LLC	2-24-14 Date (865) 481-7837

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

Plan Concurrence:	Doug Hawn, Project Manager SpecPro Environmental Services LLC	2-24-14 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	*Code of Federal Regulations*
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^3	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	*SpecPro Environmental Services LLC Safety and Health Program Manual*
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^3	50 mg/m^3	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^3	100 mg/m^3	Irritation of eyes, respiratory system, cough, breathing difficulty, wheezing	N/A
Lead	SB: unknown SD: unknown SW: unknown GW: unknown	0.05 mg/m^3	100 mg/m^3	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^3 = 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

Position	Name	Telephone
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 CSP = Certified Safety Professional
SSHO = Site Safety and Health Officer

***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

Training	Worker[a]	Worker[b]	SSHO	Site Visitor[c]
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[d]	Y[d]	N

Note: For the purposes of this table, the SSHO is considered a site worker.
[a]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.
[b]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.
[c]Vendors and similar personnel
[d] EODT workers and SUXO
CPR = cardiopulmonary resuscitation
HAZWOPER = hazardous waste operations and emergency response
PPE = personal protective equipment
SSHO = site safety and health officer

Table 4-2 Training Requirements by Project Activity and Role

Project Activity	Training/Certification/Qualifications
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
EOD = explosive ordnance disposal
PPE = personal protective equipment
SUXO = senior unexploded ordnance
UXOSO = unexploded ordnance safety officer
UXOQCS = unexploded ordnance quality control supervisor
UXOT1 = unexploded ordnance technician I
UXOT2 = unexploded ordnance technician II
UXOT3 = unexploded ordnance technician III

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

Task	Level	Body	Head	Respirator
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 **Boots:** Safety-toe, chemical-resistant boots OR safety-toe, leather work boots with outer rubber boot covers **Gloves:** 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 **Boots:** Safety -toe, chemical-resistant boots OR Safety -toe, leather work boots with outer rubber boot covers **Gloves:** 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	**Coveralls:** Polycoated Tyvek® **Boots:** Safety-toe boots **Gloves:** 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)

Task	Level	Body	Head	Respirator
Equipment decontamination if using pressure washer	Modified D with splash protection	**Coveralls:** Polycoated Tyvek® **Boots:** 16-inch-high steel-toe rubber boots **Gloves:** 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	**Coveralls:** Polycoated Tyvek® **Boots:** Safety-toe, chemical-resistant boots OR safety-toe, leather work boots with outer rubber boot covers **Gloves:** Inner surgical-style Nitrile 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	**Coveralls:** Polycoated Tyvek® **Boots:** Safety-toe, chemical-resistant boots OR Safety-toe, leather work boots with outer rubber boot covers **Gloves:** Inner surgical-style Nitrile 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
• Request from individual performing tasks. • Change in work tasks that will increase contact or potential contact with hazardous materials. • Occurrence or likely occurrence of gas or vapor emission. • Known or suspected presence of dermal hazards. • Instrument action levels in Section 7 exceeded.	• New information indicating that situation is less hazardous than originally thought. • Change in site conditions that decrease the hazard. • Change in work task that will reduce contact with hazardous materials.

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

Instrument	Tasks	Action Levels[a]		Frequency [b]	Calibration
Dust Monitor: Dataram or equivalent	During any work in potentially contaminated soils	< 1.0 mg/m^3 ≥ 1.0 mg/m^3	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^3. If dust suppression does not succeed in maintaining dust levels to below 1.0 mg/m^3, stop work and contact Rich Rathnow, SES safety and health manager.	Continuous during work in contaminated soils	Zero daily
Noise-Level Monitor[c]:	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

[a] Action levels apply to sustained breathing-zone measurements above background.
[b] The exact frequency of monitoring depends on field conditions and is to be determined by the 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.).
[c] 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

Instrument	Gas	Span	Reading	Method
Dust Monitor: Dataram-PDM3	Dust-free air	Not applicable	0.00 mg/m^3 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^3 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)

Wind Speed (mph)	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	25	-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
High **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
Low **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
Sedentary **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® 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.

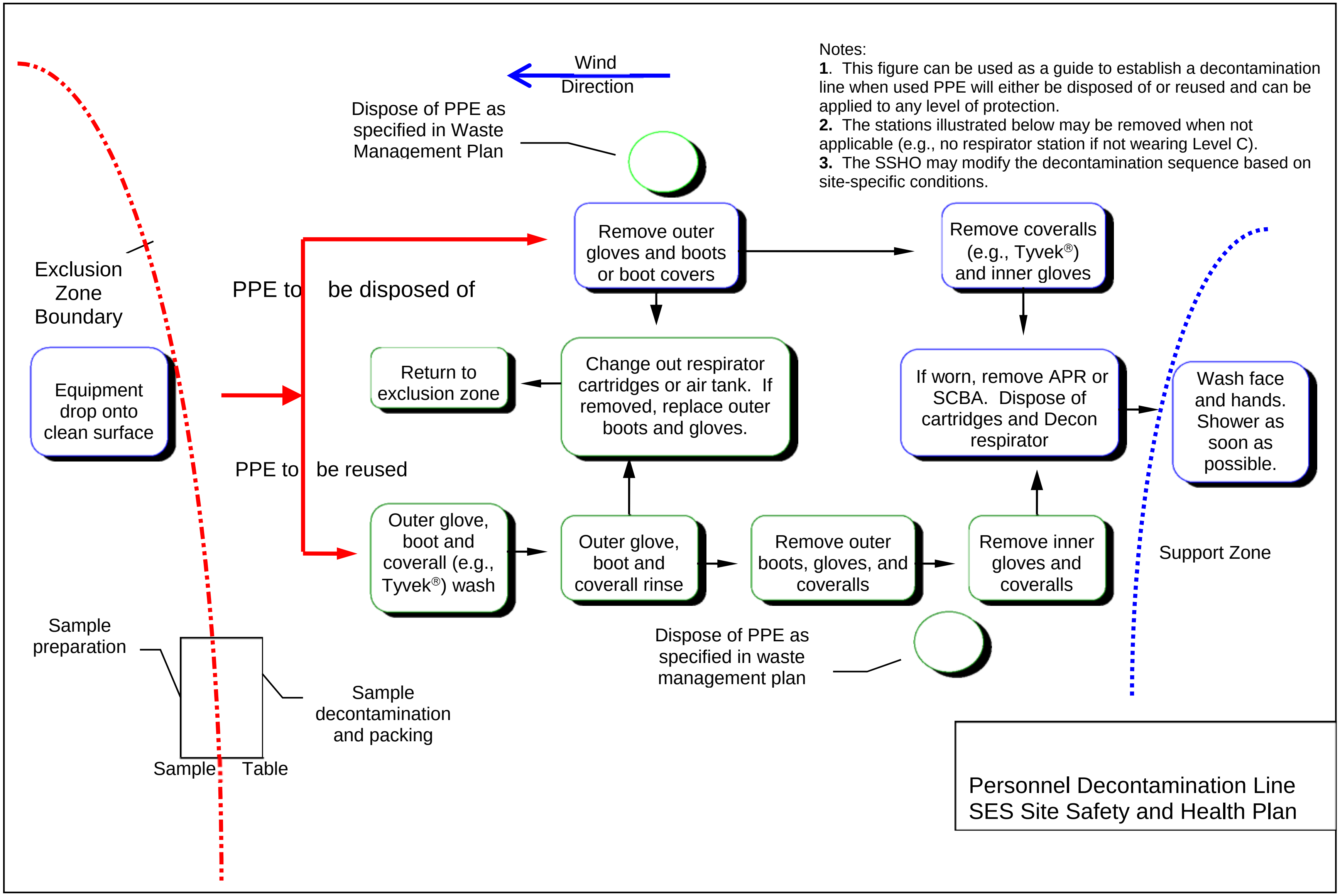

Figure 10-1 Representative Exclusion Zone/Contamination-Reduction Zone)/Support Zone

- 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.

Legend

Site Investigation Boundary

Evacuation Route

Emergency Assembly Area

Hazard Communication Inventory Storage Area

Job Title: Site Investigation at the Small Arms Range Berm Area Fort Stewart, Georgia

Figure 10-2 Site Control

R:\Projects\E0209\E0209.0025\Fig 10-2 Site Control.mxd (10/22/2013)

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 D Fletcher

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 M Kight

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.

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 know 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 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 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
	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	G	P	F	F
	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
Dioctyl 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
	Lautric 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	P	P	P	P
	white fuming	F	P	F	F
	*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	G	F	F	F
removers	E	E	E	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 distiliates				
(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
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

	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	E	E	E	E
	dust	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

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 the 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