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This Project Work Plan has been developed for the U.S. Army Corps of Engineers, Louisville to support the on-site operations for the Compliance Restoration Site CC-RVAAP-80 and Other Environmental Services at the Ravenna Army Ammunition Plant (RVAAP) in Ravenna, Ohio.

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FINAL PROJECT WORK PLAN FOR THE COMPLIANCE RESTORATION SITE CC-RVAAP-80 GROUP 2 PROPELLANT CAN TOPS AND OTHER ENVIRONMENTAL SERVICES

Ravenna Army Ammunition Plant (RVAAP)
Ravenna, Ohio

Contract No. W912QR-10-P-0058

Submitted to

U.S. Army Corps of Engineers, Louisville
600 Dr. Martin Luther King, Jr. Place
Louisville, KY 40202

Submitted by

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PROJECT WORK PLAN

DOCUMENT DISTRIBUTION

Name/Organization	Hard Copies	Electronic Copies
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Ohio EPA/NEDO/DERR	2	1
PIKA Program Manager	1	1
PIKA Project Manager	2	2
REIMS	0	1
RVAAP Facility Manager	2	2
USACE Project Manager	2	2

OHARNG – Ohio Army National Guard/Camp Ravenna

Ohio EPA/NEDO/DERR – Ohio Environmental Protection Agency Northeast District Office Division of Emergency and Remedial Response

PIKA – PIKA International Inc.

REIMS – Ravenna Environmental Information Management System

RVAAP – Ravenna Army Ammunition Plant

USACE – United States Army Corps of Engineers – Louisville District

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 GENERAL INFORMATION 1
1.1.1 Project Authorization and Background 1
1.1.2 Objective and Scope 2
1.1.3 Work Plan Organization 2
1.1.4 Changes to the Work Plan 2
1.2 RVAAP LOCATION 3
1.3 RVAAP HISTORY 4
1.4 RVAAP - CC-RVAAP-80: GROUP 2 PROPELLANT CAN TOPS 5
1.5 RVAAP- 09: LOAD LINE 2 7
1.6 RVAAP SITE CLIMATE 7

2.0 TECHNICAL MANAGEMENT PLAN 8
2.1 GENERAL 8
2.2 GUIDANCE, REGULATIONS, AND POLICY 8
2.3 RECOVERED CHEMICAL WARFARE MATERIEL 8
2.4 PROCEDURES IF MEC IS ENCOUNTERED 9
2.5 TECHNICAL SCOPE 9
2.5.1 Project Site Layout 9
2.5.2 Operational Sequence Overview 10
2.6 PROCEDURES FOR CHANGED SITE CONDITIONS 10
2.7 MANAGEMENT ROLES AND RESPONSIBILITIES GENERAL 10

TABLE 2-1: KEY PROJECT PERSONNEL 11
2.7.1 Program Manager (PM) 12
2.7.2 UXO Quality Assurance/Quality Control Manager (UXO QA/QCM) 12
2.7.3 Project Manager (PjM) 12
2.7.4 Corporate Environmental Safety and Health Manager (CESHM) 13
2.7.5 Site Supervisor/Senior UXO Person on Site (UXOT III/Team Leader) 13
2.7.6 Site Safety and Health Officer (SSHO)/UXO Safety Officer (UXOSO) 14
2.7.7 Field Team(s) 15
2.7.8 Functional Relationships 15

2.8 OVERALL SAFETY PRECAUTIONS AND PRACTICES 15
2.9 COMPLIANCE WITH PLANS AND PROCEDURES 16
2.10 GENERAL SITE PRACTICES 17
2.11 SAFETY AND OPERATIONAL TRAINING AND BRIEFING 18
2.12 MOBILIZATION AND SITE PREPARATION 18
2.12.1 Mobilization of Manpower 18
2.12.2 Preliminary Activities 18
2.12.3 Equipment 19
2.12.4 Site-Specific Training 20
2.12.5 Project Notifications 21
2.12.5.1 Public Notification 21
2.12.5.2 Emergency Response and General Notifications 21
2.12.6 Permitting 22
2.12.7 Tenant Relocation 22
2.12.8 Establishing Site control 22
2.12.8.1 Minimum Separation Distance (MSD) 23
2.12.8.2 Set-up of Work Zones 23
2.13 VEGETATION REMOVAL 23
2.13.1 Vegetation Removal 23
2.14 MEC CONSTRUCTION SUPPORT TASKS 24
2.14.1 Coordination with Site Personnel 24
2.14.1.1 Initial Safety Briefing 24
2.14.1.2 Daily Safety Briefings 24
2.14.2 Surface Sweep 25
2.14.3 Onsite Excavation Support 25
2.14.3.1 Disposal Actions 26
2.14.3.2 Exclusion Zone (EZ) 26
2.14.3.3 EOD Notification and Response 26
2.15 COLLECTING SURFACE SOIL SAMPLES 27
2.16 DISPOSAL OF IDW 27
2.17 WATER REMOVAL SERVICES AT LOAD LINE 2 (LL2) 28
2.18 SITE RESTORATION 29
2.19 DEMOBILIZATION 29

2.20 PUBLIC AFFAIRS AND COMMUNITY RELATIONS 29
2.20.1 Public Involvement 29
2.20.2 Public Approach 30
2.21 DISSEMINATION OF DATA 30
2.22 PROJECT SCHEDULE 30
2.23 MONTHLY PROGRESS REPORTS 30
2.23.1 RVAAP Master Schedule 31
2.24 INVESTIGATION REPORT 31

3.0 EXPLOSIVES MANAGEMENT PLAN 32

4.0 EXPLOSIVE SITING PLAN 33

5.0 GEOPHYSICAL PROVE OUT PLAN AND REPORT 34

6.0 GEOPHYSICAL INVESTIGATION PLAN 35
6.1 GENERAL 35
6.2 SITE-SPECIFIC DYNAMIC EVENTS AFFECTING GEOPHYSICAL INVESTIGATIONS 35
6.3 GEOPHYSICAL PROJECT PERSONNEL 36
6.3.1 Project Geophysicist 36
6.4 GEOPHYSICAL SURVEY EQUIPMENT 36
6.4.1 Electromagnetics 36
6.4.2 Ground Penetrating Radar 37
6.4.2.1 Sensors and Software Noggin 250MHz GPR System 37
6.5 METHODOLOGY 38
6.5.1 Survey Grids- Day 1 38
6.5.2 Data Acquisition- Day 2, 3 and 4 38
6.6 DATA PROCESSING 39

7.0 GEOSPATIAL INFORMATION & ELECTRONIC SUBMITTALS 42
7.1 GENERAL 42
7.2 MEC/UXO SAFETY PROVISIONS 42
7.3 CONTROL POINTS 42
7.3.1 Accuracy 43

7.3.2 Monument Caps 43
7.3.3 Plotting 43
7.3.4 Description Cards 43
7.4 MAPPING 43
7.5 DIGITAL DATA AND COMPUTER REQUIREMENTS 43
7.6 LS&M SUBMITTALS 44

8.0 WORK DATA AND COST MANAGEMENT PLAN 45
8.1 PROJECT MANAGEMENT APPROACH 45
8.2 PROJECT SCHEDULE 45
8.3 PROJECT COST CONTROL AND TRACKING 45
8.4 SUBCONTRACTOR COSTS 45
8.5 MANPOWER REQUIREMENTS 46
8.6 RECURRING DELIVERABLES 46
8.6.1 Monthly Progress Reports 46
8.7 DAILY PROGRESS REPORTS 47
8.8 COMMUNICATIONS 47
8.9 RECORDS MANAGEMENT 47

9.0 PROPERTY MANAGEMENT PLAN 48

10.0 QUALITY CONTROL PLAN (QCP) 49

11.0 ENVIRONMENTAL PROTECTION PLAN 50
11.1 INTRODUCTION 50
11.2 IDENTIFICATION OF AREAS REQUIRING PROTECTION 50
11.2.1 Endangered/Threatened Species 50
11.2.2 Wetlands 50
11.2.3 Cultural and Archaeological Resources 51
11.2.4 Water Resources 52
11.3 MITIGATION PROCEDURES 52
11.3.1 Waste Disposal 52
11.3.1.1 Solid Waste Disposal 52
11.3.1.2 Hazardous Waste Disposal 53
11.3.1.3 Dust and Emission Control 53

11.4 SPILL CONTROL AND PREVENTION 53
11.5 STORAGE AREAS AND TEMPORARY FACILITIES 55
11.6 ACCESS ROUTES 55
11.7 PROTECTION AND RESTORATION OF TREES AND SHRUBS 55
11.8 CONTROL OF WATER RUN ON AND RUN OFF 55
11.9 POST CONSTRUCTION CLEANUP 56

12.0 INVESTIGATIVE DERIVED WASTE (IDW) PLAN 57

13.0 INTERIM HOLDING FACILITY SITING PLAN FOR CWM PROJECTS 58

14.0 PHYSICAL SECURITY PLAN FOR RCWM PROJECT SITES 59

15.0 REFERENCES 60

LIST OF TABLES

TABLE 2-1: Key Project Personnel 11

LIST OF APPENDICES

Appendix A: ..... Scope of Work
Appendix B: ..... Site Map/Figures
Appendix C: ..... Points of Contact
Appendix D: ..... Accident Prevention Plan
Appendix E: ..... Sampling and Analysis Plan
Appendix F: ..... Quality Assurance Project Plan
Appendix G: ..... Cumulative Signed Documentation/Correspondence
Appendix H: ..... Ohio EPA MEC Notification Procedures
Appendix I: ..... GeoSearches Informational Letter Memo
Appendix J: ..... Comment Response Table

LIST OF ACRONYMS

AHA	Activity Hazard Analysis
AOC	Area of Concern
APP	Accident Prevention Plan
AR	Army Regulation
ARPA	Archaeological Resources Protection Act of 1979
CELRL	USACE - Louisville District, Louisville, Kentucky
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESHM	Corporate Environmental Safety and Health Manager
CFR	Code of Federal Regulations
COR	Contracting Officer's Representative
CR	Compliance Restoration
CRM	Cultural Resource Manager
DA	Department of Army
DDESB	Department of Defense Explosives Safety Board
DID	Data Item Description
DOD	Department of Defense
DODI	Department of Defense Instruction
EOD	Explosive Ordnance Disposal
EM	Engineering Manual
EP	Engineering Pamphlet
ES&H	Environmental Safety and Health
ESHP	Environmental Safety and Health Procedure
EZ	Exclusion Zone
FFP	Firm Fixed Price
FM	Facility Manager
GIS	Geographic Information System

GOCO	Government Owned, Contractor Operated
GPS	Global Positioning System
HQ	Headquarters
HAZWOPER	Hazardous Waste Operations and Emergency Response
HTRW	Hazardous Toxic and Radioactive Waste
IAW	In Accordance With
IDW	Investigation Derived Waste
IED	Improvised Explosives Device
IR	Investigation Report
IRP	Installation Restoration Program
LL	Load Line
m	meter
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
MGFD	Munition with Greatest Fragmentation Distance
MI	Multi-Increment
mm	millimeter
MPPEH	Material Potentially Presenting an Explosive Hazard
MSD	Minimum Separation Distance
msl	mean sea level
mV	milliVolts
NCP	National Contingency Plan
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NGB	National Guard Bureau
NMEA	National Marine Electronics Association
NSCMP	Non-stockpile Chemical Materiel Project
Ohio EPA	Ohio Environmental Protection Agency
OHARNG	Ohio Army National Guard

OHPO	Ohio Historic Preservation Office
OSHA	Occupational Safety and Health Administration
PAM	Pamphlet
PAO	Public Affairs Office
pc	personal computer
PIKA	PIKA International, Inc.
PM	Program Manager
PjM	Project Manager
PMP	Project Management Plan
POC	Point of Contact
PPE	Personal Protective Equipment
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QA/QCM	Quality Assurance Quality Control Manager
QC	Quality Control
QCM	Quality Control Manager
QCP	Quality Control Plan
RAB	Restoration Advisory Board
RCWM	Recovered Chemical Warfare Materiel
RRD	Range Related Debris
RVAAP	Ravenna Army Ammunition Plant
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SM	Site Manager
SOW	Scope of Work
SSHO	Site Safety and Health Officer
SSHP	Site-Specific Safety and Health Plan
SZ	Support Zone

TP	Technical Paper
USACE	United States Army Corps of Engineers
USP&FO	United States Property and Fiscal Officer
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
UXOSO	Unexploded Ordnance Safety Officer
UXOT III	Unexploded Ordnance Technician III/Team Leader
WP	Work Plan
WZ	Work Zone

1.0 INTRODUCTION

1.1 GENERAL INFORMATION

1.1.1 *Project Authorization and Background*

This Work Plan (WP) has been developed in response to the Scope of Work (SOW) for the Compliance Restoration Site CC-RVAAP-80 and Other Environmental Services at the Ravenna Army Ammunition Plant (RVAAP) in Ravenna, Ohio. A copy of the SOW is presented in Appendix A.

The WP describes the procedures, operational sequence, and resources PIKA International, Inc. (PIKA) will use for the following tasks:

- Perform a geophysical delineation of the buried or near surface materials (propellant can tops, etc.) in the designated Group 2 areas;
- Collect surface soil samples based on the results of the geophysical delineation;
- Analyze soil samples for the common propellants used by the Department of Defense (DoD) including Nitrocellulose, Nitroglycerine, Nitroguanidine, and Perchlorate. One (1) of the samples will also be analyzed for the RVAAP full suite;
- Dispose of all Investigation Derived Waste (IDW);
- Prepare investigation report (IR); and
- Pump and remove accumulated water from excavation at RVAAP LL2 building 802 in accordance with Ohio Environmental Protection Agency (Ohio EPA) requirements for ground application.

Authorization for performance is contained in contract W912QR-10-P-0058 issued to PIKA by U.S. Army Corps of Engineers - Louisville District (CELRL), Louisville, Kentucky. The work will be performed on behalf of the CELRL.

1.1.2 *Objective and Scope*

The objective of this project is to conduct an initial investigation of the Group 2 Propellant Can Tops areas. The following objectives will be achieved during the investigation:

- Delineate the boundaries of the propellant can lid areas;
- Confirm the presence or absence of releases of propellants and/or other munitions constituents (MC) to the surface soils at this area of concern (AOC) and;
- Remove accumulated water from the excavation at building 802 (Load Line 2) to facilitate completion of scheduled site restoration operations by others under a separate BRAC-D contract.

1.1.3 *Work Plan Organization*

This WP, with its attached Accident Prevention Plan (APP) has been prepared to outline the goals, methods, procedures and personnel used for field activities under the SOW. This WP will document the logical sequence of activities, the procedures that will be used and the applicable regulations that will be followed. The APP is Appendix D of the WP, and includes a Site Specific Safety and Health Plan (SSHP) as an attachment.

1.1.4 *Changes to the Work Plan*

This WP was prepared after a review of archival data, study of prior investigations, discussions with the RVAAP Facility Manager (FM), and a thorough evaluation of the site. The WP is based on the information available at the time of its preparation and may require modification if unforeseen circumstances arise during the execution of this WP. Should the WP require modification, changes will be made using the following procedures:

- Under no circumstances will any change to the approved WP be executed without prior approval of the CELRL Project Manager (PjM), the PIKA Program Manager (PM) and the Ohio EPA.
- The PIKA PjM/Site Manager (SM)/ unexploded ordnance (UXO) Tech III/Team Leader will notify the PIKA PM of the required changes and the rationale for the changes.
- The PIKA PM will develop the changes in conjunction with the CELRL PjM.
- Changes to this WP will be provided in writing by PIKA to CELRL PjM and Ohio Environmental Protection Agency (EPA) for approval.
- On-site implementation of changes will be initiated prior to inclusion of the formal written changes, if verbal approval is provided to PIKA by CELRL PjM and Ohio EPA.

1.2 RVAAP LOCATION

When the RVAAP Installation Restoration Program (IRP) began in 1989, the RVAAP was identified as a 21,419 acre installation. The property boundary was resurveyed by the Ohio Army National Guard (OHARNG) over a two year period (2002 and 2003) and the actual total acreage of the property was found to be 21,683 acres. As of February 2006, a total of 20,403 acres has been transferred to the National Guard Bureau (NGB) and subsequently licensed to the OHARNG for use as a military training site known as Camp Ravenna. The current RVAAP consists of 1,280 acres scattered throughout Camp Ravenna.

Camp Ravenna is in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 kilometers (3 miles) east northeast of the city of Ravenna and approximately 1.6 kilometers (1 mile) northwest of the city of Newton Falls. The RVAAP portions of the property are solely located within Portage County. Camp Ravenna/RVAAP is a parcel of property approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide bounded by State Route 5, the Michael J.

Kirwan Reservoir, and the CSX System Railroad on the south; Garret, McCormick, and Berry roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east. Camp Ravenna is surrounded by several communities: Windham on the north; Garrettsville 9.6 kilometers (6 miles) to the northwest; Newton Falls 1.6 kilometers (1 mile) to the south east; Charlestown to the southwest; and Wayland 4.8 kilometers (3 miles) to the south.

When RVAAP was operational, Camp Ravenna did not exist and the entire 21,683-acre parcel was a government-owned contractor operated (GOCO) industrial facility. The RVAAP IRP encompasses investigation and cleanup of past activities over the entire 21,683 acres of the former RVAAP, references to the RVAAP in this document are considered to be inclusive of the historical extent of RVAAP, unless otherwise specifically stated. A regional map indicating the location of the RVAAP is presented in Appendix B as Figure 1. A facility map showing the location of the Group 2 Propellant Can Lid Area and the LL2 area of RVAAP is presented in Appendix B as Figure 2.

1.3 RVAAP HISTORY

Production at the facility began in December 1941 with the primary missions of depot storage and ammunition loading. The installation was divided into two separate units - the Portage Ordnance Depot and the Ravenna Ordnance Plant. The Portage Ordnance Depot's primary mission was storage of munitions and components, while the mission of the Ravenna Ordnance Plant was loading and packing major caliber artillery ammunition and the assembly of munitions initiating components that included fuzes, boosters and percussion elements. In August 1943, the installation was re-designated the Ravenna Ordnance Center and again in November 1945 as the Ravenna Arsenal. The plant was placed in standby status in 1950 and operations were limited to renovation, demilitarization and normal maintenance of equipment, along with storage of ammunition and components.

The plant was reactivated during the Korean Conflict to load and pack major caliber shells and components. All production ended in August 1957, and in October 1957

the installation was again placed in a standby condition. In October 1960, the ammonium nitrate line was renovated for demilitarization operations which involved melting explosives out of bomb casings for subsequent recycling. These operations commenced in January 1961. In July 1961, the plant was again deactivated. In November 1961, the installation was divided into the Ravenna Ordnance Plant and an industrial section, with the entire installation then being designated as the RVAAP.

In May 1968, RVAAP began loading, assembling, and packing munitions on three load lines (LLs) and two component lines in support of the Southeast Asia Conflict. These facilities were deactivated in August 1972. The demilitarization of the M71A1 90-millimeter (mm) projectile extended from June 1973 until March 1974. Demilitarization of various munitions was conducted from October 1982 through 1992.

Until 1993, RVAAP maintained the capability to load, assemble and pack military ammunition. As part of the RVAAP mission, the inactive facilities were maintained in a standby status by keeping equipment in a condition to permit resumption of production within prescribed limitations. In September 1993, the RVAAP was placed in inactive caretaker status, and subsequently changed to modified caretaker status. The LLs and associated real estate were determined to be excess by the Army.

A total of 20,403 acres of the former 21,683 acre RVAAP was transferred to the United States Property and Fiscal Officer (USP&FO) for Ohio for use by OHARNG as a military training site. The current RVAAP consists of 1,280 acres in several distinct parcels scattered throughout Camp Ravenna. The RVAAP and Camp Ravenna are co-located on contiguous parcels of property.

1.4 RVAAP - CC-RVAAP-80: GROUP 2 PROPELLANT CAN TOPS

CC-RVAAP-80 consists of the Group 2 Propellant Can Tops area. Propellant can lids or tops were identified on the ground surface/near surface at the southern end of the former Group 2 Ammunition Storage Area. These materials are

typically classified as Range-Related Debris (RRD) (similar to munitions packaging materials). This site was never used or classified as an operational range. It is believed that the discarded propellant can tops might qualify as inert scrap metal.

The propellant can tops located at the south end of Group 2 were initially identified by Ohio Army National Guard trainees in the winter of 2008. The propellant can tops were observed in the vegetated area located immediately south of the ammunition storage magazines in the vicinity of the southern railroad spur lines (see Figure 3, Appendix B). This area consists of approximately 539,572 square feet (12.4 acres).

The Louisville District USACE performed an emergency survey with a metal detector of a portion of the southern area ground surface. Results of the initial investigation revealed multiple magnetic anomalies in the surface and near surface soils. On-site UXO personnel visually identified the surface anomalies as propellant can tops. During the emergency survey it was also noted that the ground surface had been disturbed and contained hummocks (mounds) ranging in height from 1' to 2' throughout the survey area.

As such, the propellant can tops or RRD are of environmental concern for the subject area. A geophysical survey is necessary to identify the anomalies and anomalous areas within the subject area, and to characterize the subject area boundary(s).

The anomalies and anomalous areas should be clearly marked during the field survey in order to facilitate a limited soil investigation, and possible future clean up activities. The limited soil investigation is warranted to assess possible releases of propellants or MC to the surface soils in the vicinity of the can tops.

The site is a low probability site in regard to encountering munitions and explosives of concern (MEC). Therefore, only UXO construction support will be needed for this project. However, if prior to this project or during any phase of this project MEC are found at the site, the project may be stopped and the site will need to be reevaluated and potentially assigned a new probability rating.

1.5 RVAAP- 09: LOAD LINE 2

Former excavation activities conducted at Load Line 2 (RVAAP- 09) have resulted in the accumulation of water within the building DB-802 footprint. Restoration activities are now planned at this location, and the accumulated water needs to be removed from the excavation to assist in the restoration of the site. A site showing the location of building 802 within LL2 is presented in Figure 4, Appendix B.

1.6 RVAAP SITE CLIMATE

The site lies at approximately 41° 11' 42.19" north latitude and 81° 05' 36.73" west longitude at an elevation of 1,043 feet above mean sea level (msl). The site has hot humid summers and cold damp winters with a maximum yearly mean temperature of 80° F in July and a minimum yearly mean temperature of 16° F in January. The yearly average mean temperature is approximately 50° F with rainfall averages of 35 inches per year and snowfall averages of 25 inches per year.

2.0 TECHNICAL MANAGEMENT PLAN

2.1 GENERAL

This section of the WP addresses specific field-level approach and procedures that PIKA will employ during the planned activities for site investigation activities at Compliance Restoration (CR) Site CC-RVAAP-80 (Group 2 Propellant Can Tops) and Water Removal Services at RVAAP- 09 (Load Line 2) to include: mobilization; site preparation; access surveys; vegetation removal; geophysical delineation; collection of surface soil samples; sample analysis; disposal of IDW; data management/data validation; surveying and mapping; water removal services at Load Line 2; and demobilization and document preparation in support of the ultimate completion of this environmental investigation.

2.2 GUIDANCE, REGULATIONS, AND POLICY

The work conducted under this SOW will be performed within the relevant requirements presented in Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendment and Reauthorization Act (SARA), and National Oil and Hazardous Substances Contingency Plan (NCP) requirements, and coordinating with the Ohio Environmental Protection Agency (EPA) as appropriate. This work will also be conducted in accordance with (IAW) Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) standards found in 29 Code of Federal Regulations (CFR) 1910, 1926 and 1904, and the referenced documents contained in Section 15.0 of this WP. All work will also be performed IAW all Federal, State, Army, EPA and environmental rules, regulations and laws.

2.3 RECOVERED CHEMICAL WARFARE MATERIEL

RVAAP is on the Non-stockpile Chemical Materiel Project (NSCMP) list due to the suspected Mustard Agent Burial Site. It should be noted however that the Suspected

Mustard Agent Burial Site is not in the areas where work will be conducted under this contract. The U.S. Army 22nd Chemical Battalion at Aberdeen Proving Ground, Maryland will be contacted in the event that any item is located and suspected of containing Chemical Warfare Materiel (CWM). If a suspect CWM item is located, the PIKA PM will notify the RVAAP FM (RVAAP Commander) who in turn will notify the 22nd Chemical Battalion. In the event that U.S. Army 22nd Chemical Battalion is required, PIKA personnel will be stationed in a safe up-wind position to observe and secure the area until support arrives. The RVAAP FM will be responsible for contacting any local law enforcement agencies needed to secure any public roads that require blocking or to evacuate local residents.

2.4 PROCEDURES IF MEC IS ENCOUNTERED

Destruction of MEC is not included in the SOW. If a MEC item is encountered, the PIKA UXOT III/Team Leader will contact the RVAAP FM, who will make the determination whether or not external explosive ordnance disposal (EOD) support is necessary. The RVAAP FM will contact the appropriate EOD detachment for assistance and will provide the military EOD with support if so needed. PIKA personnel will maintain security at the site until military EOD support arrives and will provide the military EOD with support if so directed by the RVAAP FM.

2.5 TECHNICAL SCOPE

2.5.1 *Project Site Layout*

PIKA has been contracted to conduct an initial environmental investigation to delineate the boundaries of the propellant can lid areas, confirm the presence of absence of release of propellants and/or other MC to the surface soils, and water removal services at LL2. All actions taken to conduct the environmental investigations will be documented in an Investigation Report (IR). PIKA will accomplish these tasks as described in the following paragraphs.

2.5.2 *Operational Sequence Overview*

The Initial Environmental Investigation operations/activities at CC-RVAAP-80 Group 2 Propellant Can Tops and RVAAP- 09 LL2 will be conducted with procedures approved by this WP. A general overview of these procedures is as follows:

1. Conduct site preparation to include vegetation removal.
2. Geophysical Delineation of Group 2 Propellant Can Tops area.
3. Conduct MI surface soil samples within those areas that are identified to include near surface propellant can tops or other possible waste materials.
4. Perform Sample Analysis for the common propellants used by the DoD including Nitrocellulose, Nitroglycerine, Nitroguanidine, and Perchlorate.
5. Disposal of IDW.
6. Data Management/Data Validation IAW EPA CLP Level IV data validation to meet the requirements of DoD QSM.
7. Survey and Mapping.
8. Water Removal Services at LL2.

2.6 PROCEDURES FOR CHANGED SITE CONDITIONS

In the event that the site conditions change, PIKA will notify the CELRL Contracting Officer's Representative (COR) to determine the impact of the change on site operations and project funding. The Ohio EPA will be notified in the event changes in the WP have an impact on environmental issues. All changes will be resolved and all changes to site plans will be generated, submitted, and approved prior to conducting tasks associated with the change.

2.7 MANAGEMENT ROLES AND RESPONSIBILITIES GENERAL

In addition to PIKA, the project team consists of Lisa Roseberry, Contract Specialist, Jay Trumble, CELRL Technical Manager, Glenn Beckham, CELRL PjM, and Mr. Mark Patterson, RVAAP FM. Table 2-1 identifies primary roles/responsibilities of PIKA personnel assigned to the project. All PIKA personnel assigned to this project meet

the CELRL training and experience requirements for the positions to which they are assigned.

TABLE 2-1: KEY PROJECT PERSONNEL

Title / Name	Responsibilities
Program Manager (PM) Kathleen Anthony	- Ensures resources are available - WP/APP Review - Conflict Resolution/Stop Work
UXO Quality Assurance/Quality Control Manager (QA/QCM) Scott Wardle	- Manages the QA Organization - Maintains the QA Program - Approves QA required documents
Project Manager (PjM) Brian Stockwell	- Responsible Project Budget - Resolve Regulatory-Level Issues - WP preparation - APP Review - Notification - Conflict Resolution/Stop Work
Corporate Environmental Safety and Health Manager (CESHM) Joseph Frydenger, CSP	- APP Preparation and Approval - APP Review and Implementation Audits - APP Modification/Deviation Recommendation - Conduct/assist with site, task & hazard specific training - Conflict Resolution/Stop Work
Site Supervisor/Senior UXO Person on Site (UXOT III/Team Leader) Mel Lau	- Site Supervisor - APP/SSHP Review - APP/SSHP & Work Plan implementation - Notification - Conflict resolution/stop work
Site Safety and Health Officer (SSHO)/UXO Safety Officer (UXOSO) UXOT III/Team Leader Lew Kovarik	- APP & WP Implementation - Documentation/Reporting - Asbestos Notifications - Coordinate and Manage ACM removal operations - Visual Inspection and Certification for asbestos clearance - Safety Inspection - Site Safety Control - Accident Prevention - Conflict Resolution/Stop Work
Field Personnel – To be determined	- APP Adherence - Accident Prevention

2.7.1 *Program Manager (PM)*

Ms. Kathleen Anthony is the PM for this project. Ms. Anthony will manage the PIKA resources needed for site operations and is responsible for the overall implementation of the project. Ms. Anthony has over 16 years of technical and management experience with environmental and explosive remediation projects.

2.7.2 *UXO Quality Assurance/Quality Control Manager (UXO QA/QCM)*

Mr. Scott Wardle is the UXO QA/QCM for this project. Mr. Wardle has substantial experience in the management of environmental projects involving UXO and MEC and will have the following responsibilities:

- Foster a culture of excellence for quality;
- Manage the QA organization and maintain the Quality Assurance Project Plan (QAPP) in Appendix E;
- Approve QA requirement documents, project and program implementing procedures and subcontractor QAPP;
- Ensure all personnel are properly trained and adequately experienced for their duties; and
- Performance of all required duties listed in Quality Control Plan (QCP) Section of this WP concerning the QAPP.

2.7.3 *Project Manager (PjM)*

Mr. Brian Stockwell is the PjM for this project. Mr. Stockwell has substantial experience in the management of environmental remediation projects and will have the following responsibilities:

- Managing the funding, manpower, and equipment necessary to conduct site operations.

- Acting as the point of contact (POC) for communicating with the COR, RVAAP FM and Ohio EPA.
- Overseeing the overall performance of all PIKA individuals assigned to the project.
- Reviewing the SOW and ensuring that necessary elements are addressed in project plans.
- Coordinating all contract and subcontract work and controlling costs and schedules.

2.7.4 *Corporate Environmental Safety and Health Manager (CESHM)*

Mr. Joseph Frydenger is the PIKA Corporate Environmental Safety and Health Manager (CESHM). Mr. Frydenger is a Certified Safety Professional with experience in industrial hygiene, safety, and hazardous waste experience, to include working on projects with MEC contamination. During this project, Mr. Frydenger will provide occupational safety and health management duties as presented in detail in the APP for this project.

2.7.5 *Site Supervisor/Senior UXO Person on Site (UXOT III/Team Leader)*

Mr. Mel Lau is the UXOT III/Team Leader. Mr. Lau served in the United States Army for 20 years, where he performed as a UXO Technician through Senior UXO Supervisor and Team Leader for various operations. During his tenure with the Army, Mr. Lau was an Explosive Ordnance Disposal (EOD) Team Leader and instructor at the Army/Navy Joint EOD School, as well as an instructor at the Ground Ordnance, Improvised Explosives Device (IED) Division, and Nuclear Weapons Division. Mr. Lau's qualifications meet or exceed the requirements for that position as presented in the Department of Defense Explosives Safety Board (DDESB) approved "UXO Personnel Training and Experience Hierarchy" found in Technical

Paper (TP) Number 18 - Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel, 2004.

As UXOT III/Team Leader Mr. Lau will control operations of all field teams performing MEC construction support/avoidance activities and will spend most of the day in the field monitoring their performance and helping them achieve maximum operational safety and efficiency. He reports directly to the PM. He will implement the approved plans in the field and must review and approve any changes. As UXOT III/Team Leader, Mr. Lau is authorized to temporarily stop work to correct an unsafe condition or procedure.

2.7.6 *Site Safety and Health Officer (SSHO)/UXO Safety Officer (UXOSO)*

Mr. Kovarik holds the position of UXO Site Safety and Health Officer (SSHO). With over nine years of EOD experience with the U.S. Army and five years of civilian UXO experience, Mr. Kovarik's expertise includes extensive range clearance operations in Central America and the U.S. He is also extremely skilled in the operation of heavy equipment in explosive contaminated areas as well as contaminated soil sites involving ordnance explosives (OE), UXO, and MEC.

As UXOSO, Mr. Kovarik will be responsible for the operational items listed below in addition to the safety and health responsibilities:

- Issuing and/or approving "Stop Work" orders for safety and health reasons.
- Conducting on-site safety and health training for PIKA and subcontractor personnel.
- Identifying and evaluating any known or potential safety problems that may interfere with or interrupt site operations and endanger site personnel.
- Consulting with the PjM on identifying and implementing any necessary safety-related corrective actions.

- Coordinating with the PjM for the implementation of the safety requirements in the APP.
- Ensuring that all site activities are conducted IAW this WP and relevant Federal and State rules, laws and regulations.

2.7.7 *Field Team(s)*

Technicians assigned to this project as field staff will be responsible to adhere to the approved APP, WP, ESS and incorporate accident prevention into daily tasks.

2.7.8 *Functional Relationships*

The PIKA PjM will interact with the COR for all matters concerning management and the SOW. All contract-related issues will be reported directly to the COR for consideration and/or approval. The PIKA PjM will report directly to the PIKA PM. The PIKA UXOT III/Team Leader will report directly to the PIKA PjM for all matters concerning site operations. All personnel will report to the UXOT III/Team Leader. Regarding safety issues, the UXOT III/Team Leader will have direct access to and will report functionally to the CESHM. For matters concerning QC, the UXOT III/Team Leader will have direct access to and will report functionally to the PIKA UXO QA/QCM.

2.8 OVERALL SAFETY PRECAUTIONS AND PRACTICES

PIKA will conduct safety and operational briefings daily. Additionally, the UXOT III/Team Leader may hold a safety stand-down to conduct training, at any time a deviation or degradation of safety warrants a review. The safety and operational training and briefings will be performed IAW the SSHP for this project as summarized below:

- **Daily Safety Briefing:** Each day, prior to the commencement of work, a safety briefing will be conducted for all site personnel by the UXOT III/Team Leader. A written record of this meeting will be maintained in the PIKA Safety

Meeting Attendance Log. The briefing will focus on specific daily hazards, potential hazards and risks that may be encountered, and the safety measures that should be used to eliminate or mitigate those hazards. These briefings will provide personnel with the known or potential task-specific hazards related to the day's operation. The Activity Hazard Analysis (AHA) forms will be available and used during the safety briefing to inform personnel of the task-related hazards. The AHA will be used to inform personnel of the Personal Protective Equipment (PPE) and safe work practices that will be used to mitigate the task hazards.

- **Visitor Safety Brief:** All visitors entering the site must report to the UXOT III/Team Leader and sign the visitor's log. Visitors shall be given a safety briefing, as outlined in the SSHP, prior to entering any work area. Visitors shall be escorted at all times by a UXO-qualified individual.

- **Environmental Concerns:** The promotion of environmental sensitivity will be an ongoing part of the daily safety and operational briefs.

- **UXO Refresher:** All UXO personnel will be given UXO refresher training by the UXOT III/Team Leader, on the known explosives to be encountered on site, including the identification of the MEC, the hazards, and the disposition methods.

- **Additional Training:** The SSHP prepared for this project details additional on-site training.

2.9 COMPLIANCE WITH PLANS AND PROCEDURES

All personnel will adhere strictly to approved plans and established procedures. If operational parameters change and there is a corresponding requirement to change procedures or routines, careful evaluation of such changes will be conducted by on-site supervisory personnel. Any new course of action or desired change in procedures will be submitted in writing along with justification for approval. Approved written changes will be implemented in a manner that will ensure procedural uniformity and end-product quality.

2.10 GENERAL SITE PRACTICES

All operational activities at RVAAP will be performed under the supervision and direction of qualified UXO personnel (certification IAW DDESB TP-18). Non-UXO qualified personnel will be prohibited from performing any operation unless they are accompanied and supervised by a UXO technician. Throughout the entire project, PIKA personnel will adhere to the following general practices.

- **Work Hours:** Operations will be conducted only during daylight hours. PIKA intends to work four 10-hour days with an optional schedule of five 8-hour days. However, due to operational needs, PIKA may decide to work more than 40 hours in a week. Additionally, a minimum 48-hour rest period will be provided before the start of the next work week.

- **Basic MEC Procedures and PIKA Environmental Safety and Health Procedures (ESHP):** During site operations PIKA personnel will adhere to the operational and Environmental Safety and Health (ES&H) procedures outlined in the ESHPs referenced and presented in the APP.

- **Site Access:** PIKA will control access to all work areas. Access will be limited to only those personnel required to accomplish the specific operations or to those personnel who have a specific purpose and authorization to be on the site. No hazardous MEC operations will be conducted when non-UXO or unauthorized personnel are inside the defined minimum separation distance (MSD) zone.

- **Handling of MEC:** Only UXO-qualified personnel and UXO Technicians as defined in DDESB TP-18 will handle MEC items.

- **Visitor Safety:** All visitors entering the site will report to the PIKA field office and sign the visitor's log. All site visitors shall receive a safety briefing, as outlined in the SSHP, and visitors will be escorted at all times by UXO personnel when inside the MEC area.

2.11 SAFETY AND OPERATIONAL TRAINING AND BRIEFING

PIKA will conduct safety and operational training on a daily basis starting with the morning briefing. Daily safety training will typically be conducted by the UXOT III/Team Leader; however, with regard to safety, PIKA solicits and welcomes comments and input from all employees. This training will address team assignments, potential problems and their respective resolutions and productivity status.

2.12 MOBILIZATION AND SITE PREPARATION

2.12.1 *Mobilization of Manpower*

PIKA will schedule the arrival of the work force in a manner designed to facilitate immediate productivity. All PIKA personnel mobilized to the site will meet requirements for OSHA hazardous waste operations training and medical surveillance requirements as specified in the APP/SSHP. Site personnel will also be trained to perform the specific tasks to which they are assigned. At no time will site personnel be tasked with performing an operation or duty for which they do not have appropriate training and experience.

2.12.2 *Preliminary Activities*

During the initial mobilization, PIKA site management personnel will engage in the following preliminary activities:

- Coordination with the designated RVAAP FM to finalize access requirements, location of any temporary facilities to be used, and communications requirements;
- Contact and coordination with RVAAP FM and local fire, medical, and other emergency services to ensure availability of services, and the appropriate response actions IAW the WP and APP;

- Contact and coordination with local vendors for accommodations as well as vendors/suppliers for routine purchases to ensure smooth project start up;
- Inspection of each work area to identify possible environmental constraints, terrain limitations, and other interferences; and
- Prior to initiating site activities and following WP approval, PIKA will notify the client, OHARNG and the Ohio EPA of its intent to initiate onsite activities.

2.12.3 *Equipment*

All equipment will be inspected as it arrives to ensure it is in proper working order. Any equipment found damaged or defective will be repaired or returned to the point of origin, and a replacement will be secured. All instruments and equipment that require routine maintenance and/or calibration will be checked initially upon its arrival and then checked again prior to its use each day. This system of checks ensures that the equipment is functioning properly. If an equipment check indicates that any piece of equipment is not operating correctly, and field repair cannot be made, the equipment will be tagged and removed from service. A request for replacement equipment will be placed immediately for expeditious receipt of replacement equipment. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service. PIKA UXO personnel use on-site communication radios IAW Department of Army (DA) Pamphlet (PAM) 385-64, Section IV, Sub-section 6-15, which states the general requirements to include the minimum safe separation distances required. As part of the initial equipment set-up and testing, PIKA will also install and test its communication equipment that includes the following:

- Cellular Phone Service to maintain communication with RVAAP security personnel.
- Hand-held portable radios used to maintain communications between the PjM and the UXOT III/Team Leader.

- Cellular telephones equipped with Direct Connect Service (very high frequency band) to be used as back up communications between the PjM and the UXOT III/Team Leader.

- Prior to initiating site activities, PIKA will coordinate real time radio communication capabilities with Camp Ravenna Range Control; including information relative to planned road blocks, as needed.

2.12.4 *Site-Specific Training*

As part of the mobilization process, PIKA will perform site-specific training for all on-site personnel assigned to this project. The purpose of this training is to ensure that all on-site personnel fully understand the operational procedures and methods to be used by PIKA at RVAAP. Individual responsibilities and safety and environmental concerns associated with operations will also be covered in the training. The UXOT III/Team Leader will conduct the training sessions which will include the topics identified below.

- Field equipment operation, including the safety and health precautions, field inspection and maintenance procedures that will be used.

- Interpretation of relevant sections of this WP and APP/SSHP as they relate to the tasks being performed.

- Personnel awareness of potential site and operational hazards associated with site-specific tasks and operations.

- Public relations to ensure that personnel will not make any public statements to the media without prior coordination with and approval of the RVAAP FM.

- Environmental concerns and sensitivity including endangered/threatened species and historic, archeological, and cultural issues.

- Additional OSHA or CELRL required training as required by the APP.

- Identification features, hazards, and disposal methods of MEC/UXO that may be encountered.

2.12.5 *Project Notifications*

2.12.5.1 Public Notification

PIKA will not publicly disclose any data generated or reviewed under this contract. All requests for any public conveyance will be routed through the RVAAP FM in conjunction with the USACE Public Affairs Specialist. PIKA will notify RVAAP FM prior to any contact with regulatory agencies.

2.12.5.2 Emergency Response and General Notifications

At least one week prior to the initiation of field activities, PIKA will contact all local emergency services to verify the availability of requisite services and to confirm the means used to summon the services. General notifications will be made to key project personnel at this time as well. This includes the following contacts:

- RVAAP Security Dispatcher (Post 1) – (330) 358-2017
- Ravenna City Fire Department – (330) 296-5783
- Ravenna Police Dept. – (330) 297-6486
- RVAAP Caretaker Contractor (PIKA International, Inc.) – (330) 358-3005
- Hospital – Robinson Memorial Hospital – (330) 297-0811
- Police – Portage County Sheriff Office – (330) 296-5100
- Police – Trumbull County Sheriff Office – (330) 675-2508
- Ohio State Patrol – (330) 297-1441
- Glenn Beckham – CELRL PjM – (502) 315-6799

- Jay Trumble – CELRL Technical Manager – (502) 315-6349
- Lisa Roseberry – CELRL KO – (502) 315-6190
- Christy Mitchell – CELRL COR – (502) 315-6319
- Mark Patterson – RVAAP Facility Manager – (330) 358-7311
- Ohio EPA – Eileen Mohr – (330) 963-1221
- OHARNG – Lt. Col. Ed Meade – (614) 336-6560
- Katie Elgin – Camp Ravenna Environmental Specialist – (614) 336-6136

2.12.6 *Permitting*

No permits have been identified to be required for the execution of work under this scope of work.

2.12.7 *Tenant Relocation*

PIKA will work with the RVAAP FM in conjunction with the OHARNG in order to minimize any effects caused by the performance of any/all of the operational tasks outlined within this WP. The Initial Environmental Investigation of CC-RVAAP-80 Group 2 Propellant Can Tops and RVAAP- 09 LL2, RVAAP operations require a 200 foot diameter exclusion zone (EZ). All non-essential personnel to the Initial Environmental Investigation operations, which include (emergency response vehicles, any employees working within the area) will comply with the approved EZ. In the event that tenants/workers require relocation PIKA will coordinate with RVAAP FM in conjunction with the OHARNG.

2.12.8 *Establishing Site control*

PIKA will establish site control through the implementation of the following procedures for the CC-RVAP-80 Group 2 Propellant Can Tops and LL2 AOCs.

2.12.8.1 Minimum Separation Distance (MSD)

On all MEC sites where MEC operations are conducted, the MSD, or EZ, will be determined based on the Munition with the Greatest Fragmentation Distance (MGFD). During MEC Construction Support/Anomaly Avoidance operations IAW Engineering Pamphlet 75-1-2 *Munitions and Explosives of Concern (MEC) Support During Hazards, Toxic, and Radioactive Waste (HTRW) and Construction Activities,* MSD's are not required; however, during MEC Support activities, a safe work zone will be set up of 200 feet during those activities.

2.12.8.2 Set-up of Work Zones

PIKA does not anticipate the installation of any facilities with the exception of work zones (WZ). In general the regulated work zones will include an EZ, and support zone (SZ) for site access control during field operations.

Due to the proximity of the project site to the PIKA RVAAP field office, services such as water, telephone, and gas will not be installed at the work site. Potable water for decontamination of personnel and equipment (if needed) will be stored in portable poly containers. Cellular and two-way radios will be used for communications and emergency notifications. Temporary sanitary facilities will be mobilized to the site outside the established MSD per this WP and maintained by local vendors.

Upon delineation of the work zones, site access control points will be established and site control and security will be implemented. This will consist of establishing barriers such as warning cones and yellow tape to control points of site access control. The UXOT III/Team Leader will be responsible for site access.

2.13 VEGETATION REMOVAL

2.13.1 *Vegetation Removal*

PIKA will conduct manual and mechanical brush removal of the Group 2 Propellant Can Lid Area to facilitate the geophysical survey operations. All the brush clearing and vegetation removal operations will be coordinated with OHARNG. The brush removal includes the removal of small trees and ground level vegetation that may hinder the performance of the geophysical survey. PIKA will primarily use a Bush Hog with the deck locked in position at 6-inches above ground level during the brush removal operation, however, hand held weed eaters and/or chain saws may also be used as needed. Prior to and during vegetation removal, UXO Technicians will visually search the area where the vegetation will be removed to ensure the area is free of surface MEC/UXO items or other items that may present a physical hazard. During vegetation removal operations, the affected site personnel will utilize all the safety and health PPE specified in the APP.

2.14 MEC CONSTRUCTION SUPPORT TASKS

2.14.1 *Coordination with Site Personnel*

2.14.1.1 Initial Safety Briefing

The onsite UXOTIII will hold an Initial Safety Briefing for each person who enters the site. An Initial Safety Briefing will be held during the kick-off meeting; however, additional briefings may be required throughout the duration of the activities at the site, as new personnel and/or visitors are introduced to the site. The Initial Safety Briefing will include an explanation of the potential hazards at the site (i.e., the potential presence of MEC). The UXOTIII will also inform meeting attendees that if MEC/Materials Potentially Presenting an Explosive Hazard (MPPEH)/Munitions Debris (MD) is encountered, they must immediately notify the on-site UXOTIII and not disturb the item.

2.14.1.2 Daily Safety Briefings

The onsite UXO technicians will meet with the onsite management and geophysical personnel and conduct a general work and safety briefing for site personnel and visitors each day.

2.14.2 *Surface Sweep*

The onsite UXO technicians will physically preview the actual Group 2 Propellant Lid Area footprint with the onsite management of the geophysical contractor and discuss visual observations and potential areas of concern. If MEC is found on the surface, the onsite UXO technicians will:

(a) Place cross-pinned flag(s) adjacent to the MEC discovery for visual reference; select a course around the item.

(b) Evacuate any onsite personnel from the area.

(c) Identify and assess the condition of the MEC and notify the RVAAP FM who in-turn will request EOD support.

(d) Determine Hazardous Fragmentation Distance (HFD) based on MEC found IAW DDESB 6055.09-STD and Technical Paper 16.

(e) Conduct a surface sweep of the immediate area to locate additional MEC that may be present on the surface.

(f) Maintain security of the site.

(g) Once security and Government personnel arrive on site the UXO Team will provide assistance as necessary.

2.14.3 *Onsite Excavation Support*

On-site support is required for the construction activities at sites assigned a “low” probability category of encountering MEC. The onsite UXO technicians will ensure that the geophysical crew is aware of their location and/or contact information at all times. The onsite UXO technicians will visually monitor the geophysical activities at the site. During geophysical activities, the onsite UXO technicians will be positioned

to have a continuous visual observation of activities. If the contractor discovers MEC/MPPEH/MD or any unidentified item, the onsite UXO technicians will be immediately notified and all geophysical activities will be halted until the item is assessed. The onsite UXO technicians will identify and assess the condition of the item to the extent possible to classify it as MEC, MPPEH or MD. If the item, after inspection is classified as MD, the item will be moved out of the immediate area and geophysical activities can continue. If the item is identified as MEC/MPPEH the UXOTIII will follow the notification procedures as described in Section 2.4. Photographs will be taken and a MEC Discovery Form will be filled out for MEC/MPPEH found. A blank MEC Discovery Form is included as Appendix D of this WP. Once MEC has been encountered in the area, no further work will be allowed at that location until the Government has responded, removed the MEC/MPPEH, and declared the area safe or the item has been disposed and the USACE has authorized work to continue.

2.14.3.1 Disposal Actions

In the event that MEC/MPPEH is discovered, the UXOTIII will notify the RVAAP FM who will request EOD support.

2.14.3.2 Exclusion Zone (EZ)

If a MEC item is discovered, all activities will cease immediately. An initial EZ shall be instituted at that time, and all non-essential personnel will be evacuated from the EZ. The onsite UXO technicians will designate a safe area for these personnel to retreat to. The EZ will be established IAW the DDESB 6055.09-STD and Technical Paper 16.

2.14.3.3 EOD Notification and Response

If MEC/MPPEH/MD is encountered during construction activities, the UXO technicians will identify the condition of the MEC/MPPEH/MD and the UXOTIII will notify RVAAP FM who will request EOD support. The onsite UXO Technicians will secure the site until relieved by security and or EOD.

All non-essential personnel will remain outside the EZ until the UXO Technicians conduct their investigation, and the Government has disposed of the item or removed the item. The requirements listed in the Ohio EPA MEC Notification Form shall be complied with and the required notification made. Activities will not continue until the Government gives approval for site activities to resume.

2.15 COLLECTING SURFACE SOIL SAMPLES

PIKA will collect Multi-Increment® (MI) surface soil samples based on the results of the geophysical delineation in order to assess possible releases of propellants MC to the surface soils. Up to three (3) (3 maximum plus QA samples) biased MI surface soil samples will be collected within those areas that are identified to include near surface propellant can tops or other possible waste materials. Additionally, one of the samples will be analyzed for the RVAAP full suite. During surface soil sampling operation PIKA UXO Technicians will follow MEC Anomaly Avoidance IAW Engineering Pamphlet 75-1-2 Munitions and Explosives of Concern (MEC) Support During Hazards, Toxic, and Radioactive Waste (HTRW) and Construction Activities. The details pertaining to the collection of surface soil samples at the Group 2 Propellant Can Tops Area are covered in Appendix E, Sampling and Analysis Plan (SAP).

2.16 DISPOSAL OF IDW

Within 90 days of the generation of IDW, PIKA will characterize and properly dispose of all IDW at approved off-site waste disposal facilities in compliance will all applicable Federal, State, and local rules, laws and regulations. Land application of select wastes may apply (subject to approval). PIKA will be responsible for maintaining all applicable waste characterization and disposal records, and for producing a waste disposal report for submittal to and approval by the Ohio EPA. IDW disposal activities will be coordinated with the RVAAP Facility Manager and the OHARNG. PIKA will manage transportation and disposal operations in a manner to ensure that all IDW is removed from the subject property no later than 90 days following waste generation.

2.17 WATER REMOVAL SERVICES AT LOAD LINE 2 (LL2)

The planned action for restoring this area is to push back concrete and other demolition debris into the excavation to a depth 4 feet below the surrounding grade. Then, soil will be placed on the top of the rubble to match the surrounding grade. To achieve this, it is anticipated the water will need to be pumped out of the excavation in two phases. First, PIKA will pump water out of the excavation down to a level suitable to fill the excavation with demolition debris without causing the remaining water in the excavation to rise out of the excavation and cause excessive runoff. Once this amount of water is removed, the rubble will be immediately pushed into the excavation. Pushing rubble into the excavation will be completed by others under a previously awarded BRAC-D contract. After this work is complete, PIKA will revisit the site (if needed) and pump out any water that is above the level of the demolition debris in the excavation. Once this water level is achieved, soil will be immediately placed into the excavation by others under a previously awarded BRAC-D contract. PIKA will complete the water removal work in accordance with the BRAC-D contractor's schedule. Pumping water out of the excavation will be done immediately before backfilling the excavation to ensure the excavation does not again fill with water. Water will be removed from the excavation in a manner that is approved by the Army and Ohio EPA. A Letter work plan will be prepared presenting the methodology to conduct the water removal for concurrent review by all RVAAP stakeholders.

NOTE: As per the requirements of the SOW, the water removal services are to coincide with the BRACD contractor's schedule. To that end, the water removal services were conducted by PIKA from May 3, 2010 through May 18, 2010 to facilitate the June 2010 restoration activities at LL2 building 802. All water removal services were conducted in accordance with Ohio EPA requirements. A copy of the Ohio EPA e-mail correspondence relative to approval for discharging the surface water to ground surface is provided in Appendix G.

2.18 SITE RESTORATION

PIKA will remove all materials and equipment acquired and used in support of the site investigation operations at Group 2 Propellant Can Tops Area and will be responsible for cleaning the site and removing all project generated wastes IAW the SOW. General trash will be removed for proper disposal.

2.19 DEMOBILIZATION

Upon completion of the tasks covered under this SOW, PIKA will demobilize from the site. The demobilization activities will consist of the following steps:

1. Remove/demobilize all PIKA equipment.
2. Demobilize any other remaining equipment and supplies.
3. Demobilize any necessary personnel.

2.20 PUBLIC AFFAIRS AND COMMUNITY RELATIONS

2.20.1 *Public Involvement*

All public relations efforts for the Compliance Restoration Site CC-RVAAP-80 at RVAAP will be coordinated and approved by the RVAAP FM and the USACE Public Affairs Office (PAO). Public involvement for this project will include the following activities:

- Coordinate and provide Public Affairs and Community Relations support for this project and ensure that all Public Affairs and Community Relations activities are coordinated and approved by the RVAAP FM/COR.
- As per the SOW, PIKA will attend a minimum of one (1) applicable Restoration Advisory Board (RAB) meeting during the specified period of performance at the discretion of the COR. PIKA will provide the necessary support to initiate, schedule, and address all public participation aspects of

the project (e.g., preparation of briefings, presentations, fact sheets, news letters, articles/public notices to news media, and notifications to RAB members). PIKA will be responsible for addressing all public comments consistent with the applicable regulatory drivers. The USACE COR, or designee, will attend and represent the Army at all meetings with the public.

2.20.2 *Public Approach*

PIKA personnel will not make available or publicly disclose any data generated or reviewed under this contract. When approached by any person or entity requesting information about the subject of this or any contract, PIKA personnel will defer to the RVAAP FM, and notify the COR for response.

2.21 DISSEMINATION OF DATA

Reports and data generated under this contract shall become the property of the Government and distribution to any other source by the contractor is prohibited unless authorized by the RVAAP FM.

2.22 PROJECT SCHEDULE

PIKA has proposed a start date for field work for April, 2011. The start date and schedule is contingent on the timing of document (WP, and APP) review and approvals by all stakeholders, as well as coordination of activities with the RVAAP FM and the OHARNG (See Project Schedule in Figure 5, Appendix B).

2.23 MONTHLY PROGRESS REPORTS

Monthly progress reports will be submitted on the 5th of every month. The monthly status report will document the following:

- Activities completed during the month;
- Issues and problems encountered and their resolution;

- QC data and reports;
- Health and Safety reports;
- Activities planned for the next month; and
- Schedule status showing actual versus planned activities.

The monthly progress report will be provided electronically by the 5th day of each month with a hard copy mailed the following day. If the 5th falls on a weekend or holiday, the reports will be provided on the next work day.

2.23.1 *RVAAP Master Schedule*

PIKA will supply a schedule for inclusion into the RVAAP master schedule. PIKA will participate in the bi-weekly schedule update meetings with USACE and the weekly contractor meeting held at RVAAP building 1037.

2.24 INVESTIGATION REPORT

PIKA will prepare and submit a Preliminary draft, draft and final Investigation report for this project with the preliminary draft being submitted within 90 calendar days following the completion of the field investigation activities. The report will document the process and procedures used in conducting the geophysical delineation, and describe all soil sampling activities conducted during this project. The report will include details about pre-mobilization, mobilization, site preparation, the geophysical delineation, sample collection, decontamination, analytical results, waste management, event chronology, final site inspection, and mapping. The investigation report maps will include the delineation of known and/or suspected buried waste materials, and the locations of MI sample area boundaries.

3.0 EXPLOSIVES MANAGEMENT PLAN

Not required under this SOW.

4.0 EXPLOSIVE SITING PLAN

Not required by the SOW.

5.0 GEOPHYSICAL PROVE OUT PLAN AND REPORT

Instead of conducting geophysical prove out, an instrument verification strip (ISV) will be utilized as noted in the informational letter memo from the geophysical subcontractor (Appendix I).

6.0 GEOPHYSICAL INVESTIGATION PLAN

6.1 GENERAL

PIKA has subcontracted *Geosearches* located in Chagrin Falls, Ohio to conduct the delineation of the Group 2 Propellant Can Lid Area for this project.

6.2 SITE-SPECIFIC DYNAMIC EVENTS AFFECTING GEOPHYSICAL INVESTIGATIONS

Dynamic events (rain, lightning, solar flares, etc.) may temporarily impact geophysical data collection and/or data quality. The following procedures will be followed during these anticipated events:

1. **Rain**—Depending on its intensity, rain can be a significant impediment to survey operations. The Geophysicist will assess the intensity of rainfall and its effects on survey instrumentation. The Geophysicist will also assess safety considerations, such as site access (driving and passable roads), hazards (slip, trip, fall), and potential for flash flooding. General guidance for common conditions is as follows:

1A. **A period of Drizzle or Intermittent Light Rain**—Tape plastic around instrument electronics and continue to collect data.

1B. **Thunderstorm**—Take cover and cease operation until the storm passes.

1C. **Continuous Medium or Heavy Rain**—Take cover and cease operations until conditions improve.

2. **Lightning**—Because most geophysical instruments contain sufficient metal and geometry to pose a preferred pathway for electrical discharge (lightning rod effect), observed lightning in the area will be deemed a safety hazard and will be cause for the cessation of survey activities until the lightning activity has ceased.

Site personnel and equipment will shelter in a safe area. The UXO Safety Officer (UXOSO) will document that lightning is present and log the times when site survey activities are shut down and resumed. Activities will not resume until 30 minutes have past since last observed lightning flash or clap of thunder heard.

3. **Solar Flares**—Solar flares are sun-generated atmospheric phenomena, typically occurring in the afternoon, which may temporarily generate high magnitude magnetic noise sufficient to make magnetometers, and often gradiometers, unusable for the duration of the event. It is unlikely that these events will have a significant impact on the magnetometer data. Solar flares are typically readily observable by the instrument operators (throughout the area) as rapidly fluctuating signal readings with no apparent cultural or survey source. The Geophysicist will be alert to solar flares and temporarily cease data collection until static testing shows a cessation of the solar activity.

6.3 GEOPHYSICAL PROJECT PERSONNEL

All geophysical investigations will be managed by the qualified personnel in GeoSearches Inc. All technical staff will report to GeoSearches Project Manager, Mr. Terence Hamill.

6.3.1 *Project Geophysicist*

Mr. Terence Hamill is the Project Geophysicist and has overall responsibility for design, implementation, and management of all geophysical investigations. He will establish and approve technical procedures, conduct technical QC procedures on the data, communicate with the geophysical crew to guide the progress of the investigation and ensure that the objectives are being met, and approve the geophysical sections of the reports to be prepared under this task order.

6.4 GEOPHYSICAL SURVEY EQUIPMENT

6.4.1 *Electromagnetics*

The EM61-MK2 sensor is battery-powered and operates at a maximum output of 10,000 milliVolts (mV). The EM61-MK2 sensor is a 1 meter (m) x 0.5 m air-core coil that acts as both a transmitter and receiver. The transmitter generates a pulsed magnetic field that induces eddy currents in conductive objects within the subsurface. These currents are proportional to the conductive nature of the material below the instrument. When conductive objects are present below the instrument, the amplitude and decay time of the induced eddy currents vary in response to the size, mass, and orientation of the objects. The receiver measures the amplitude of these eddy currents at 216, 366, 660, and 1,260 micro-second intervals (time gates) during the decay period.

A single EM61-MK2 sensor will be hand-pulled on a wheel- or sled-mounted cart. A Global Positioning System (GPS) antenna or RTS prism will be mounted over the center of the sensor and linked to a portable receiver unit attached to the EM61-MK2 backpack. This receiver captures positional information and outputs a National Marine Electronics Association (NMEA) message directly into the Allegro data logger at one second intervals. Direct interfacing between the GPS and EM61-MK2 utilizes a single clock and streams position information directly into a raw MK2 data file.

The rationale for selection of the EM61-MK2 is provided in the GeoSearches informational letter memo located in Appendix I.

6.4.2 *Ground Penetrating Radar*

6.4.2.1 Sensors and Software Noggin 250MHz GPR System

The GPR method provides a very rapid means of non-intrusive data collection. The system is most commonly moved along the surface at a consistent pace as data are collected continuously along profiles. The depth at which a feature can be imaged is largely dependent on subsurface material type (resistive versus conductive). With prior knowledge of expected subsurface materials and clearly defined objectives, we will optimize data collection parameters to compensate for less than ideal geologic environments.

The rationale for selection of the GPR instrumentation is provided in the GeoSearches informational letter memo located in Appendix I.

6.5 METHODOLOGY

6.5.1 *Survey Grids- Day 1*

Full coverage and transect survey modes will be utilized. Full coverage (100%) will be achieved through deployment of the sensor system through the collection of sub-parallel survey lines or swaths with sensor separations of 3 feet. Transect surveys are utilized to evaluate the extent of contamination in a large area through systematic surveying along linear paths with offset patterns and swath widths. Grids of 200ft by 200ft will be established in the field to systematically survey the site in the most effective pattern. The survey pattern will consist of consecutive multi-sensor passes. To ensure that full, overlapping coverage is obtained over the entire survey area, the operator will navigate through several methods, including: 1) observing the tracks of previous lines and offsetting the new line to obtain overlapping coverage; or 2) using spray paint or portable markers to mark the position of lines and then offsetting the new lines.

6.5.2 *Data Acquisition- Day 2, 3 and 4*

The instrument spacing within the data grids will be 5ft and the EM 61 will have 100% coverage. Ground Penetrating Radar will be used to quantify unknown anomalies seen within the processed data. Specific Procedures for Transect Survey Mode include the following:

- All transects will consist of straight-line paths to the maximum extent possible.

- In-field transects definition. Stakes and highly visible flagging are placed in the field along transect paths such that the distance between flags is visible to the sensor operator. The maximum distance between stakes is highly variable and is dependent on site conditions such as tree density, topography

and location of any other line of sight obstruction. The first point and last point of each traverse will be identified with double flags.

- Typically transects will consist of a single pass of the sensor system. In cases where two passes are required, the sensor system will run on one side of the transect flags on the first pass and to the other side on the return pass.

- Field logs will be maintained to document the conditions of the data collections. The field logs will include information and observations of the data collection area, field conditions, data acquisition parameters, and QC performed. Field geophysical data and navigation data will be downloaded to a field personal computer (PC). The electronic files will be organized on an office PC dedicated to geophysical investigation management. Data will be backed-up daily.

- The collected data will be subjected to Quality Control procedures on a daily basis to make sure all planned data lines for the day are covered.

6.6 DATA PROCESSING

GeoSearches standard data processing will include statistical data assessment, grid generation, and data filtering to accentuate target signatures. However, if necessary, in-house software may be used to facilitate some data filtering functions. Subsequent to the processing and review of the data, all data grids and target detections will be loaded into the Geographic Information System (GIS).

The Project Geophysicist will review sensor and navigation data for accuracy, completeness, and data fidelity and will verify that the data are complete. The quality of the data will be determined and additional filtering or reprocessing of the data that may be necessary will be determined. All activities will be documented on the Data Processing Log. The initial steps taken in the data processing flow will include the following:

Initial Review of Collected Data—The data will be reviewed to assess the

coverage area, noise levels, and erroneous points.

Navigation Data Review—Positional information collected via GPS navigation is designed to provide real-time XYZ location solutions concurrent with collection of the sensor data. However, circumstances can arise where the data require post-processing to remove errors in coordinate locations. If positional errors are detected, they will be documented in the Data Processing Log (Form C-1). Subsequently, these position data will be used in the data-merging step to create XYZ files.

Coverage Assessment — To verify that complete coverage has been achieved during survey activities, all navigation traverses will be reviewed and documented during the data processing and analysis steps. The areas surveyed and areas missed will be calculated and documented on the Navigation QC Function Log.

Deletion of Extra or Erroneous Data — Extra or erroneous data such as instrument run-ons at the ends of lines, data collected in turnaround areas, data spike, nulls, etc. will be deleted.

Site Feature Check — Additionally, the geophysicist will examine the data with respect to cultural or natural features (wells, trees, utilities, etc.) observed on site or mapped in the GIS.

Geophysical Noise Identification and Removal (Spatial, Temporal, Motional, Terrain Induced)

Profile data will be reviewed and any noise will be identified and removed. Any cultural features suspected of introducing noise into the data will be identified on maps and notes.

Global positioning system technologies offer full integration with geophysical sensors, real-time differential solutions based on either satellite-provided or base-station-provided differential corrections.

In addition to mapping geophysical data, the selected navigation instrument will be used for other location tasks including the following:

Feature Identification — The navigation system will be used to augment geophysical data and improve geophysical mapping through capture of visual observations made during site walk-over. During this process, the navigation system will be used for position-stamping debris piles, unidentified fences, soil changes, vegetation, burn areas, etc.

7.0 GEOSPATIAL INFORMATION & ELECTRONIC SUBMITTALS

7.1 GENERAL

To the maximum extent possible, PIKA will use drawings, plans and maps provided by RVAAP FM. Survey maps shall be provided in the report, which delineate the boundaries of the survey site, the boundaries and locations of the metal anomalies, and the soil sample locations subject to this SOW. Points will be uniquely numbered and identified on the map/drawing and the coordinates shown to the closest one meter. All data submitted shall be in the Universal Transverse Mercator (UTM) coordinate system. The stake in the southwest corner of each grid will be numbered to reflect the grid numbers. The site grid data will include a map of the entire site with the grids shown in relation to other pertinent site features. Grid corner coordinates will be presented as a tabulated list in appropriate computer software (i.e. Microsoft Excel Spreadsheet). MEC construction support will be conducted during all geophysical site operations as discussed in Section 2.14. Adjustable grids may be needed based upon the anomaly avoidance.

7.2 MEC/UXO SAFETY PROVISIONS

During all field and intrusive operations all non-UXO personnel approved to be on site by the UXOT III/Team Leader will be accompanied by UXO personnel. The UXO person(s) will perform a visual survey for surface MEC/UXO prior to the non-UXO personnel entering the area. The UXO person will perform a magnetometer survey of each intrusive activity site to ensure that the survey/staking point is anomaly free prior to the non-UXO personnel setting monuments, driving stakes or establishing other points.

7.3 CONTROL POINTS

Existing permanent monuments will be used.

7.3.1 *Accuracy*

A tabulated list of all control points and monuments showing their final adjusted coordinates and respective elevations (in feet to the nearest 0.3 foot) established and/or used for survey will be provided. A tabulated list of each individual boundary corner will be provided showing the adjusted coordinates to the nearest 1 meter.

7.3.2 *Monument Caps*

Existing monuments will be used.

7.3.3 *Plotting*

N/A

7.3.4 *Description Cards*

N/A

7.4 MAPPING

Survey maps will be provided in the investigation report, which delineate the boundaries of the survey site, the boundaries and locations of the metal anomalies, and the soil samples locations subject to the SOW. All data submitted will be in the UTM coordinate system. As required in the SOW - *All coordinates will be collected with applicable equipment capable of gauging field surveys within an accuracy of one meter or less of error.* All survey and mapping will be provided in accordance with Section 3.4 (Electronic Data Files) of the SOW located in Appendix A.

7.5 DIGITAL DATA AND COMPUTER REQUIREMENTS

All digital data and computer requirements will be IAW the SOW requirements (see Appendix A).

7.6 LS&M SUBMITTALS

GPS systems and requirements will be IAW the SOW requirements (see Appendix A).

8.0 WORK DATA AND COST MANAGEMENT PLAN

8.1 PROJECT MANAGEMENT APPROACH

This Work Data and Cost Management Plan outlines how the project work will be managed and accomplished. Items pertaining to cost control are in general terms for tasks awarded under CELRL, Louisville, Kentucky as a Firm Fixed Price (FFP) Task Order. PIKA internal data management will be conducted for project management purposes.

8.2 PROJECT SCHEDULE

PIKA has developed a proposed Project Schedule for the completion of all tasks presented in this WP. The Project Schedule is shown in Appendix B as Figure 5.

8.3 PROJECT COST CONTROL AND TRACKING

This is a fixed price contract and as such the cost control and tracking required by the government will be minimal. PIKA will utilize Primavera, Microsoft Project, or other cost and resource tracking software to ensure that the project costs are maintained within the proposed fixed price. In the event that unexpected and unplanned changes occur that have a significant cost impact, the PIKA PM will contact the USACE KO and RVAAP FM to evaluate any potential for changes to the fixed price based upon the cost differential associated with the project change. No contractual changes will be made without the final written approval by the USACE KO.

8.4 SUBCONTRACTOR COSTS

PIKA will control subcontractor costs by using its approved accounting policies, which require acquisition of three quotes for any equipment or services charged to a project. To secure subcontractor services, PIKA will issue a request for proposal

containing a SOW for the service needed that corresponds to the requirements of the client.

PIKA will select a subcontractor source on the basis of best value to PIKA and the Government, and the PIKA PM will subsequently review and approve all subcontractor invoices. The PIKA PM, in conjunction with the SUXOS, will monitor subcontractor progress to ensure effective completion of the subcontract.

8.5 MANPOWER REQUIREMENTS

PIKA will assign the personnel to the project on an as needed basis to ensure that the project is completed within the fixed price budget, on schedule and in a safe, efficient manner. The project management personnel assigned to this project are listed in Section 2.7 of this WP, and those personnel will be responsible for safe, successful project performance. For the performance of on-site operations, the PIKA SUXOS will be responsible and will track the manpower requirements for the project. This information will be transmitted and coordinated with the PIKA PM.

8.6 RECURRING DELIVERABLES

8.6.1 *Monthly Progress Reports*

PIKA will prepare and submit electronic copies of the monthly progress reports to the CELRL. These progress reports will document the project activities conducted by PIKA in its performance of the project tasks as previously described in Section 8.6.1. The monthly reports will be submitted for receipt by the addressee by the 5th working day of each month.

PIKA will also attend the weekly RVAAP contractors meeting at the RVAAP Headquarters (HQ) (Building 1037) to coordinate with other contractors and Camp Ravenna and the bi-weekly RVAAP schedule meeting for contractors and government agencies.

8.7 DAILY PROGRESS REPORTS

PIKA will prepare daily progress reports that will be maintained in the PIKA project office trailer for compilation of monthly reports. The daily report will be prepared using a form that provides for the collection of the relevant information for the project specific forms and reports.

8.8 COMMUNICATIONS

Project management communications for this project will generally be conducted as:

- **Field Tasks** – The UXOT III/Team Leader will communicate field information to the PIKA's PM, who in turn will inform the RVAAP FM.
- **Task Order Management** – PIKA's PM or other staff will address all task order management information (e.g., budgetary issues, change orders) directly to the RVAAP FM.

8.9 RECORDS MANAGEMENT

Hard copies of primary records for the site will be retained by PIKA. The records will include, but are not limited to:

- Task order and modification files
- Correspondence
- Draft document submittals
- Responses to comments
- Final document submittals

During field investigations, records will be maintained in the PIKA field office. Following completion of definable phases of work all files will be transferred to the PIKA Corporate Office in Stafford, TX.

9.0 PROPERTY MANAGEMENT PLAN

Not required under this task order.

10.0 QUALITY CONTROL PLAN (QCP)

Provided under separate cover in the Project Management Plan (PMP).

11.0 ENVIRONMENTAL PROTECTION PLAN

11.1 INTRODUCTION

The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract will be protected during the entire period of this contract. PIKA will confine its activities to areas defined by this WP. Environmental protection will be as stated in the following subsections.

PIKA is directly responsible for the implementation of this plan. Inspections will be made to assure field personnel's compliance with this plan. Following are several specific areas of concern that fall under environmental protection.

11.2 IDENTIFICATION OF AREAS REQUIRING PROTECTION

11.2.1 *Endangered/Threatened Species*

There are currently no federally listed species or critical habitat at Camp Ravenna. Various State-listed species have been identified. However, the project area has not been specifically investigated for endangered or threatened species. PIKA will perform all site activities in such a manner as to avoid or minimize adverse effects to any endangered or protected plant/wildlife species and resources discovered on the site. If endangered or threatened species are encountered during site activities, PIKA will locate and flag-off the areas and immediately notify and obtain guidance from Camp Ravenna-Environmental, CELRL, and RVAAP FM before continuing operations within the flagged area. All PIKA site personnel will adhere to the specific guidance received from Camp Ravenna-Environmental, CELRL, and RVAAP FM.

11.2.2 *Wetlands*

Wetlands have been identified within the project area. Prior to initiating the site investigation, the wetland areas will be located for protection during site activities. If access to wetlands becomes necessary as part of the site investigation, Camp

Ravenna-Environmental, CELRL, and RVAAP FM will be consulted and appropriate actions and measures will be taken.

11.2.3 *Cultural and Archaeological Resources*

This area has not been previously surveyed for cultural or archaeological resources. In the event that cultural materials, artifacts, or human remains are encountered in or near the project area, either by PIKA, its subcontractors or by other personnel observing the project area during the project activities, the following procedures for inadvertent discoveries should be followed:

- Report any observations or discoveries or artifacts or human remains immediately to the OHARNG Cultural Resource Manager (CRM)/Camp Ravenna Environmental Office. If the CRM is not available, report the discovery to Camp Ravenna Range Control. CELRL and the RVAAP FM will also be notified.

- The CRM or Range Control will secure any artifacts or non-human remains identified in the project area for analysis or curation, as appropriate. Human remains are not to be disturbed or removed from the project area.

- The CRM will examine the area to determine whether an archaeological deposit or human burial has been exposed within the area and will take measures to protect the location from further disturbance.

- If human remains are known or suspected to be present, the CRM or Range Control will also promptly notify the State Police or Federal Bureau of Investigation, as appropriate.

- The CRM will promptly notify the Ohio Historic Preservation Office (OHPO) of the discovery. The CRM will follow Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) and Archaeological Resources Protection Act of 1979 (ARPA) procedures to contact Native American tribes and any other stakeholders as appropriate.

- If a site area or burial is identified as the source of the materials found in the project area, the CRM will make arrangements for the site recordation and stabilization, in consultation with the OHPO and any interested Native American tribes.

- All archaeological and cultural activities will be performed with OHARNG and RVAAP FM oversight and approval.

11.2.4 *Water Resources*

PIKA will keep activities under surveillance, management and control to avoid pollution of surface and ground waters. Special management techniques as set out below will be implemented to control water pollution by site operations.

11.3 MITIGATION PROCEDURES

11.3.1 *Waste Disposal*

Disposal of any materials, waste, effluents, trash, garbage, unsatisfactorily decontaminated materials, oil, grease, chemicals etc., in areas adjacent to streams, rivers or lakes will not be permitted. If any waste materials are dumped into unauthorized areas, PIKA will remove the materials and restore the area to the condition of the adjacent undisturbed area. If necessary, ground which has been contaminated through the fault or negligence of PIKA will be excavated, disposed of as directed by RVAAP FM and Ohio EPA, and replaced with suitable fill material, compacted and graded, all at PIKA's expense. Disposal of waste, trash and other materials off the project site will be IAW all applicable Federal, State, local and DoD/Army rules, laws and regulations.

11.3.1.1 Solid Waste Disposal

Solid wastes will be placed in appropriate containers, which will be emptied regularly. All handling and disposal will be conducted to prevent further

contamination and/or contaminant migration. PIKA will dispose of all solid waste IAW all applicable Federal, State, local and DoD/Army rules, laws and regulations.

11.3.1.2 Hazardous Waste Disposal

Hazardous waste (if any) will be removed from the project site and will be manifested, transported and disposed of IAW all applicable Federal, State, local and DoD/Army rules, laws and regulations.

11.3.1.3 Dust and Emission Control

PIKA will maintain all operational areas, waste areas and other work areas free from excess dust in quantities constituting a hazard or nuisance. For this site investigation project, no dust control measures will be needed. Should unanticipated dust control issues arise, PIKA will recommend temporary methods to control dust (e.g., wetting with potable water) to Ohio EPA, CELRL, and RVAAP FM for approval. PIKA will control dust as the work proceeds and whenever a dust nuisance or hazard occurs.

Hydrocarbon, carbon monoxide, oxides of nitrogen, and sulfur emissions are the emissions associated with heavy equipment. If this type of equipment is needed at this site, the emissions will be controlled through proper vehicle maintenance, use of mufflers etc., IAW all applicable Federal, State, local and DoD/Army rules, laws and regulations.

11.4 SPILL CONTROL AND PREVENTION

Special measure will be taken to prevent chemicals, fuels, oils, greases, bituminous materials, sawdust, waste washings, herbicides, insecticides, rubbish or sewage and other pollutants from entering public waters.

With the exception of the heavy equipment (when required) on-site, there is very little potential for spillage of large quantities of chemicals. PIKA will take all necessary precautions to prevent spills and will implement contingency measures for

cleanup should any occur. To minimize the potential for and impact of spillage, PIKA will:

- Submit spill response procedures as part of the SSHP for review and approval;
- Use and store minimal quantities of fuels and oils on-site;
- Apply work practice controls to prevent spills during refueling and maintenance of power tools, site vehicles and equipment;
- Maintain on-site spill response supplies and equipment necessary to contain spilled materials and to remove and contain materials that become contaminated due to spillage.

PIKA will perform, at a minimum, the following emergency procedures if a spill occurs:

- Immediately (within 1 hour), notify CELRL, RVAAP FM and Camp Ravenna-Environmental. The RVAAP FM will provide notification to Ohio EPA.
- Halt site operations in the area and take immediate measures, using PPE and personnel to control and contain the spill;
- Isolate the hazardous area through flagging, removing or extinguishing ignition sources and evacuation of all unnecessary personnel from the area;
- If mandated by the nature of the spill, evacuate personnel upwind to the pre-designated assembly area, and post personnel at access routes to prevent unauthorized personnel from entering the area;
- Implement control measures, if needed, to reduce vapors, gases and/or dust emissions; and
- Conduct all spill response operations IAW the RVAAP installation Spill Contingency Plan and Camp Ravenna Integrated Contingency Plan. The Ohio

EPA spill response number (800) 282-9378 will be called in the event of any spills to waters of the State or spillage of reportable quantities.

11.5 STORAGE AREAS AND TEMPORARY FACILITIES

PIKA will not be locating any new storage areas or temporary facilities with this project.

11.6 ACCESS ROUTES

During all site activities PIKA will, to the greatest extent possible, use existing paved and unpaved roadways to minimize the impact of site operations.

11.7 PROTECTION AND RESTORATION OF TREES AND SHRUBS

Trees, shrubs, vines, grasses, landforms and other landscape features to be preserved will be clearly identified. Except in the study areas, trees or shrubs will not be removed, cut, defaced, injured, or destroyed without the permission of the RVAAP FM and Camp Ravenna-Environmental. Wherever possible, trees and other vegetation existing on the site will be conserved. Areas requiring clearing and grubbing (i.e., felling and removing trees) will be done only after approval from the RVAAP FM and the Camp Ravenna-Environmental office. Whenever needed, clearing and grubbing will be conducted in a selective fashion so as to maintain to the greatest extent possible, the natural random order of vegetation. Any areas accessed or impacted for the purpose of transporting or transferring materials will be restored IAW Ohio EPA, RVAAP and Camp Ravenna Environmental office requirements.

11.8 CONTROL OF WATER RUN ON AND RUN OFF

PIKA will take all reasonable precautions to prevent run-on from entering areas of the site where it may be exposed to contaminated soils, water or waste as a result

of PIKA site activities. If necessary, PIKA will construct, monitor and maintain silt fencing, temporary dikes or diversion ditches to prevent water from entering the site. Any erosion and/or sediment control measures installed as part of this investigation (if any) will be properly maintained throughout the duration of the project, as needed, to minimize erosion potential.

11.9 POST CONSTRUCTION CLEANUP

PIKA will remove all signs of disturbed areas such as work areas, fencing or any other signs of construction within the work, storage, and access areas. The area will be restored to near natural conditions and if needed, IAW the OHARNG/Camp Ravenna seed mix specifications. Any damage to roads, bridges, gates, etc., as determined by RVAAP FM and/or Camp Ravenna-Environmental will be restored to pre-contract conditions.

12.0 INVESTIGATIVE DERIVED WASTE (IDW) PLAN

An IDW plan describes procedures for handling IDW on Recovered Chemical Warfare Materiel (RCWM) projects and is not presently required under this task order. The procedures for handling IDW generated during this specific project can be found in Appendix E of the Work Plan (Sampling and Analysis Plan, Section 8.0). If in the future CWM is found or suspected at this site, an IDW plan will be prepared IAW the Data Item Description (DID).

13.0 INTERIM HOLDING FACILITY SITING PLAN FOR CWM PROJECTS

No Interim Holding Facility Siting Plan is associated with this Project.

14.0 PHYSICAL SECURITY PLAN FOR RCWM PROJECT SITES

Not required by this Task Order.

15.0 REFERENCES

1. Department of Defense (DoD), 6055.09-STD, Ammunition and Explosives Safety Standard.
2. USACE, Engineering Manual (EM) 385-1-97, Explosives Safety and Health Requirements Manual.
3. USACE, Engineering Pamphlet (EP) 75-1-2, UXO Support during Hazardous, Toxic, and Radioactive Waste (HTRW) and Construction Activities.
4. Occupational Safety and Health Administration (OSHA) General Industry, 29 CFR 1910, and Construction Industry Standards, 29 CFR 1926.
5. USACE, Engineering Manual (EM) 385-1-1, Safety and Health Requirements Manual.
6. DDESB Technical Paper (TP) 15, Approved Protective Construction.
7. DDESB Technical Paper (TP) 16, Methodologies for Calculating Primary Fragment Characteristics.
8. DDESB Technical Paper (TP) 18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel.
9. USACE, Engineering Manual (EM) 1110-1-4009 – Military Munition Response.
10. Department of Defense Instruction (DoDI) 4140.62. Management and Disposition of Material Potentially Presenting an Explosive Hazard (MPPEH).
11. Environmental Protection Agency (EPA, Code of Federal Regulations).
12. Ohio EPA 2004. Director's Final Findings and Orders in the matter of United States Department of the Army, Ravenna Army Ammunition Plant, Ravenna, Ohio.
13. Ohio Standard's for Stormwater Management and Land Development and Urban Stream Protection 2006;
14. 1998 Memorandum of Agreement (MOA) for the Ravenna Army Ammunition Plant (RVAAP) Army Headquarters, U.S. Army Industrial Operations Command (IOC), The United States Property and Fiscal Officer (USP&FO) for Ohio, and the Ohio Army National Guard (OHARNG);
15. 2001 Amendment 1 to the Memorandum of Agreement (MOA) for the Ravenna Army Ammunition Plant (RVAAP) Among Headquarters, U.S. Army

Industrial Operations Command (IOC);

16. IOC Pamphlet 385-1 Classification and Remediation of Explosive Contamination; and
17. Vista, 2009. Ravenna Army Ammunition Plant Submission Format Guidelines, Version 18.0. December.
18. Ohio Environmental Protection Agency, 2005. Munitions and Explosives of Concern (MEC) at Ravenna Army Ammunition Plant – Notification Procedures. April 8, 2005.
19. SAIC 2001. Facility-Wide Safety and Health Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna Ohio, March.
20. SAIC 2001. Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna Ohio, March.

APPENDIX A

SCOPE OF WORK

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SCOPE OF WORK

SCOPE OF WORK

FOR

COMPLIANCE RESTORATION SITE CC-RVAAP-80

AND OTHER ENVIRONMENTAL SERVICES

RAVENNA ARMY AMMUNITION PLANT

RAVENNA, OHIO

22 MARCH 2010

The Louisville District, U.S. Army Corps of Engineers (USACE) is requesting environmental services as described in this Scope of Work (SOW) at the former Ravenna Army Ammunition Plant (RVAAP).

Compliance Restoration (CR) site CC-RVAAP-80 (Group 2 Propellant Can Lids) is potentially impacted by range-related debris (RRD) and/or chemical residues of munitions or munitions constituents (MC). Response actions are required under the Defense Environmental Restoration Program (DERP), Installation Restoration Program (IRP) to further identify these materials and investigate this AOC. The SOW identifies specific requirements that will be completed by the Contractor.

This SOW also identifies other services required of the Contractor. This portion of the SOW pertains to water removal services at Load Line 2.

1.0 GENERAL INFORMATION

1.1 Site Description and Location

Past Department of Defense (DoD) activities at the former RVAAP date back to 1940 and include the manufacturing, loading, handling, and storing of military explosives and ammunition. Until 1999, the RVAAP was identified as a 21,419-acre installation. The Ohio Army National Guard (OHARNG) resurveyed the property boundary, finishing in 2003, and the actual total acreage was found to be 21,683.289 acres. As of February 2006, a total of 20,403 acres of the former 21,683-acre RVAAP have been transferred to the National Guard Bureau (NGB) via the United States Property and Fiscal Officer (USP&FO) for Ohio and subsequently licensed to the OHARNG for use as a training site. Currently, RVAAP consists of 1,280 acres in several distinct parcels scattered throughout the confines of the OHARNG's Camp Ravenna Joint Military Training Center (Camp Ravenna). RVAAP's remaining parcels of land are located completely within the Camp Ravenna perimeter fence. The RVAAP facility is controlled by the U.S. Army Base Realignment and Closure Division (BRACD).

Camp Ravenna/RVAAP is located in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 kilometers (three miles) east/northeast of the City of Ravenna and approximately 1.6 kilometers (one mile) northwest of the Village of Newton Falls. The RVAAP portions of the property are located completely within Portage County. Camp Ravenna (inclusive of RVAAP) is a parcel of property approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide. The facility is bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garrett, McCormick, and Berry Roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east. Camp Ravenna is surrounded by several communities: Windham on the north, Garrettsville 9.6 kilometers (six miles) to the northwest; Newton Falls 1.6 kilometers (one mile) to the southeast; Charlestown to the southwest, and Wayland 4.8 kilometers (three miles) to the south. The property location is depicted in Figure 1.

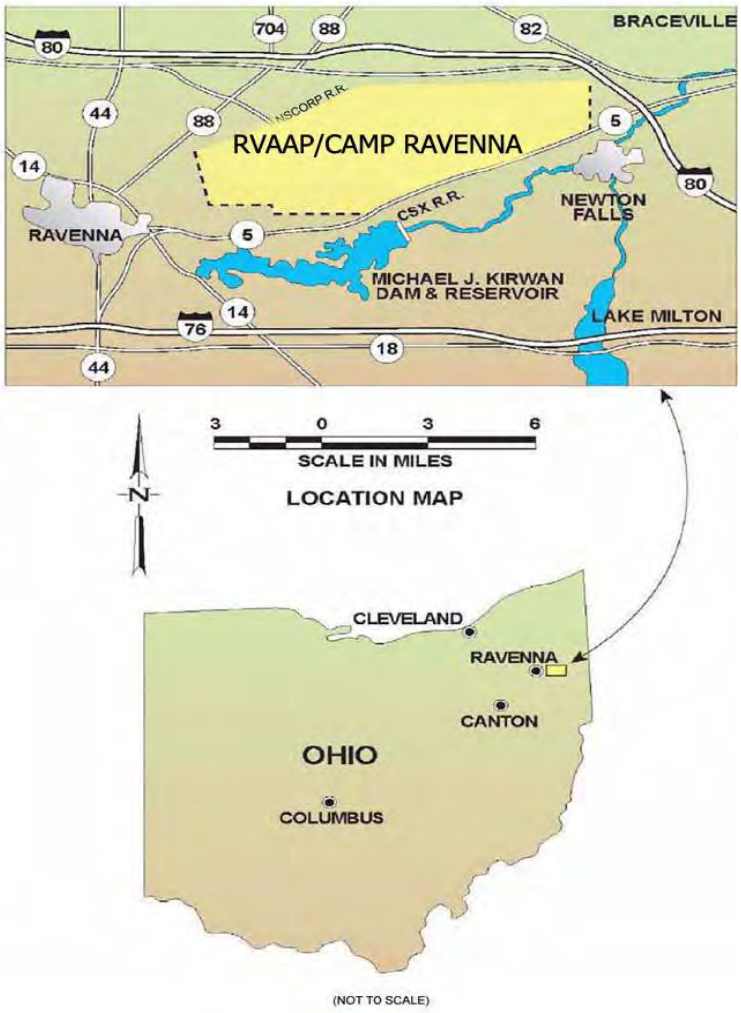


Figure 1. RVAAP/Camp Ravenna Location and General Vicinity Maps

Camp Ravenna did not exist when the RVAAP was operational, and the entire 21,683-acre parcel was a GOCO industrial facility. The RVAAP BRACD sites encompass investigation and clean up of past activities over the entire 21,683 acres of the former RVAAP. Therefore, references to the RVAAP in this document shall include the historical extent of the RVAAP, inclusive of the combined acreages of the current Camp Ravenna and RVAAP, unless otherwise specifically stated.

1.2 Areas of Concern

CC-RVAAP-80: Group 2 Propellant Can Lids

CC-RVAAP-80 consists of the Group 2 Propellant Can Lids area. Propellant can lids or tops were identified on the ground surface/near surface at the southern and northern ends of the former Group 2 Ammunition Storage Area. These materials are typically classified as RRD

(similar to munitions packaging materials); however, this site was never used or classified as an operational range. It is believed that the discarded propellant can lids might qualify as inert scrap metal.

The propellant can lids located at the south end of Group 2 were initially identified by Ohio Army National Guard trainees in the winter of 2008. The propellant can lids were observed in the vegetative area located immediately south of the ammunition storage magazines in the vicinity of the southern railroad spur lines. This area consists of approximately 539,572 square feet (12.4 acres). Reportedly, propellant can lids were also identified at the northern end of the Group 2 area by the Ohio Army National Guard. The reported northern area consists of approximately 43,418 square feet (1 acre).

The Louisville District USACE performed an emergency survey with a metal detector of a portion of the southern area ground surface. Results of the initial investigation revealed multiple magnetic anomalies in the surface and near surface soils. On-site UXO personnel visually identified the surface anomalies as propellant can lids or tops. During the emergency survey it was also noted that the ground surface had been disturbed and contained hummocks (mounds) ranging in height from 1' to 2' throughout the survey area.

As such, the propellant can lids (or RRD) are of environmental concern for the subject area. A geophysical survey is necessary to identify the anomalies and anomalous areas within the subject area, and to characterize the subject area boundary(s).

The anomalies and anomalous areas should be clearly marked during the field survey in order to facilitate a limited soil investigation, and possible future clean up activities. The limited soil investigation is warranted to assess possible releases of propellants (MC) to the surface soils in the vicinity of the can lids.

The site is a low probability site in regards to encountering munitions and explosives of concern (MEC). Therefore, only unexploded ordinance (UXO) construction support will be needed for this project. However, if prior to this project or during any phase of this project MEC are found at the site, the project may be stopped and the site will need to be re-evaluated and potentially assigned a new probability rating.

RVAAP-09: Load Line 2

Former excavation activities conducted at Load Line 2 (RVAAP-09) have resulted in the accumulation of water within the building DB-802 footprint. Restoration activities are now planned at this location, and the accumulated water needs to be removed from the excavation to assist in the restoration of the site.

2.0 PROJECT OBJECTIVES

The objective of this project is to conduct an initial investigation of the above-described Group 2 Propellant Can Lids areas. The investigation shall achieve the following objectives:

- Delineate the boundaries of the propellant can lid areas
- Confirm the presence or absence of releases of propellants and/or other MC to the surface soils at this AOC

Project objectives and the SOW associated with the water removal services at Load Line 2 are described in Section 8.0. Other portions of this document pertain to the activities and requirements associated with the Group 2 Propellant Can Lids areas.

3.0 GENERAL REQUIREMENTS

The Contractor shall possess all the required expertise, knowledge, equipment and tools required to perform the work described in this SOW in accordance with established industry standards. The Contractor shall be responsible for and shall furnish all labor, materials, plant, equipment, and supplies necessary to fully execute the Firm Fixed-Price work described herein within the contract performance period (see Section 4.0).

The Contractor shall perform all environmental services pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and National Oil and Hazardous Substances Contingency Plan (NCP) requirements, and coordinating with the Ohio Environmental Protection Agency (EPA) as appropriate. The installation is not on the National Priorities List (NPL).

The Contractor shall comply with all applicable federal, state, and local rules, laws, and regulations. The Contractor shall fulfill the work described in this SOW in a manner that is consistent with any applicable orders or permits, all cleanup agreements or guidance for the Facility, and relevant DoD and Army policy that exist or may become effective during the performance of this contract. This specifically includes the Director's Final Findings & Orders (DFFO), which the Army and Ohio EPA agreed to in 2004. The DFFO establishes certain criteria that apply to the relationship between the Army and Ohio EPA, including but not limited to approval authority, document review schedules, and various agency responsibilities. All work performed shall conform to the DFFO.

3.1 Government Property

All documents, maps, photographs, graphics, mailing lists, radio telemetry transmitters, computer files and the like developed by the Contractor while completing the requirements of this SOW are government property and will be delivered to the facility Point of Contact (POC) upon completion of this project.

3.2 Data Security

The Contractor shall not release any data, reports, or materials collected and/or developed during this project without the expressed written consent of the U.S. Army Corps of Engineers (USACE).

3.3 Deliverables and Document Format

The Contractor shall prepare and submit the following project management documents:

- Project Management Plan (PMP) including a Quality Control Plan (QCP)

In addition (but not limited to), the Contractor shall prepare the following project specific documents (as applicable) in support of the IRA:

- Work Plan (WP)
- Sampling and Analysis Plan (SAP)
- Site Safety and Health Plan (SSHP)
- Quality Assurance Project Plan (QAPP)
- Report of Findings and Conclusions

The Work Plan documents can be developed as Addenda to the approved Facility-Wide documents; however, references to the Facility-Wide documents should be held to a minimum with respect to describing actual field assessment activities. The Work Plan should be treated as the body of the report while the above associated plans are entered as tabbed sections (or incorporated by reference).

The above documents are subject to stakeholder review and approval. All documents shall be submitted by the Contractor in preliminary draft, draft, and final format. The number of documents and their distribution is described below:

Preliminary Draft Documents

Organization	Number of Paper Copies	Number of Electronic Copies
USACE	4	4
RVAAP	2	2
Ohio Army National Guard	1	1
REIMS	1	1

Draft Documents

Organization	Number of Paper Copies	Number of Electronic Copies
USACE	4	4

RVAAP	4	2
Ohio EPA	2	2
Ohio Army National Guard	1	1
REIMS	1	1

Final Documents

Organization	Number of Paper Copies	Number of Electronic Copies
USACE	4	4
RVAAP	4	2
Ohio EPA	2	2
Ohio Army National Guard	2	2
REIMS	1	1

The Army, through the Contracting Officer's Representative (COR), will receive preliminary draft documents from the Contractor and will provide review comments to the Contractor within thirty business days. Once preliminary draft comments are addressed, the Army will review draft and final documents concurrently with the other stakeholders. The Contractor shall ensure that review and response periods are consistent with the applicable regulatory drivers (see DFFO). All documents shall be identified as draft until completion of stakeholder coordination, when they will be signed and finalized. One copy of the final documents shall be placed in both the project repositories and Administrative Record (for CERCLA documents).

All documents shall be submitted in electronic and printed format in accordance with the latest version of the document entitled "Ravenna Army Ammunition Plant Deliverable Document Formatting Guidelines." The referenced document is available and can be downloaded from www.rvaap.org/docs/pub/Formatting_Guidelines.pdf.

All reports are to be typed. Field notes shall be reviewed for quality assurance (QA) and then be submitted in handwritten form. Other handwritten field originals shall also be included in the reports.

In addition, final electronic document files must be in text-searchable PDF format and be accompanied by defined metadata for upload into the Army Repository of Environmental Documents (READ).

The contractor shall secure a USACE approved laboratory that can provide analytical data in the USACE Automatic Data Review (ADR) electronic format. All samples collected and analyzed under this agreement shall be provided in the referenced electronic data deliverable (EDD) format. The project-specific library file must be maintained to accurately reflect all of the analytical quality and will be provided to both the USACE and the sub-contract laboratory for use in screening EDD submittals.
Data review must comply with the procedures outlined in the Louisville Quality System Manual (QSM) Supplement and provide compatibility with data management software, at minimum, Environmental Data Management System (EDMS) software. The Contractor shall set up

libraries in ADR/EDMS for deriving site constituents of potential concern (COPCs). The contractor is responsible for keeping ADR current.

All electronic data submitted by the contract laboratory is required to be error-free, and in complete agreement with the hardcopy data. Data files are to be delivered both by e-mail and/or high density CD accompanying the hardcopy data reports. The disk must be submitted with a transmittal letter from the laboratory that certifies the file is in agreement with hardcopy data reports and has been found to be free of errors using the latest version of the ADR evaluation software provided to the laboratory. The contract laboratory, at its cost, will correct any errors identified by the USACE, Louisville District.

All documents shall be provided in electronic format for posting to the Ravenna Environmental Information Management System (REIMS). All analytical data shall also be provided in EDD format for posting to REIMS. REIMS is currently administered by Mr. Patrick Ryan of SAIC. Mr. Ryan can be contacted at (865) 481-4664. The Contractor shall coordinate with Mr. Ryan to ensure proper sample numbering, EDD formatting, etc.

All project documents must meet the approval of the USACE. Project documents must also meet the approval of the Ohio Environmental Protection Agency (EPA) and all other stakeholders in compliance with the DFFO, and the most current version of the RVAAP Deliverable Document Format Guidelines.

3.4 Electronic Data Files

Currently the Louisville District standards for software are MicroStation Version 8 (.dgn) and MS Office Version 2003 Professional. These products are to be considered the default software of choice unless otherwise specified within individual task order scopes of work, as determined by individual customer requirements or as the District incorporates updated versions of its software.

CADD Files: When required and requested in a task order, all CADD files (survey and topographic data, remedial action design drawings, contaminant migration maps and models, etc.) shall be digitized into files compatible with Microstation vector format (or other format if directed in the individual task order). Specific design file features will be provided in the individual task orders. CADD files shall also meet any upgrade to all Corps of Engineers systems throughout the duration of the contract.

GIS Files: When required and requested in a task order, all GIS files (survey and topographic data, remedial action data collected, contaminant migration maps generated, etc.) shall be submitted compatible with Environmental Systems Research Institute (ESRI) 9.x (shape files or personal geodatabases) format (or other format if directed in the individual task order). All GIS data shall be made compliant to the Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) version 2.6 (http://www.sdsfie.org/). Specific GIS file features will be provided in the individual task orders. GIS files shall also meet any upgrade to all Corps of Engineers systems throughout the duration of the contract. All GIS data shall be collected using the local State Plane coordinate system using the North American Datum of 1983 and the North

American Vertical Datum of 1988. All files shall be collected using linear units of US Survey feet for both the horizontal and vertical.

Electronic Files: All final reports and documents, including laboratory analysis data, shall be submitted on CD/DVD. Report documents shall be in Adobe (pdf) format, and shall be accompanied by the Contractor's associated work files.

3.5 Conducting Meetings

Unless otherwise specified, the Contractor shall arrange and conduct all meetings required by this SOW. Unless otherwise specified, the installation shall provide facilities for meetings.

3.6 Project Stake Holders

For the purposes of this SOW, project stakeholders include the Army, Ohio Army National Guard, National Guard Bureau, Ohio EPA, the Restoration Advisory Board (RAB), and the general public. The Contractor's required level of involvement may differ for each AOC/Site, and the Contractor shall be responsible for obtaining comments with appropriate approval or concurrence on project deliverables consistent with applicable regulatory drivers and agreements for each AOC/CR site.

4.0 STATEMENT OF WORK

CLIN No. 1 – The Contractor shall implement and complete an initial environmental investigation at Compliance Restoration site CC-RVAAP-80, the Group 2 Propellant Can Lids Areas.

CLIN No. 2 – The Contractor shall provide water removal services as described at Load Line 2.

The Contractor is encouraged to become thoroughly familiar with all programmatic and scheduling requirements contained in this SOW as well as the DFFO in order to prepare the cost proposal. The Contractor is also encouraged to attend a preliminary site visit at the RVAAP facility with the USACE, other Army representatives, and the Ohio EPA. The purpose of the site visit is to familiarize the Contractor with the AOC/CR sites, and to provide other relative information (as applicable) necessary for the Contractor to prepare the cost proposal.

The following additional details and assumptions should also be considered in the preparation of the cost proposal:

- All of the access routes on the subject property are managed by the Ohio Army National Guard (OHARNG). Additionally, the primary AOC listed in this SOW is located on OHARNG property. Military training and other OHARNG activities are priority on OHARNG property. Contractor activities must be coordinated with the OHARNG through Mr. Mark Patterson, the BRACD Facility Manager.

- Contractor is subject to OHARNG security and access procedures.

- Contractor may not disturb soil, water, vegetation, buildings, equipment or animals without prior coordination and approval of the OHARNG.

- Contractor is responsible for repairing damage to any roads, soil, vegetation, drainage, or otherwise caused by their activities on or adjacent to OHARNG property.

All work performed on this SOW shall follow the Contractor's approved Project Management Plan (PMP), and shall be performed in accordance with the following existing documents (if applicable) developed for the facility (or updates to the existing documents, if applicable):

- Ohio EPA's Director's Final Findings and Orders (DFFO) for RVAAP (Ohio EPA 2004)

- RVAAP's Facility-Wide Human Health Risk Assessor Manual (USACE 2004)

- Facility-Wide Ecological Risk Assessment Work Plan (USACE 2003a)

- Facility-Wide Sampling & Analysis Plan and Quality Assurance Project Plan (USACE 2001b)
- Facility-Wide Safety and Health Plan (USACE 2001a)
- Facility-Wide Groundwater Monitoring Program Plan (Portage 2004)
- RVAAP Community Relations Plan (USACE 2003b)
- RVAAP Final Position Paper for the Application and Use of Facility-Wide Human Health Cleanup Goals (USACE 2009)

The above documents are available for review online at http://www.rvaap.org. Following contract award, the Contractor may direct questions to the USACE by contacting Mr. Derek Kinder at 502-315-6393.

4.1 CLIN No. 1 – Environmental Investigation at Compliance Restoration Site CC-RVAAP-80.

The detailed Tasks for this SOW are discussed in the following sections.

Task 1.0: Project Management

The Contractor shall provide a Project Manager qualified to oversee all work described in the SOW. The Project Manager shall serve as the single point of contact (POC) and liaison for all work required. All work shall be accomplished with adequate internal controls and review procedures to eliminate conflicts, errors, and omissions and to ensure the accuracy of all work completed under this SOW. The Contractor shall accept direction only from the USACE Contracting Officer (KO) or the designated COR. Any changes to this SOW must be authorized in writing by the KO.

Task 1.1: Project Management Plan (PMP)

Contractor shall develop a Preliminary Draft PMP within 30 days of contract award. The PMP shall summarize Contractor's overall technical and management approach for this project. The PMP shall also include the summary of work to be performed and project schedule, project team roles and responsibilities, and a deliverable matrix in accordance with the project performance objectives.

The PMP shall also include a Quality Control Plan (QCP). The QCP will be developed to define how quality control will be executed for products and performance of work activities by all personnel, including subcontractors.

Upon receipt of USACE comment responses, Contractor shall submit a Draft PMP for stakeholder review and approval. The Contractor shall submit the Final PMP within 30 calendar

days of receipt of COR comments on the draft document or in compliance with the schedule specified by the Ohio EPA. Schedules specified by the Ohio EPA will take precedence over the USACE schedule. Army approval is achieved through the COR, and Ohio EPA approval is achieved through receipt of EPA documentation confirming PMP approval.

Task 1.2: Site Safety and Health Plan (SSHP)

Contractor shall develop a Preliminary Draft Site-Specific Safety and Health Plan (SSHP) addenda for each appropriate task of the project. The SSHP will be presented as an addendum to the Facility-Wide Health and Safety Plan (USACE 2001a). The SSHP Addendum will address task hazard analyses, emergency response, contingency plans, and emergency contacts. The SSHP will include UXO avoidance services. The SSHP will meet the requirements of federal, state, and local regulations and will identify safety and health regulations applicable to the work. The Preliminary Draft SSHP shall be submitted to the USACE within 30 calendar days of contract award.

Upon receipt of USACE comment responses, Contractor shall submit a Draft SSHP for stakeholder review and approval. The Contractor shall submit the Draft SSHP within 30 calendar days of receipt of COR comments on the draft document or in compliance with the schedule specified by the Ohio EPA. Schedules specified by the Ohio EPA will take precedence over the USACE schedule. Army approval is achieved through the COR. The Ohio EPA may provide review and comment on the SSHP; however, does not approve health and safety documents for USACE Contractors.

Task 1.3: Project Execution/Client Correspondence

The following activities and deliverables shall be performed in support of this project:

- Project Kick-Off Meeting
- Monthly Progress Reports
- Records of Conversations
- Teleconference Progress Updates
- Meeting Minutes Documentation
- Public Involvement / RAB Meetings

The above activities will be conducted by the Contractor to achieve project execution, and maintain client correspondence with the USACE. These activities are discussed in further detail below.

Task 1.3.1: Project Kick-Off Meeting - Upon Army and Ohio EPA approval of the PMP and SSHP, the Contractor shall implement and attend an initial Project Kick-Off Meeting at the RVAAP facility. The Contractor shall present the details of the PMP, the SSHP, and the anticipated approach to conducting the IRA Activities. The Kick-Off Meeting is intended to assist the Contractor with the submittal and stake holder approval of the related Work Plan documents.

Task 1.3.2: Monthly Progress Reports - The Contractor shall submit monthly written progress reports to the USACE for every month by the fifth (5^{th}) day of the following month. The monthly reports will include an accurate and current account of all work completed and deliverables furnished to the government. Progress reports will be prepared following the described sections presented in Section XVI of the DFFO. Contractor's payment invoices may accompany the monthly progress reports.

Task 1.3.3: Records of Conversations - The Contractor shall prepare and maintain records of telephone conversations and significant verbal conversations conducted in support of this project. These records will be forwarded with monthly progress reports.

Task 1.3.4: Teleconference Progress Updates - The Contractor shall attend periodic teleconference progress meetings with the USACE to provide project status updates. The progress update meetings are currently held on a biweekly basis.

Task 1.3.5: Meeting Minutes Documentation - The Contractor shall document discussions at all meetings held in support of this project. Meeting minutes will be typed, and distributed to the USACE and installation POCs within 7 calendar days following the meeting.

Task 1.3.6: Public Involvement / RAB Meetings – The Contractor should note that the Installation has an active Restoration Advisory Board (RAB) and detailed information concerning the RAB's organization and activities will be provided to the Contractor. The Contractor shall attend a minimum of one (1) applicable RAB meeting during the specified period of performance at the direction of the COR.

All public participation coordination shall be approved by the Army through the Facility Manager and the COR. The Contractor shall provide the necessary support to initiate, schedule, and address all public participation aspects of the project (e.g., preparation of briefings, presentations, fact sheets, newsletters, articles/public notices to news media, and notifications to RAB members). The Contractor shall be responsible for requesting and addressing all public comments consistent with the applicable regulatory drivers. The USACE COR, or designee, will attend and represent the Army at all meetings with the public.

Task 2.0: Preparation of Work Plan and Supporting Documents

The Contractor shall prepare a work plan (WP) and the necessary supporting documents to implement and complete an initial environmental investigation at the designated Group 2 Propellant Can Lid Areas. The investigation shall consist of a geophysical delineation of the designated areas, and a limited soil investigation of the surface soils in these areas.

Consistent with the RVAAP Deliverable Document Format Guidelines, the deliverables shall consist of the WP, the Sampling and Analysis Plan (SAP), the Site Safety and Health Plan (SSHP as discussed in Task 1.2), and the Quality Assurance Project Plan (QAPP). The WP documents shall follow the most recent version of the outline specified in the RVAAP Deliverable Document Format Guidelines.

The following paragraphs describe the requirements associated with the Contractor's development of the WP documents:

Contractor shall develop a Preliminary Draft WP, SAP and QAPP within 60 days of approval of the final PMP. The SAP and QAPP will be developed as an Addendum, tiered under the existing RVAAP Facility-Wide SAP (USACE 2001b), to comply with USACE and Ohio EPA requirements.

All analytical work shall be performed in accordance with the most recent version of the DOD Quality System Manual (QSM). Sampling objectives will be established and the appropriate method will be identified to satisfy the performance objectives. The chemical analytical laboratory must be selected and included in all QAPP deliverables. No sampling activities shall commence until all plans are approved.

Upon receipt of USACE comment responses, Contractor shall submit a Draft SAP and QAPP for stakeholder review and approval. The Contractor shall submit the Final documents within 30 calendar days of receipt of Ohio EPA comments. Schedules specified by the Ohio EPA will take precedence over the USACE schedule. Army approval is achieved through the COR, and Ohio EPA approval is achieved through receipt of EPA correspondence confirming the Plan approvals.

Task 3.0: Implementation of Work Plan

Within 30 days of Final WP approval, Contractor shall begin implementation of the WP by performing the field assessment activities specified in the approved plan. A revised schedule for implementation of field activities may be warranted due to weather conditions or other unforeseen changes in the project schedule. The USACE reserves the right to modify the schedule for field activities due to inclement weather, and for safety and health purposes.

The Contractor shall be responsible for and bear all associated costs necessary to achieve the objectives of the WP. This includes, but is not limited to, possible vegetation clearing activities, the geophysical delineation, and the soil sampling and analysis activities. Right of Entry to the Ravenna facility shall be coordinated with the OHARNG and the Army. Coordination with both agencies must first go through the Ravenna Facility Manager.

Task 3.1: Geophysical Delineation

The Contractor shall implement and complete a geophysical delineation of the buried or near surface materials (propellant can lids, etc.) in the designated Group 2 areas. The geophysical equipment must be appropriate and capable of identifying horizontal and vertical anomalies cause by buried waste. The proposed equipment and anticipated limitations shall be detailed in your proposal. The geophysical survey personnel shall be capable of producing working maps in the field or be capable of transmitting data back to the office and receiving a map back from the office prior to beginning work the next day.

The Contractor shall provide a cost of mobilization and demobilization, and a unit cost per day for the total geophysical survey cost including equipment, personnel, and daily map production support.

Task 3.2: Collecting Surface Soil Samples

Contractor shall collect Multi Increment® (MI) surface soil samples based on the results of the geophysical delineation. Up to three (3) (3 maximum plus QA samples) MI surface soil samples will be collected within those areas that are identified to include near surface propellant can lids or other possible waste materials.

The MI surface soil samples shall be obtained by collecting a minimum of 30 increments per sample area from 0 to 1 foot below ground surface (bgs). MI Sample areas should be approximately one quarter of an acre or less in size. Multiple smaller areas where anomalies are found can be combined into one designated MI sample area. Anomaly avoidance should be used during sampling to ensure soils around the anomalies can be collected to the desired depth of 1 foot bgs. The Contractor shall provide a unit price and total price for this task.

Task 3.3: Sample Analysis

Contractor shall provide fixed unit costs and total cost for analyses as specified in Table 1 included in this SOW. Costs shall include all labor, materials, equipment, and supplies necessary to complete this task. All samples shall be analyzed for TAL Metals, and common propellants used by the DoD including Nitrocellulose, Nitroglycerine, Nitroguanidine, and Perchlorate. One (1) of the samples shall also be analyzed for the RVAAP full suite as prescribed in the Facility Wide SAP. Contractor shall provide for quality control testing as specified in the facility wide SAP. QA samples will be collected at a frequency of 10% and sent to a lab contracted by the USACE. All analytical data should be reported per Ravenna specific ADR specifications. Analytical methods shall be in accordance with the Facility-Wide SAP and the Contractor's approved Work Plan.

IDW samples shall be analyzed for the Full List TCLP for waste characterization purposes. Upon project completion, the Government will de-obligate any unused funds associated with this Task.

Table 1 Costs for Soil Sample Analysis

Analyte	Fixed Unit Price	Number of Tests	Total Cost
Surface Soil			

MI Sample Prep			
TAL Metals			
Mercury			
Hexavalent Chromium			
Propellants			
Explosives			
SVOCs			
VOCs			
Pesticides			
PCBs			
TCLP			

Task 3.4: Disposal of IDW

Within 90 days of the generation of IDW, Contractor shall characterize and properly dispose of all IDW at approved off-site waste disposal facilities in compliance with all applicable Federal, State, and local rules, laws and regulations. Land application of select wastes may apply (subject to approval). Contractor is responsible for maintaining all applicable waste characterization and disposal records, and for producing a waste disposal report for submittal to and approval by the Ohio EPA. IDW disposal activities shall be coordinated with the RVAAP Facility Manager and the OHARNG. **(Note: All IDW is to be removed from the subject property no later than 90 days following waste generation.)**

Task 3.5: Data Management / Data Validation

EPA CLP Level IV data validation will be required to meet the requirements of the DoD QSM. The Contractor shall perform data verification for all analytical results according to the process provided in the Louisville QSM Supplement and QC criteria in the DoD QSM. USACE Louisville District shall contract a third-party contractor for a minimum 10% or greater validation of analytical results. The Contractor shall include the completed validation report as presented by the validator as an appendix to the final document, and discuss results in the project report. The report shall also be sent directly from the validator to the USACE technical contact upon completion of validation.

Task 3.6: Surveying and Mapping

Survey maps shall be provided in the report, which delineate the boundaries of the survey site, the boundaries and locations of the metal anomalies, and the soil sample locations subject to this SOW. All data submitted shall be in the Universal Transverse Mercator (UTM) coordinate system. *(Note: All coordinates shall be collected with applicable equipment capable of gauging field surveys within an accuracy of one meter or less of error.)*

Task 4.0: Investigation Report

The Contractor shall prepare and submit a Preliminary Draft investigation report within 90 calendar days following the completion of the field investigation activities. The report shall document the process and procedures used in conducting the geophysical delineation, and describe all soil sampling activities conducted during this project. This report shall include details about pre-mobilization, mobilization, site preparation, the geophysical delineation, sample collection, decontamination, analytical results, waste management, event chronology, final site inspection, and mapping. The investigation report maps shall include the delineation of known and/or suspected buried waste materials, and the locations of MI sample area boundaries.

Upon receipt of USACE comment responses, Contractor shall submit a Draft investigation report for stakeholder review and approval. The Contractor shall submit the Draft investigation report within 30 calendar days of receipt of COR comments on the draft document or in compliance with the schedule specified by the Ohio EPA. Schedules specified by the Ohio EPA will take precedence over the USACE schedule. Army approval is achieved through the COR.

4.2 CLIN No. 2 – Water Removal Services at Load Line 2

Task 1.0: Water Removal Services

As described in Section 1.2, former excavation activities conducted at Load Line 2 (RVAAP-09) have resulted in the accumulation of water within the building DB-802 footprint. Restoration activities are now planned at this location, and the accumulated water must be removed from the excavation to assist in the restoration activities.

The planned action for restoring this area is to push back concrete and other demolition debris into the excavation to a depth 4 feet below the surrounding grade. Then, soil will be placed on top of the rubble to match the surrounding grade. To achieve this, it is anticipated the water will need to be pumped out of the excavation in two phases. First, the Contractor shall pump water out of the excavation down to a level suitable to fill the excavation with demolition debris without causing the remaining water in the excavation to rise out of the excavation and cause excessive runoff. Once this amount of water is removed, the rubble will be immediately pushed into the excavation. Pushing rubble into the excavation will be completed under a previously awarded BRAC-D contract. After this work is complete, the Contractor shall revisit the site and pump out any water that is above the level of the demolition debris in the excavation. Once this water level is achieved, soil will be immediately placed into the excavation under a previously awarded BRAC-D contract. The Contractor must complete their work in accordance with the BRAC-D contractor's schedule. Pumping water out of the excavation must be done immediately before backfilling the excavation. Allowing time to pass between pumping water out of the excavation and backfilling may allow the excavation to again fill with water. Water should be removed from the excavation in a manner that is approved by the Army and the Ohio EPA. A Letter Work Plan shall be prepared presenting the methodology to conduct the water removal for concurrent review by all RVAAP stakeholders.

5.0 PAY ESTIMATES

The Contractor shall submit Pay Estimates using ENG Form 93 as specified in the contract. ENG Form 93 may be found on the Internet under the library of USACE publications. The Contractor shall ensure that the Pay Estimates include a separate line item for each task. All ENG Form 93 shall be submitted to the USACE COR or the COR designated representative. Electronic submission of Pay Estimates to the USACE is acceptable; however, should be followed with the mailing of a hard copy.

Release of Claims shall accompany the final Pay Estimate. The Release of Claims shall be signed and shall include the total contract amount, amount of final payment due, and a statement similar to the following:

> "The undersigned architect-engineer firm, under Contract No. ##, Delivery Order No. ##, between the United States of America and said Contractor for services at (property name) in (location) hereby release the U.S., its officers, agents, and employees from any and all claims arising under or by virtue of said contract or any modification or change thereof except with respect to those claims, if any, listed below:"

The Contractor's pay estimates must meet the CLIN structure presented in this SOW. For instance, all pay estimates for tasks performed under the environmental investigation for CC-RVAAP-80 shall appear under the CLIN No. 1 heading. All pay estimates associated with the water removal services at Load Line 2 shall appear under the CLIN No. 2 heading. Pay estimates submitted to the USACE without the proper CLIN designation shall be returned to the Contractor for clarification purposes.

6.0 PROPOSAL ESTIMATE

The Contractor shall submit a detailed estimate of the effort required to complete the described SOW. The proposal submittal shall also include the estimated costs associated with all planned sampling and analysis activities (other direct and indirect costs). The proposed sampling shall include 15% of the samples also having analyses for propellants, VOCs, SVOCs, pesticides/herbicides, and PCBs (full analyses), as prescribed in the Facility Wide SAP. The Contractor shall complete and submit Table 1 (as shown) as a summary of estimated costs.

Table 2: Contractor's Summary of Estimated Costs

Task #	Task Description	Unit	Fixed Unit Cost	Number of Units	Total Cost
CLIN No. 1 – Environmental Investigation at Compliance Restoration Site CC-RVAAP-80					
1.1	Project Management Plan				
1.2	Site Safety Health Plan				
1.3.1	Project Kickoff Meeting				

1.3.2	Monthly Progress Reports				
1.3.3	Records of Conversations				
1.3.4	Teleconference Progress Updates				
1.3.5	Meeting Minutes Documentation				
1.3.6	RAB Meetings				
2.0	Work Plan and Support Documents				
3.0	Implementation of Work Plan				
3.1	Geophysical Delineation				
3.2	Surface Soil Sampling				
3.3	Sample Analysis				
3.4	Disposal of IDW				
3.5	Data Management / Data Validation				
3.6	Surveying and Mapping				
4.0	Investigation Report				
				CLIN No. 1 – Total Cost Estimate	
CLIN No. 2 – Water Removal Services at Load Line 2					
1.0	Water Removal Services				
				CLIN No. 2 – Total Cost Estimate	

7.0 PERIOD OF PERFORMANCE / PROJECT SCHEDULE

The Period of Performance for this contract shall begin at the time of contract award, and ends 31 December 2011.

The Contractor shall submit a proposed project schedule for the described SOW. The schedule should be prepared in general conformance with the following schedule anticipated by the

USACE. *(Note: The award of this SOW to the Contractor is subject to the availability of funding.)*

Task No.	Identified Task	Duration / Due Date
CLIN No. 1 – Environmental Investigation at Compliance Restoration Site CC-RVAAP-80		
--	Preliminary Site Visit (Prior to Award)	14 Days of USACE Submittal of Request For Proposal (RFP)
--	Notice to Proceed (NTP) / Contract Award	31 March 2010
1.1	Pre-Draft Project Management Plan	30 Calendar Days of NTP
1.2	Pre-Draft Site Safety Health Plan	30 Calendar Days of NTP
1.3.1	Project Kickoff Meeting	30 Calendar Days of Approval of PMP and SSHP
1.3.2	Monthly Progress Reports	By the 5th Day of Each Month
1.3.3	Records of Conversations	By the 5th Day of Each Month
1.3.4	Teleconference Progress Updates	Bi-Weekly
1.3.5	Meeting Minutes Documentation	7 Calendar Days Following Meeting
1.3.6	RAB Meetings	Once per Army Direction
2.0	Pre-Draft Work Plan and Support Documents	60 Calendar Days of NTP
3.0	Implementation of Work Plan	Begin 30 Calendar Days of Approval of Final Work Plan
4.0	Pre-Draft Investigation Report	Within 90 Calendar Days of Completing Field Investigation Activities
CLIN No. 2 – Water Removal Services at Load Line 2		
1.0	Water Removal Services	Must adhere to BRAC-D Contractor's Schedule

Upon project award to the Contractor, the agreed upon project schedule will be updated with calendar dates and will be included in the Contractor's PMP. Adherence to the PMP project schedule will serve as a measurement of Contractor performance on this project.

8.0 ADDITIONAL INFORMATION

8.1 Additional Contractor Requirements

The Contractor shall be aware of the following requirements:

- HTRW, MEC, MC or MD may be found in munitions, containers, landfills, Open Burning/Open Detonation (OB/OD) areas, ground spills, surface water, or groundwater. If suspected HTRW, MEC, MC or MD of unknown origin and nature is encountered, the

contractor shall immediately notify the Facility Manager, the Contracting Officer or the designated COR. The contractor shall take necessary actions to protect the safety of its workforce, the public, and the environment.

- Permits. The contractor shall obtain the permits and licenses necessary to conduct his/her operations including, but not necessarily limited to, installation required permits, building permits, drilling permits, and/or waste transportation and disposal permits.

- Safety and Health Program. The contractor shall ensure that its subcontractors, suppliers, and support personnel follow all safety and health provisions established in the approved Accident Prevention Plan (APP) for the site. A Site Safety and Health Plan (SSHP) shall be included in the APP as an Attachment. The Government reserves the right to stop work under this contract for any violations at no additional cost. The Government will verify that corrective action has been implemented prior to the contractor continuing performance under the contract. All personnel performing onsite activities shall participate in an ongoing medical surveillance program meeting the requirements of 29 CFR 1910.120. The medical examination protocols and results shall be overseen by a licensed physician who is certified in Occupational Medicine by the American Board of Preventive Medicine or who by necessary training and experience is board eligible.

- Quality Management. The contractor is responsible for the control of product quality and for offering to the Government for acceptance only those products/services that conform to the contractual requirements.

APPENDIX B

SITE MAPS/ FIGURES

Figure 1 – General Location and Orientation Map

Figure 2 – Compliance Restoration Site CC-RVAAP-08 Group 2 Propellant Can Tops and RVAAP- 09 Load Line 2 Building DB-802 within RVAAP

Figure 3 – CC-RVAAP-80 Group 2 Propellant Can Tops Site Map

Figure 4 – RVAAP- 09 Load Line 2 Building DB-802 Site Map

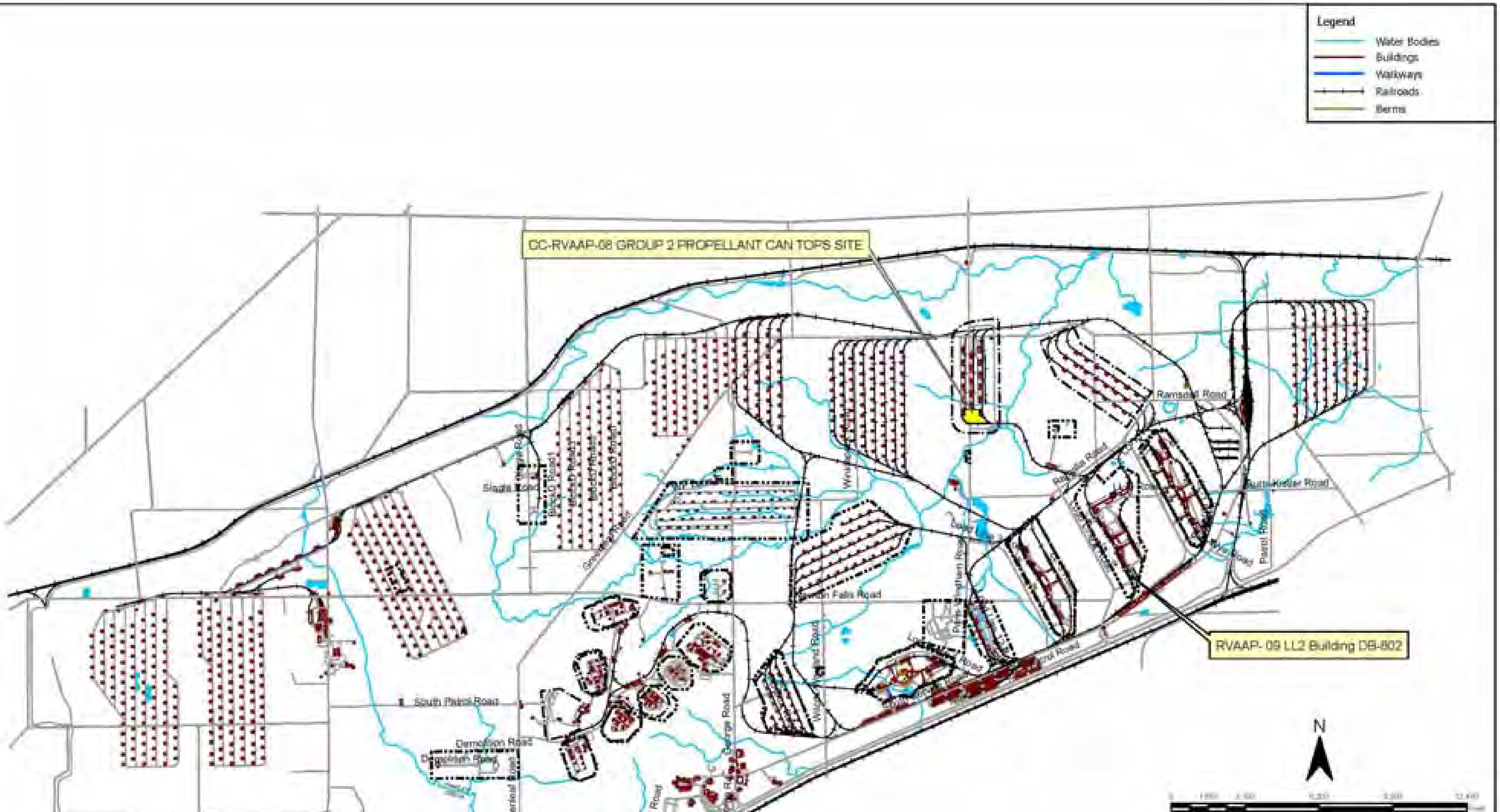
Figure 5 – Project Schedule

PIKA INTERNATIONAL, INC.
12723 CAPRICORN DR. STE#500
STAFFORD, TX 77477

Ravenna Army Ammunition Plant
Ravenna, OH

FIGURE 1 - GENERAL LOCATION AND ORIENTATION OF RVAAP

Drawn On: 10/30/2007 Drawn By: QX Reviewed By: SAK



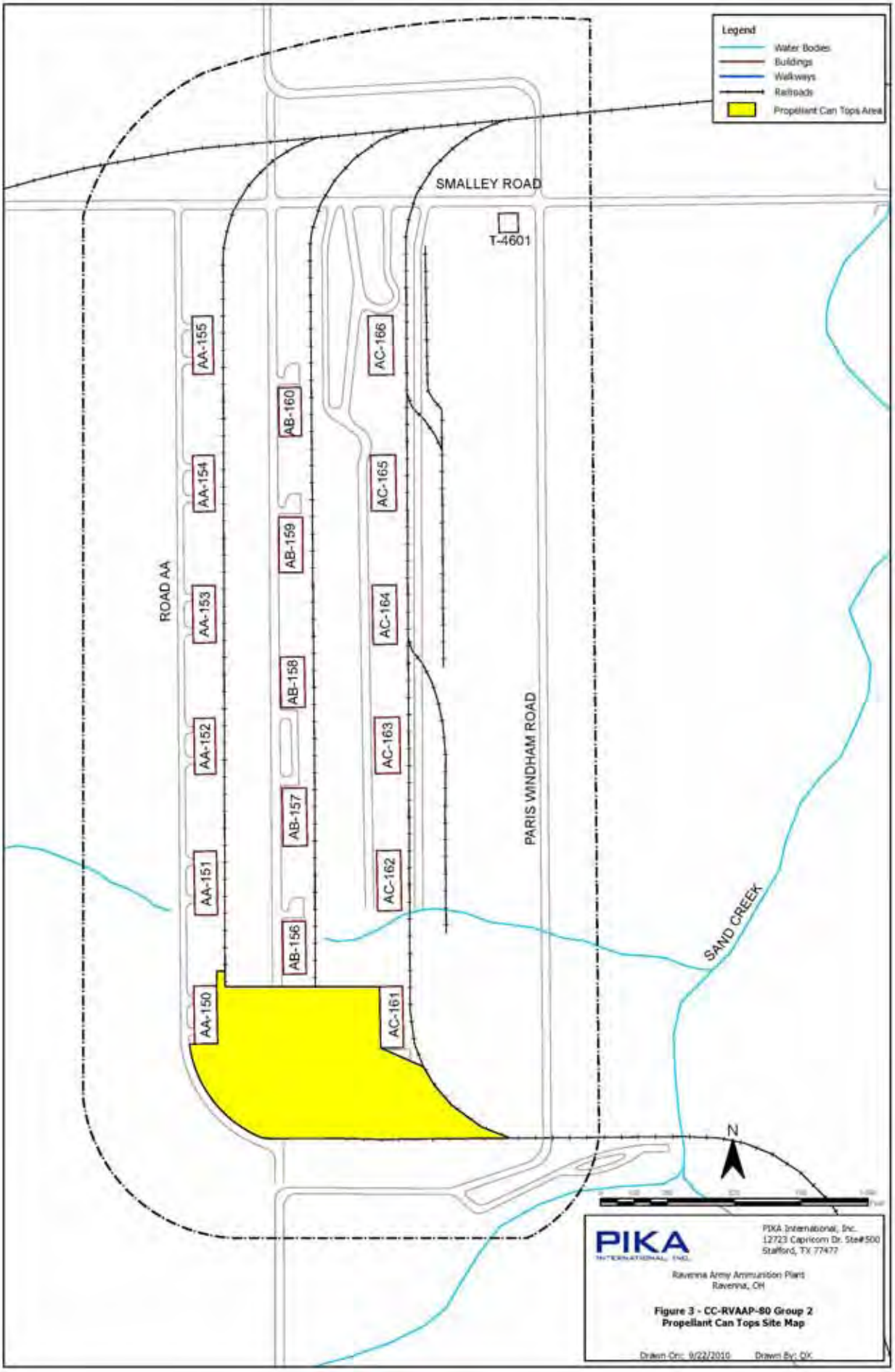
PIKA
INTERNATIONAL INC.

PIKA International, Inc.
12723 Capricorn Dr. Ste#500
Stafford, TX 77477

Ravenna Army Ammunition Plant
Ravenna, OH

Figure 2- Compliance Restoration Site CC-RVAAP-08 Group 2 Propellant Can Tops and RVAAP- 09 Load Line 2 Building DB-802 within RVAAP

Drawn On: 8/05/2010 Drawn By: QX


Legend
Water Bodies
Buildings
Walkways
Railroads
Propellant Can Tops Area
SMALLEY ROAD
T-4601
ROAD AA
PARIS WINDHAM ROAD
SAND CREEK
AA-150
AA-151
AA-152
AA-153
AA-154
AA-155
AB-156
AB-157
AB-158
AB-159
AB-160
AC-161
AC-162
AC-163
AC-164
AC-165
AC-166
N
PIKA
PIKA International, Inc.
12723 Capricorn Dr. Ste#500
Stafford, TX 77477
Ravenna Army Ammunition Plant
Ravenna, OH
Figure 3 - CC-RVAAP-80 Group 2
Propellant Can Tops Site Map
Drawn On: 9/22/2010
Drawn By: DK

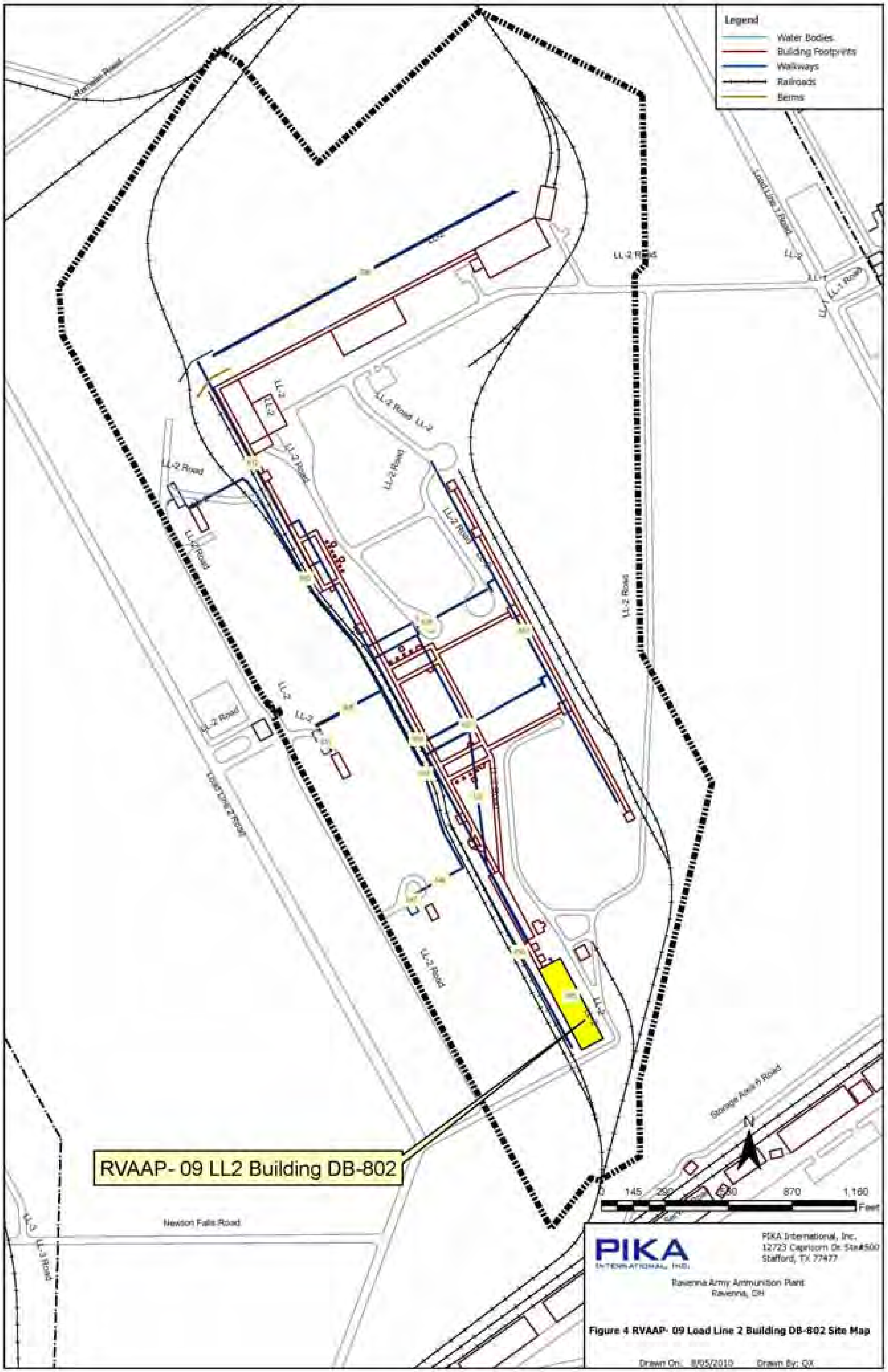
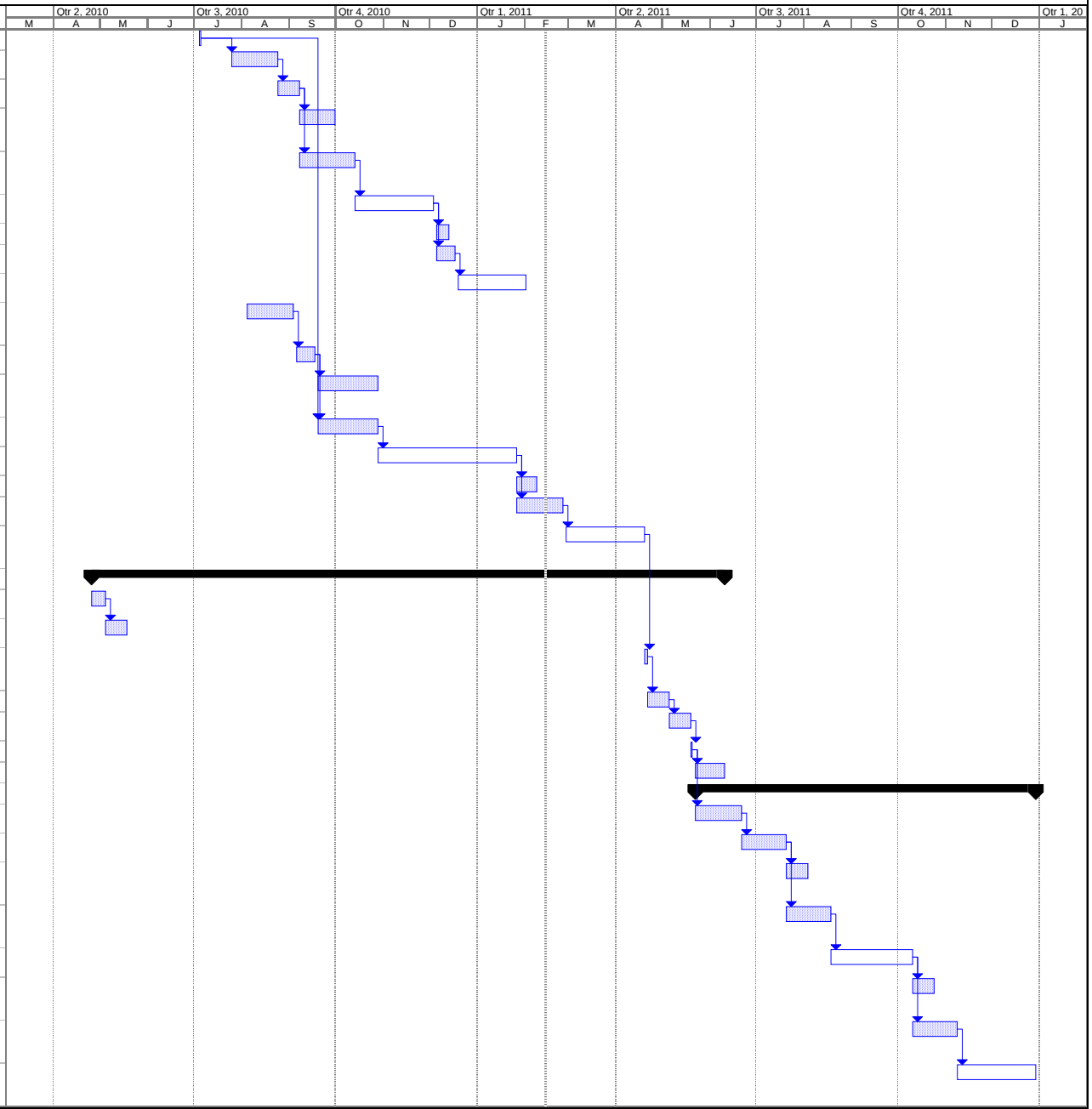


Figure 4 RVAAP- 09 Load Line 2 Building DB-802 Site Map

Figure 5 - Project Schedule
Compliance restoration Site CC-RVAAP-80 and Other Environmental Services
Ravenna Army Ammunition Plant, Ravenna, Ohio

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Contract Award**	1 day	Mon 7/5/10	Mon 7/5/10	
2	Prepare Pre-draft PMP and SSHP	22 days	Mon 7/26/10	Tue 8/24/10	1
3	Army review Pre-Draft Work Plans	10 days	Wed 8/25/10	Tue 9/7/10	2
4	Pre-draft comment resolution for PMP and SSHP	17 days	Wed 9/8/10	Thu 9/30/10	3
5	Develop Draft PMP and SSHP and submit to OEPA/Stakeholders	26 days	Wed 9/8/10	Wed 10/13/10	3
6	Army/OEPA Review of Draft PMP and SSHP	37 days	Thu 10/14/10	Fri 12/3/10	5
7	Draft Comment Resolution	6 days	Mon 12/6/10	Mon 12/13/10	6
8	Develp Final PMP and SSHP Work Plans	10 days	Mon 12/6/10	Fri 12/17/10	6
9	Army/OEPA Review of Final PMP and SSHP Plans	32 days	Mon 12/20/10	Tue 2/1/11	8
10	Prepare Pre Draft Work Plan, SAP and QAAP	22 days	Thu 8/5/10	Fri 9/3/10	
11	Army review of Pre Draft Work Plan, SAP and QAPP	10 days	Mon 9/6/10	Fri 9/17/10	10
12	Pre-draft comment resolution for Work Plan, SAP and QAAP	29 days	Mon 9/20/10	Thu 10/28/10	11
13	Develop Draft WP, SAP and QAPP	29 days	Mon 9/20/10	Thu 10/28/10	11,1
14	Army/OEPA review of Draft WP, SAP and QAPP	64 days	Fri 10/29/10	Wed 1/26/11	13
15	Draft Comment Resolution	9 days	Thu 1/27/11	Tue 2/8/11	14
16	Develop Final WP, SAP and QAPP	22 days	Thu 1/27/11	Fri 2/25/11	14
17	Army/OEPA Review of Final WP, SAP and QAPP	37 days	Mon 2/28/11	Tue 4/19/11	16
18	**Begin Field Work**	**295 days**	**Mon 4/26/10**	**Fri 6/10/11**	
19	Submit Water Removal Letter work plan for	7 days	Mon 4/26/10	Tue 5/4/10	
20	Conduct Water removal At LL2 bldg 802	10 days	Wed 5/5/10	Tue 5/18/10	19
21	Mobilization for Geophysical Study at Group 2	2 days	Wed 4/20/11	Thu 4/21/11	17
22	Brush Clearing	10 days	Fri 4/22/11	Thu 5/5/11	21
23	Geophysical investigation at Group 2	10 days	Fri 5/6/11	Thu 5/19/11	22
24	Soil Sampling	1 day	Fri 5/20/11	Fri 5/20/11	23
25	Disposal of IDW	15 days	Mon 5/23/11	Fri 6/10/11	24
26	**Investigation Report**	**159 days**	**Mon 5/23/11**	**Thu 12/29/11**	
27	Prepare and submit Pre-Draft Investigation	22 days	Mon 5/23/11	Tue 6/21/11	24
28	USACE Review of Pre-draft Report	21 days	Wed 6/22/11	Wed 7/20/11	27
29	Respond to USACE Comments on Pre-draft Report	10 days	Thu 7/21/11	Wed 8/3/11	28
30	Prepare and submit Draft Report for OEPA/Stakeholder review	21 days	Thu 7/21/11	Thu 8/18/11	28
31	Review Draft by OEPA/Stakeholders	37 days	Fri 8/19/11	Mon 10/10/11	30
32	Respond to OEPA/Stakeholder Comments on Pre-draft Report	10 days	Tue 10/11/11	Mon 10/24/11	31
33	Revise doc and Submit Final Iteration	21 days	Tue 10/11/11	Tue 11/8/11	31
34	Review Final Iteration by OEPA	37 days	Wed 11/9/11	Thu 12/29/11	33



Project: Group 2 schedule
Date: Mon 2/14/11

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

APPENDIX C

POINTS OF CONTACT

POINTS OF CONTACT	
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USACE Public Affairs Specialist Jennifer Domashevich 502-315-7452 Jennifer.S.Domashevich@usace.army.mil	Mark Patterson Ravenna Army Ammunition Plant Facility Manager 8451 St Rt 5 Ravenna, OH 44266 330-358-7311 mark.c.patterson@us.army.mil
Brian Stockwell Project Manager PIKA International Inc. 8451 St Rt 5 Ravenna, OH 44266 330-358-7135 bstockwell@pikainc.com	Kathleen Anthony Program Manager PIKA International Inc 5025 Arnold Ave McClellan, CA 95652 916-920-9146 kanthony@pikainc.com
Lt. Col Ed Meade OHARNG 1438 SR 534 SW Newton Falls, OH 44444 614-336-6560 william.meade1@us.army.mil	Katie Tait RTLS Environmental Specialist 1438 SR 534 SW Newton Falls, OH 44444 614-336-6136 Kathryn.s.tait@us.army.mil
Eileen Mohr Ohio EPA – NE District – DERR 2110 East Aurora Rd Twinsburg, OH 44087 Phone # 330-963-1221 Eileen.mohr@epa.state.oh.us	

APPENDIX D

ACCIDENT PREVENTION PLAN

DOCUMENT DISTRIBUTION

Name/Organization	Hard Copies	Electronic Copies
OHARNG/Camp Ravenna	1	1
Ohio EPA/NEDO/DERR	2	1
PIKA Program Manager	1	1
PIKA Project Manager	2	2
REIMS	0	1
RVAAP Facility Manager	2	2
USACE Project Manager - Louisville	2	2

OHARNG – Ohio Army National Guard

Ohio EPA/NEDO/DERR – Ohio Environmental Protection Agency Northeast District Office Division of Emergency and Remedial Response

PIKA – PIKA International Inc.

REIMS – Ravenna Environmental Information Management System

RVAAP – Ravenna Army Ammunition Plant

USACE – United States Army Corps of Engineers – Louisville District

ACCIDENT PREVENTION PLAN SIGNATURE SHEET

Project: Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services

Site: Ravenna Army Ammunition Plant (RVAAP)

Site Location: Ravenna, Ohio

PIKA International, Inc. has developed this Accident Prevention Plan (APP) for the above referenced project. This document with its attachments has been developed for the US Army Corps of Engineers (USACE) Louisville District (CELRL). The PIKA personnel referenced below have reviewed and approved this APP for implementation for the above referenced work. Procedures for the submission, approval, integration and implementation of changes to this APP are discussed within the body of the APP and will be followed whenever a change will significantly impact the safety of site personnel, the environment or off-site personnel.

Plan Prepared and Approved By: _____ Date: 02/24/2011

Joseph Frydenger, CSP
PIKA Corporate Safety and Health Manager

Plan Concurrence By: _____ Date: 02/24/2011

Brian Stockwell
PIKA Project Manager

Approval by: _____ Date: 02/24/2011

Lew Kovarik
PIKA Senior UXO Safety Officer/UXO Quality Control Specialist

TABLE OF CONTENTS

1.0 BACKGROUND INFORMATION 1
1.1 PLAN INTRODUCTION AND INTEGRATION 1
1.2 CONTRACTOR 2
1.3 CONTRACT NUMBER 2
1.4 PROJECT NAME 2
1.5 BRIEF PROJECT DESCRIPTION 2
1.5.1 Description of Work to be Performed 2
1.5.2 Location 3
1.6 HISTORY 4
1.7 PHASES OF WORK REQUIRING ACTIVITY HAZARDS ANALYSES 6

2.0 STATEMENT OF SAFETY AND HEALTH POLICY 8
2.1 SAFETY AND HEALTH POLICY STATEMENT 8
2.2 PIKA'S WRITTEN SAFETY PROGRAM GOALS, OBJECTIVES AND ACCIDENT CONTROL PROGRAMS/MANAGEMENT 8
2.2.1 Written CESHP Goals 8
2.2.2 CESHP Objectives 8
2.2.2.1 Management Objective 8
2.2.2.2 Regulatory Compliance Objective 9
2.2.3 Accident Experience Goals for This Contract 9

3.0 RESPONSIBILITIES AND LINES OF AUTHORITIES 11
3.1 THE PIKA RESPONSIBILITY FOR S&H IMPLEMENTATION 11
3.2 IDENTIFICATION/ACCOUNTABILITY OF PERSONNEL RESPONSIBLE FOR SAFETY 11
3.3 COMPETENT AND/OR QUALIFIED PERSONS 12
3.4 ON-SITE COMPETENT PERSON REQUIREMENTS 12
3.5 PRE-TASK SAFETY AND HEALTH ANALYSIS 12
3.6 LINES OF AUTHORITY 12
3.7 POLICIES AND PROCEDURES REGARDING NONCOMPLIANCE 13
3.7.1 General Requirements 13
3.7.2 Safety and Health Violations 13
3.7.3 Disciplinary Actions 14
3.8 MANAGER AND SUPERVISOR ACCOUNTABILITY FOR SAFETY 15

4.0 SUBCONTRACTORS AND SUPPLIERS 16
4.1 SUBCONTRACTORS AND SUPPLIERS 16
4.2 CONTROL / COORDINATION OF SUBCONTRACTORS AND SUPPLIERS 16
4.3 SAFETY RESPONSIBILITIES OF SUBCONTRACTORS AND SUPPLIERS 16

5.0 TRAINING 18
5.1 NEW HIRE SAFETY AND OCCUPATIONAL HEALTH ORIENTATION 18
5.1.1 HAZWOPER Training 18
5.1.2 Review of the Project Safety Plan 18
5.1.3 Required Site and Task Hazard Training 18

5.2 MANDATORY TRAINING/CERTIFICATIONS APPLICABLE TO PROJECT 19
5.3 PERIODIC S&H TRAINING FOR SUPERVISOR AND EMPLOYEES 19
5.4 REQUIREMENTS FOR EMERGENCY RESPONSE TRAINING 20

6.0 SAFETY AND HEALTH INSPECTIONS 21
6.1 DAILY AND WEEKLY SAFETY INSPECTIONS AND AUDITS 21
6.2 PERIODIC CORPORATE SAFETY AND HEALTH INSPECTIONS 21
6.3 DEFICIENCY TRACKING AND FOLLOW-UP 21
6.4 EXTERNAL INSPECTIONS/CERTIFICATIONS REQUIRED 22

7.0 ACCIDENT REPORTING 23
7.1 PERSONS RESPONSIBLE FOR ACCIDENT REPORTING AND INVESTIGATION 23
7.2 ACCIDENT REPORTING 23

8.0 APPLICABLE PLANS/PROGRAMS/PROCEDURES 24
8.1 LAYOUT PLANS 24
8.2 EMERGENCY RESPONSE PLANS 24
8.3 PLAN FOR PREVENTION OF ALCOHOL AND DRUG ABUSE 24
8.3.1 Introduction 24
8.3.2 Substance Use and Abuse Testing/Screening Policy 25
8.3.3 Prescription Medications 26
8.3.4 Suspicion Inspections and Testing 27
8.4 SITE SANITATION PLAN 27
8.5 ACCESS AND HAUL ROAD PLAN 27
8.6 RESPIRATORY PROTECTION PLAN 28
8.7 HEALTH HAZARD CONTROL PROGRAM 28
8.8 HAZARD COMMUNICATION PLAN 28
8.9 PROCESS SAFETY MANAGEMENT PLAN 28
8.10 LEAD ABATEMENT PLAN 28
8.11 ASBESTOS HAZARD ABATEMENT PLAN 29
8.12 RADIATION SAFETY PROGRAM 29
8.13 ABRASIVE BLASTING 29
8.14 HEAT/COLD STRESS MONITORING PLAN 29
8.15 CRYSTALLINE SILICA MONITORING PLAN 29
8.16 NIGHT OPERATIONS LIGHTING PLAN 29
8.17 FIRE PREVENTION PLAN 29
8.18 WILD LAND FIRE MANAGEMENT PLAN 30
8.19 HAZARDOUS ENERGY CONTROL PLAN 30
8.20 CRITICAL LIFT PLAN 30
8.21 CONTINGENCY PLAN FOR SEVERE WEATHER 30
8.22 FLOAT PLAN 30
8.23 SITE- SPECIFIC FALL PROTECTION & PREVENTION PLAN 30
8.24 DEMOLITION PLAN 30
8.25 EXCAVATION AND TRENCHING PLAN 31
8.26 EMERGENCY RESCUE FOR TUNNELING 31
8.27 UNDERGROUND CONSTRUCTION FIRE PREVENTION/PROTECTION PLAN 31
8.28 COMPRESSED AIR PLAN 31

8.29 FORMWORK AND SHORING ERECTION AND REMOVAL PLANS 31
8.30 PRECAST CONCRETE PLAN 31
8.31 LIFT SLAB PLANS 31
8.32 STEEL ERECTION PLAN 32
8.33 SSHP 32
8.34 BLASTING PLAN 32
8.35 DIVING PLAN 32
8.36 CONFINED SPACE PROGRAM 32

9.0 RISK MANAGEMENT PROCESSES 33

LIST OF TABLES

TABLE 1-1: PIKA'S Accident Statistics 10
TABLE 3-1: Disciplinary Actions for Minor and Major Violations 14

ATTACHMENTS

ATTACHMENT 1 .....SITE SPECIFIC SAFETY AND HEALTH PLAN
ATTACHMENT 2 ..... CERTIFICATION OF ACTIVITY HAZARD ANALYSIS FORMS
ATTACHMENT 3 .....ENVIRONMENTAL SAFETY AND HEALTH PROCEDURE
ATTACHMENT 4 .....PIKA ES&H FORMS
ATTACHMENT 5 ..... PIKA EMPLOYEE HEALTH AND SAFETY QUALIFICATIONS
ATTACHMENT 6 .....PIKA MEDICAL SURVEILLANCE PROGRAM

LIST OF ACRONYMS

AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
CAHA	Certification of Activity Hazard Analysis
CEHNC	United States Army Engineering and Support Center, Huntsville
CELRL	United States Corps of Engineers, Louisville District
CESHM	Corporate Environmental Safety and Health Manager
CESHP	Corporate Environmental Safety and Health Program
CFR	Code of Federal Regulations
COR	Contracting Officer Representative
DID	Data Item Description
EM	Engineering Manual
EMR	Experience Modification Rating
EPA	Environmental Protection Agency
ES&H	Environmental Safety and Health
ESHP	Environmental Safety and Health Procedures
GOCO	Government Owned, Contractor Operated
HAZCOM	Hazard Communication
HAZWOPER	Hazardous Waste Operations and Emergency Response
IAW	In Accordance With
IRP	Installation Restoration Program
KO	Contracting Officer
LLs	Load Lines
LWDR	Lost Work Day Rate
MI	Multi-Increment
mm	millimeter
NGB	National Guard Bureau
OHARNG	Ohio Army National Guard
OSHA	Occupational Safety and Health Administration
PCP	Phencyclidine
PIKA	PIKA International, Inc.
PjM	Project Manager
PPE	Personal Protective Equipment

RVAAP	Ravenna Army Ammunition Plant
SOW	Scope of Work
S&H	Safety and Health
SS	Site Supervisor
SSHO	Site Safety and Health Officer
SSHP	Site Safety Health Plan
SUXOS	Senior UXO Supervisor
THC	Marijuana
TL	Team Leaders
TO	Task Order
TRIIR	Total Recordable Injury and Illness Rate
USACE	United States Army Corps of Engineers
USP&FO	United States Property and Fiscal Officer
UXO	Unexploded Ordnance
UXOSO	Unexploded Ordnance Safety Officer
WP	Work Plan
WZ	Work Zone

1.0 BACKGROUND INFORMATION

1.1 PLAN INTRODUCTION AND INTEGRATION

This Accident Prevention Plan (APP) and the attached Site Safety and Health Plan (SSHP) have been developed for the US Army Corps of Engineers (USACE) Louisville District (CELRL) to support the on-site operations presented in paragraph 1.5 of this APP. The Operations associated with this APP will be conducted at the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services at the Ravenna Army Ammunition Plant (RVAAP), Ravenna, Ohio. This APP has been developed to meet the US Army requirements as outlined in the Section 01.A.09 of the USACE Engineering Manual (EM) 385-1-1, Safety and Health Requirements Manual, dated 15 September 2008. The USACE EM 385-1-1 manual and the Occupational Safety and Health Administration (OSHA) regulations will be the primary regulatory documents under which all operations at the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops will be conducted.

The APP and SSHP have been developed in accordance with (IAW) the US Army Engineering and Support Center, Huntsville (CEHNC) Data Item Description (DID) MR-005-06 to tier under and supplement the RVAAP Facility-Wide Health and Safety Plan (USACE 2001a). As stated in DID MR-005-06, the APP is to be an implementing document that emphasizes “who” will have specific environmental, safety and health (ES&H) responsibilities and “how” and “when” they will be applied to the project. As such, this APP will act as PIKA International’s Inc., (PIKA) overall ES&H document for this project and will be used to present programmatic data related to the project execution.

The EM 385-1-1 APP outline specifies that a SSHP be developed as a sub plan of the APP for sites where the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standard is applied. Therefore, a SSHP has been developed for this project and is presented in Attachment 1 of this APP. As mandated by OSHA, the intent of an SSHP is to disseminate site and task specific hazard

information and hazard control/mitigation procedures to on-site personnel. Therefore, where outline requirements for the APP and the SSHP cause duplication in data presentation, PIKA has chosen to present the bulk of the site-specific data in the SSHP. Transfer of data from the APP to the SSHP is noted as applicable in this APP.

1.2 CONTRACTOR

The contractor for the performance of this project is PIKA International, Inc. (PIKA). As the contractor for this Task Order (TO), PIKA will be responsible for its successful completion and for the management of all resources required to meet the requirements of the scope of work (SOW).

1.3 CONTRACT NUMBER

The contract number for this project is W912QR-10-P-0058.

1.4 PROJECT NAME

The name of this project is the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services, Ravenna Army Ammunition Plant, Ravenna, Ohio.

1.5 BRIEF PROJECT DESCRIPTION

1.5.1 Description of Work to be Performed

The objective of this project is to perform the on-site activities necessary to meet the goals of the SOW, to include the following (site activity specifics can be found in Section 2.0 of the project Work Plan (WP)):

- Mobilization
- Brush clearing and vegetation removal
- Conduct geophysical survey of the site

- Accomplish Multi-Increment (MI) surface sampling
- Site restoration and demobilization
- Excavation dewatering

1.5.2 Location

When the RVAAP Installation Restoration Program (IRP) began in 1989, the RVAAP was identified as a 21,419 acre installation. The property boundary was resurveyed by the Ohio Army National Guard (OHARNG) over a two year period (2002 and 2003) and the actual total acreage of the property was found to be 21,683 acres. As of February 2006, a total of 20,403 acres has been transferred to the National Guard Bureau (NGB) and subsequently licensed to the OHARNG for use as a military training site known as Camp Ravenna. The current RVAAP consists of 1,280 acres scattered throughout Camp Ravenna.

Camp Ravenna is in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 kilometers (3 miles) east northeast of the city of Ravenna and approximately 1.6 kilometers (1 mile) northwest of the city of Newton Falls. The RVAAP portions of the property are solely located within Portage County. Camp Ravenna/RVAAP is a parcel of property approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garret, McCormick, and Berry roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east. Camp Ravenna is surrounded by several communities: Windham on the north; Garrettsville 9.6 kilometers (6 miles) to the northwest; Newton Falls 1.6 kilometers (1 mile) to the south east; Charlestown to the southwest; and Wayland 4.8 kilometers (3 miles) to the south.

When RVAAP was operational, Camp Ravenna did not exist and the entire 21,683-acre parcel was a government-owned contractor operated (GOCO) industrial facility. The RVAAP IRP encompasses investigation and cleanup of past activities over the entire 21,683 acres of the former RVAAP, references to the RVAAP in this document

are considered to be inclusive of the historical extent of RVAAP, unless otherwise specifically stated.

1.6 HISTORY

Production at the facility began in December 1941 with the primary missions of depot storage and ammunition loading. The installation was divided into two separate units - the Portage Ordnance Depot and the Ravenna Ordnance Plant. The Portage Ordnance Depot's primary mission was storage of munitions and components, while the mission of the Ravenna Ordnance Plant was loading and packing major caliber artillery ammunition and the assembly of munitions initiating components that included fuzes, boosters and percussion elements. In August 1943, the installation was re-designated the Ravenna Ordnance Center and again in November 1945 as the Ravenna Arsenal. The plant was placed in standby status in 1950 and operations were limited to renovation, demilitarization and normal maintenance of equipment, along with storage of ammunition and components.

The plant was reactivated during the Korean Conflict to load and pack major caliber shells and components. All production ended in August 1957, and in October 1957 the installation was again placed in a standby condition. In October 1960, the ammonium nitrate line was renovated for demilitarization operations which involved melting explosives out of bomb casings for subsequent recycling. These operations commenced in January 1961. In July 1961, the plant was again deactivated. In November 1961, the installation was divided into the Ravenna Ordnance Plant and an industrial section, with the entire installation then being designated as the RVAAP.

In May 1968, RVAAP began loading, assembling, and packing munitions on three load lines (LLs) and two component lines in support of the Southeast Asia Conflict. These facilities were deactivated in August 1972. The demilitarization of the M71A1 90-millimeter (mm) projectile extended from June 1973 until March 1974. Demilitarization of various munitions was conducted from October 1982 through 1992.

Until 1993, RVAAP maintained the capability to load, assemble and pack military ammunition. As part of the RVAAP mission, the inactive facilities were maintained in a standby status by keeping equipment in a condition to permit resumption of production within prescribed limitations. In September 1993, the RVAAP was placed in inactive caretaker status, and subsequently changed to modified caretaker status. The LLs and associated real estate were determined to be excess by the Army.

A total of 20,403 acres of the former 21,683 acre RVAAP was transferred to the United States Property and Fiscal Officer (USP&FO) for Ohio for use by OHARNG as a military training site. The current RVAAP consists of 1,280 acres in several distinct parcels scattered throughout Camp Ravenna. The RVAAP and Camp Ravenna are co-located on contiguous parcels of property.

CC-RVAAP-80 Area Specific Description

CC-RVAAP-80 consists of the Group 2 Propellant Can Tops area. Propellant can lids or tops were identified on the ground surface/near surface at the southern end of the former Group 2 Ammunition Storage Area. These materials are typically classified as RRD (similar to munitions packaging materials). This site was never used or classified as an operational range. It is believed that the discarded propellant can tops might qualify as inert scrap metal.

The propellant can tops located at the south end of Group 2 were initially identified by OHARNG trainees in the winter of 2008. The propellant can tops were observed in the vegetated area located immediately south of the ammunition storage magazines in the vicinity of the southern railroad spur lines. This area consists of approximately 539,572 square ft (12.4 acres).

The site is a low probability site in regard to encountering Munitions and Explosives of Concern (MEC). Therefore, only unexploded ordinance (UXO) construction support will be needed for the project. However, if prior to this project or during any phase of this project MEC are found at the site, the project may be stopped and the site will need to be re-evaluated and potentially assigned a new probability rating.

RVAAP- 09 Load Line 2 Specific Description

Former excavation activities conducted at Load Line 2 (RVAAP -09) have resulted in the accumulation of water within the building DB-802 footprint. Restoration activities are now planned at this location, and the accumulated water needs to be removed from the excavation to assist in the restoration of the site.

NOTE: As per the requirements of the SOW, the water removal services are to coincide with the BRACD contractor's schedule. To that end, the water removal services were conducted by PIKA from May 3, 2010 through May 18, 2010 to facilitate the June 2010 restoration activities at LL2 building 802. All water removal services were conducted in accordance with Ohio EPA requirements. A copy of the Ohio EPA e-mail correspondence relative to approval for discharging the surface water to ground surface is provided in Appendix G.

1.7 PHASES OF WORK REQUIRING ACTIVITY HAZARDS ANALYSES

During the course of work, PIKA personnel will be involved with activities that will potentially expose them to chemical, physical and biological hazards which PIKA will control through the use of engineering, administrative and personal protective equipment controls. Additionally, since the operations conducted during this project are governed by the OSHA hazardous waste standard in 29 CFR 1910.120 and 1926.65, PIKA is required to develop a SSHP for this project (See Attachment 1 to this APP). During the SSHP development, PIKA will conduct an activity hazard analysis (AHA) of the tasks outlined below. The results of the AHA will be expressed in the PIKA Certification of Activity Hazard Analysis (CAHA) forms presented in Attachment 2 of this APP. CAHA forms will be completed incrementally with the development of site specific work plans and will be submitted with the work plan and as an addendum to Attachment 2 of the APP. Additional information on the activity hazard assessment process can be found in Section 3.0 of the attached RVAAP SSHP. The phases of work to which an AHA will be developed, or the phases of work with similar hazard and hazard control techniques which can be addressed in a single AHA include:

- Mobilization, Site Setup and Demobilization;

- Access Surveys, Vegetation Removal and Geophysical Data Collection;
- MI Surface Sampling;
- Dewatering and,
- Site Restoration

2.0 STATEMENT OF SAFETY AND HEALTH POLICY

2.1 SAFETY AND HEALTH POLICY STATEMENT

The fundamental safety and health (S&H) policy of PIKA is to provide PIKA employees with a safe and healthful working environment that is free of recognized safety or health hazards. Paramount to the implementation of this policy is PIKA's core safety belief that accidents are preventable and that the safety of the worker, the environment or the public will never be compromised to promote other project objectives such as production, cost or schedule.

2.2 PIKA'S WRITTEN SAFETY PROGRAM GOALS, OBJECTIVES AND ACCIDENT CONTROL PROGRAMS/MANAGEMENT

2.2.1 Written CESHP Goals

The goal of PIKA's comprehensive written Corporate Environmental, Safety and Health Program (CESHP) is to outline the management structure and safety integration procedures PIKA uses to assist in the transfer of ES&H values from the corporate environment to the field operations. Safety policies do not benefit the company, the worker or the client if there is no vehicle present to translate the policy statements into actions that positively impact the personnel, environment and client associated with each project. To facilitate this, the PIKA CESHP contains the hazard control and management programs required by OSHA, the USACE, and other agency and client specific regulations. Additionally, the PIKA ES&H Procedures (ESHPs), and Environmental Safety and Health Forms (ESHFs) are attached to the program as Appendices for use by field personnel. The ESHPs and ESHFs relevant to this project are presented in Attachments 3 and 4 respectively.

2.2.2 CESHP Objectives

2.2.2.1 Management Objective

In order for PIKA to effectively implement its ES&H policies, it is imperative that the PIKA CESHP include information relevant to the incorporation of ES&H values into levels of project performance. Therefore, one of the primary objectives of this

CESHP is to provide management and project personnel with practical information related to the anticipation, recognition, evaluation, and mitigation of ES&H issues that may adversely impact on-site personnel, the environment or the public. As such, this CESHP contains information related to:

1. The ES&H chain of command and the responsibilities of corporate and on-site ES&H personnel;
2. The procedures used to integrate ES&H during the planning and implementation of projects;
3. The anticipated hazards to which personnel may be exposed, to include information that will be used to recognize and assess the anticipated hazards;
4. The control procedures and safe work practices personnel will use to reduce, and when possible eliminate, the hazards and/or the risk of exposure; and
5. The identification and evaluation of potential impacts to the environment and the measures to manage, control, and mitigate those impacts.

2.2.2.2 Regulatory Compliance Objective

An additional objective of this CESHP is to achieve PIKA's compliance with the applicable requirements outlined in regulatory references applicable to PIKA's work, specifically the HAZWOPER requirements presented in Title 29 of the Code of Federal Regulations (CFR) Part 1910.120 and Section 28 of USACE EM 385-1-1. As specified in these standards, PIKA is required to develop and implement a Safety and Health Program to govern work at HAZWOPER sites. The PIKA CESHP with its attached ESHPs provides PIKA with the compliance tools needed to meet the regulatory requirements of 29 CFR 1910.120(b), and EM 385-1-1 paragraph 01.A.02.

2.2.3 Accident Experience Goals for This Contract

As with every contract, PIKA's goal will be to perform this contract without an USACE or OSHA recordable accident. PIKA routinely completes projects with no first aid or medical service incidents. PIKA's past Total Recordable Injury and Illness Rate (TRIIR), Lost Work-day Rate (LWDR), and Experience Modification Rate (EMR) for the past four years is presented in Table 1.1.

Table 1-1: PIKA's Accident Statistics

YEAR	TRIIR	LWDR	EMR
2005	3.1	0	0.90
2006	3.0	0	0.89
2007	3.3	0.8	0.82
2008	2.9	0.0	0.78
2009	1.9	0.6	0.75

3.0 RESPONSIBILITIES AND LINES OF AUTHORITIES

3.1 THE PIKA RESPONSIBILITY FOR S&H IMPLEMENTATION

The PIKA CESHP specifies that all the PIKA personnel are responsible for their safety and the safety of the personnel working with them. However, it is also stated that the ultimate S&H responsibility begins with the Principal of PIKA and this responsibility radiates outward to all management, administrative, operations, and field personnel. To achieve this philosophy, PIKA empowers all personnel with stop work authority regarding known or potential S&H issues. Additionally, all the PIKA personnel are held accountable for performing their assigned tasks in a manner that promotes continuous, active hazard evaluation and safe task performance.

3.2 IDENTIFICATION/ACCOUNTABILITY OF PERSONNEL RESPONSIBLE FOR SAFETY

The key personnel at PIKA that are responsible for safe project performance include:

- The President of PIKA.
- PIKA's Corporate Environmental Safety and Health Manager (CESHM).
- The Project Manager (PjM).
- The project Site Supervisor (SS) who will also meet the requirements for a Senior Unexploded Ordnance Supervisor (SUXOS) and be referred to as SUXOS throughout this document.
- The Site Safety and Health Officer (SSHO) who will also meet the requirements for a UXO Safety Officer (UXOSO) and be referred to as UXOSO throughout this document.
- The project Team Leaders (TL).
- The field personnel.

The ES&H responsibilities of the personnel filling the roles listed above are presented in detail in Section 4.0 of the SSHP in Attachment 1 of this APP. Since this

on-site safety management structure is specific for this type of work, PIKA has chosen to present the personnel responsible for safety in Section 4.0 of the SSHP.

3.3 COMPETENT AND/OR QUALIFIED PERSONS

IAW the definitions published by OSHA in 29 CFR 1926.32, and the definitions published by the USACE in the Appendix Q of EM 385-1-1, the terms Competent Person and Qualified Person have very specific meanings and are used by OSHA and the USACE to specify the level of training, experience, certification and competency required by on-site personnel involved with specific tasks. As applicable to, and necessary for the performance of a specific task within the SOW, PIKA will designate the name and position of the competent/qualified person(s) required for each task presented in the AHA forms developed IAW 01.A.13 of USACE EM 385-1-1 for each task or group of similar tasks in the SOW.

3.4 ON-SITE COMPETENT PERSON REQUIREMENTS

At no time will site operations be conducted without the presence of the designated competent person being at the site, nor will any task be performed which requires a qualified person without the presence or written approval of the qualified person.

3.5 PRE-TASK SAFETY AND HEALTH ANALYSIS

As outlined in paragraph 1.5.4 of this APP, all phases of work will be reviewed and an AHA developed and submitted for approval. Multiple tasks may be addressed and listed under a single AHA if the hazards and control methods employed to safeguard personnel are similar for all the tasks listed on the AHA. Prior to the initiation of a specific task, a task hazard briefing will be provided by the UXOSO to inform task personnel of the hazards and methods of hazard control associated with the given task. The UXOSO will be responsible for documenting the Task Hazard Briefing and all personnel present for the briefing will sign the documentation of training form for the specific AHA.

3.6 LINES OF AUTHORITY

As a part of its corporate structure, the PIKA has developed a system whereby the lines of authority for personnel responsible for production and on-site ES&H are separate. All issues related to on-site operations regarding production, and resources are handled initially on-site by the SUXOS who reports to the PjM. Issues that cannot be handled by the PjM are delegated to the Principal of the PIKA. While S&H is the responsibility of all personnel, the UXOSO is the on-site representative of the PIKA CESHM. As such, the UXOSO is responsible for ensuring overall compliance by site personnel with the APP and to maintain autonomy, the UXOSO reports directly to and is accountable to the CESHM for S&H issues.

3.7 POLICIES AND PROCEDURES REGARDING NONCOMPLIANCE

3.7.1 General Requirements

These procedures are corporate level procedures and as such are presented here in the APP rather then in the SSHP that is more site-specific. An essential element of safe work performance is the realization by site personnel that their compliance with established safety and health procedures is of paramount importance in the prevention of accidents and emergencies that could compromise their safety and health, and the well being of other site personnel, the environment, and the public. Because violations of the safety and health procedures and programs outlined in this APP can result in serious personal injury, illness, death, or environmental insult, personnel violating the safety or health requirements of this APP may be subject to disciplinary action.

3.7.2 Safety and Health Violations

It is the general policy of the PIKA that no personnel engage in any activity for which: 1) they are not properly trained; 2) the consequences of the activity are uncertain; or 3) the activity hazards have not been assessed. As deemed necessary, the SUXOS or UXOSO may impose other prohibitions to ensure the safe conduct of operations. The prohibitions presented below are strictly forbidden at any time, during any on-site operation, with the violation of these rules possibly resulting in termination of employment.

- Horseplay or fighting.

- Use of alcohol on site or during the period from mobilization to the site each day, until demobilization from the site each workday.
- Illegal use of drugs at any time either on or off the work site.
- Use of prescription or over-the-counter medications without SUXOS approval
- Eating, drinking, or smoking in a work zone (WZ) without prior approval.
- Unnecessary sitting or kneeling on potentially contaminated surfaces.
- Starting/maintaining an open flame of any type unless authorized by the SUXOS IAW the allowable provisions of the WP and this APP.
- Using equipment that has not been inspected and deemed safe for operation.
- Entry into a work site without prior approval of the SUXOS.
- Initiation of work without the presence of a buddy.
- Failure to report an incident that results in personal injury or property damage.

3.7.3 Disciplinary Actions

If a nonconformance occurs, appropriate positive disciplinary action will be taken. In all cases where a potential violation has been reported, the SUXOS and UXOSO will conduct an investigation to validate the report and to determine the severity of the violation. Violations will be divided into two categories: major and minor. An example of a minor violation is reporting to work without the prescribed personal protective equipment (PPE). A major violation is any violation of the APP that could have resulted, or did result, in an accident involving personal injury or property damage. Table 7-1 outlines the disciplinary actions and procedures to be followed if a noncompliance issue results from personnel actions.

TABLE 3-1: DISCIPLINARY ACTIONS FOR MINOR AND MAJOR VIOLATIONS

MINOR VIOLATION ISSUES	
First Offense:	A verbal warning will be given to the individual; the offense to be noted in individual's file and supervisor's project file; a discussion with the individual's supervisor or Team Leader will be conducted.
Second Offense:	Written reprimand by the SUXOS will be entered in individual's file; discussion with individual and individual's supervisor.
Third Offense:	Potential termination of employment as determined by the PIKA Principal.

MAJOR VIOLATION ISSUES	
Any Offense:	Minimum penalty for a major violation will consist of a written reprimand being entered in individual's file and a discussion between the individual and the SUXOS being conducted. Depending upon the severity of the violation, the SUXOS may temporarily dismiss the individual from the job site pending further investigation of the offense. Major violations must be immediately reported to the PjM and CESHM by the SUXOS. Upon completion of a full investigation, the individual's employment may be terminated, if deemed appropriate by the PIKA Principal.

3.8 MANAGER AND SUPERVISOR ACCOUNTABILITY FOR SAFETY

Due to the limited size of PIKA's project management structure, formalized S&H measurement matrices for Supervisors and Managers are still under development. However, PIKA does compile a matrix of S&H incidents on a per site basis as part of its accident prevention and lessons learned programs. The matrix is compiled from data provided on the PIKA Accident/Incident/Near Miss forms submitted by the UXOSO upon completion of each incident investigation. This matrix is reviewed by the CESHM to determine accident trends pertaining to sites, supervisors and project managers. Trends identified are reported to the PIKA Principal on at least a quarterly basis. Supervisors and PjMs identified as having adverse trends will be counseled by the PIKA Principal and negative trend reports may negatively impact financial gain and future employment of the Supervisor or PjM. Supervisors and PjMs will be counseled and involved in resolution when an incident happens on their site to quickly assess and learn from the incident.

4.0 SUBCONTRACTORS AND SUPPLIERS

4.1 SUBCONTRACTORS AND SUPPLIERS

For the performance of site operations, PIKA and its subcontractors will utilize several local and out-of-area suppliers, including, but not limited to:

- Rental car companies for the acquisition of site vehicles.
- Local suppliers for brush clearing equipment, miscellaneous supplies, etc.

4.2 CONTROL / COORDINATION OF SUBCONTRACTORS AND SUPPLIERS

Control of subcontractors and suppliers will be maintained by PIKA's site control plan as implemented by the SUXOS. Suppliers and subcontractors wishing to gain access to the site will be required to notify the SUXOS of their arrival and sign in with the SUXOS. The SUXOS will then be responsible for ensuring that deliveries are made and equipment is properly stored and secured. The SUXOS will also ensure that all site related personnel and subcontractors are properly trained and have read and understood the SSHP.

4.3 SAFETY RESPONSIBILITIES OF SUBCONTRACTORS AND SUPPLIERS

As a part of PIKA's subcontractor agreement and purchase order system, subcontractors agree to conduct their operations IAW PIKA's site plans and applicable Federal, state and local ES&H requirements. Enforcement of these requirements will be made by the SUXOS with consultation and coordination by the PjM, UXOSO and CESHM. All subcontractors and suppliers will be responsible for providing adequately trained and experienced personnel who arrive at the site with appropriate equipment that is in safe operational condition. Subcontractors or suppliers that arrive at the site with inadequate or defective equipment will be required to remove such items from the site and will not be allowed to perform operations until operationally safe equipment is used. Additionally, the subcontractor and suppliers will agree to inform the SUXOS of any hazardous activities they are required to conduct prior to its performance in order to allow the

SUXOS and UXOSO to assess the task to ensure all hazards are identified and controlled by procedures in either this APP or the SSHP.

5.0 TRAINING

5.1 NEW HIRE SAFETY AND OCCUPATIONAL HEALTH ORIENTATION

5.1.1 HAZWOPER Training

PIKA conducts a large variety of operations under contract to various Federal, State and commercial clients which involve many different task-related hazards. This includes the performance of work involving Uncontrolled Hazardous Waste sites. Therefore, PIKA requires all of its site personnel to provide documentation of having completing the OSHA-required 40-Hour HAZWOPER course or if they are unexposed workers, the 24-hour HAZWOPER course. This requirement also has the benefit of making sure all PIKA personnel have a baseline safety orientation and background knowledge of the topics taught in the 40-hour or 24-hour HAZWOPER courses, to include:

1. PPE use, limitations and maintenance;
2. Basic hazard assessment and control measures;
3. General contamination control and decontamination procedures;
4. Medical surveillance requirements;
5. The types and affects of chemical exposure;
6. Identification and control of physical hazards such as heat/cold stress and noise;
7. Identification and control of biological hazards; and
8. Employee Hazard Communication (HAZCOM) Right-to-Know regulations.

5.1.2 Review of the Project Safety Plan

Prior to being allowed to participate in site activities where an exposure to safety or health hazards exists, new field personnel and supervisors will read the project APP. As required in the plans, the employees will sign the appropriate plan review form indicating that they have read and understand the S&H provisions and requirements outlined in the plan.

5.1.3 Required Site and Task Hazard Training

Prior to their participation in tasks with potential exposure to ES&H hazards, new employees will be provided Site-specific and Hazard Information Training as required by OSHA in 29 CFR 1910.120(i). This training will be based upon general hazards of the site, the tasks to be performed and the hazards associated with the tasks. All new employees will be provided this training and all site training required by this Section shall be conducted, or arranged for, by the SUXOS. All training will be documented using the PIKA Safety Training Attendance Log (ESHF-503) and the PIKA New Employee Safety Orientation Checklist form (ESHF-534). At no time will new PIKA personnel be permitted to conduct any site operations involving the potential for exposure to safety or health hazards until they have received appropriate training.

5.2 MANDATORY TRAINING/CERTIFICATIONS APPLICABLE TO PROJECT

The mandatory training and certifications and periodic retraining and recertification that are applicable to each SOW will be conducted for all site personnel. Included in the mandatory training/certification will be the OSHA training requirements outlined in 29 CFR 1910 and 1926, as well as any additional training required by USACE EM 385-1-1 that will be applicable to the tasks associated with each SOW. The UXOSO will document all training provided on site using the PIKA Safety Training Attendance Log (ESHF-503). The UXOSO will also verify the training/certifications of the site personnel.

5.3 PERIODIC S&H TRAINING FOR SUPERVISOR AND EMPLOYEES

Once per week (usually Monday), a weekly safety briefing will be presented in conjunction with the daily safety briefing. This briefing will consist of information about site hazards or general safety/health issues relevant to the site personnel, and will be presented by the UXOSO or a speaker selected by the SUXOS. All site personnel will attend the training, and the UXOSO shall document this training on the PIKA Documentation of Training form.

Additional OSHA-required training as deemed necessary by the CESHM shall be provided as needed. Such training may include training related to specific chemical contaminants (such as lead, arsenic, etc.) or task-specific hazards such as confined space, heavy equipment, hand-tool operation, special PPE, etc.

5.4 REQUIREMENTS FOR EMERGENCY RESPONSE TRAINING

All the PIKA personnel involved with responding to an on-site emergency will be briefed in their roles and responsibilities as required by paragraph 9.b. of Appendix A in USACE EM 385-1-1. This training will be documented and will also involve a documented rehearsal of the emergency response plan prior to the start of site activities.

6.0 SAFETY AND HEALTH INSPECTIONS

6.1 DAILY AND WEEKLY SAFETY INSPECTIONS AND AUDITS

Daily inspections shall be conducted by both the SUXOS and UXOSO to ensure that site operations and personnel are complying with this APP and other regulatory requirements. The results of these inspections shall be recorded in the Safety Log and documented on the PIKA Safety Inspection and Audit Log form. Any site or operational discrepancies identified will be noted on this form, and the results of the inspection shall be reported to the CESHM and the SUXOS. On a weekly basis, the UXOSO shall conduct a compliance audit of the site. This audit will also be noted in the Safety Log and then documented on the PIKA Safety Inspection and Audit Log.

6.2 PERIODIC CORPORATE SAFETY AND HEALTH INSPECTIONS

During the course of this project the PIKA CESHM will make periodic inspections of the project. The frequency and duration of the inspections will be determined based upon the complexity, nature and hazards of the project. It is anticipated that during the course of the site investigation operations, the CESHM will conduct site inspections approximately every 30 – 45 days. The CESHM will generate an After Action Report for each inspection that will detail the parameters of the inspection and the observations and findings. A copy of this report will be distributed to the project management team and the USACE personnel. Deficiencies noted on the inspection report will be logged and tracked until mitigated/abated.

6.3 DEFICIENCY TRACKING AND FOLLOW-UP

Any deficiencies noted during a site inspection or audit will be reported to the CESHM and noted on the Safety Inspection and Audit Log form. The UXOSO will conduct the follow up on the deficiency to track and log the corrective actions. When the form is completed, the UXOSO will forward a copy of the completed form to the CESHM who will then verify the adequacy of the corrective actions.

6.4 EXTERNAL INSPECTIONS/CERTIFICATIONS REQUIRED

With the exception of the government quality assurance inspections, it is not anticipated that there will be any additional external inspections/certifications required during the site operations. During HTRW operations, external inspections of the site sampling and waste handling, third-party inspection or certification may be required to meet local and/or state Environmental Protection Agency (EPA) office requirements. In the event that an external inspection/certification is required, the PIKA site management personnel will fully cooperate with the external inspection/certification personnel as specified in the project SOW and site plans.

7.0 ACCIDENT REPORTING

7.1 PERSONS RESPONSIBLE FOR ACCIDENT REPORTING AND INVESTIGATION

The following personnel will be responsible for accident reporting and investigation as required in Section 8 of Appendix A in EM 385-1-1:

- Exposure Data: The PjM will report exposure data to the Contracting Officer/Contracting Officer Representative (KO/COR).
- Accident Investigations: The SUXOS and UXOSO will investigate all accidents. Details of the accident investigation process are contained in the PIKA Incident Reporting and Investigation procedure ESHP-502 presented in the PIKA CESHP.
- Accident Reports: The UXOSO will be responsible for the initial verbal reporting and also the follow-on written reports. The UXOSO will complete the required report forms as soon as possible after the incident but no more then five calendar days following the accident. A copy of the accident report form will be forwarded to the KO/COR.
- Accident Logs: The PIKA CESHM will be responsible for completing the PIKA OSHA 300 and 300A logs to record and track the PIKA accidents.

7.2 ACCIDENT REPORTING

Verbal reporting by the SUXOS to the PIKA PjM and the KO/COR will occur as soon as possible after the accident but not more then 24 hours afterwards. Additionally, the UXOSO will be responsible for the initial verbal reporting of an accident to the PIKA CESHM. Immediate notification will be made to the USACE KO/COR for any of the following:

- A fatal injury
- A permanent total disability
- A permanent partial disability
- The hospitalization of three of more personnel resulting from a single event
- Property damage in excess of $200,000.

8.0 APPLICABLE PLANS/PROGRAMS/PROCEDURES

Only those plans that are applicable to this SOW have been addressed in this section. In the event that future work conducted under this APP requires additional plans, this APP will be amended to include the additional plans, programs and procedures.

8.1 LAYOUT PLANS

Plans for the mobilization and set-up of temporary facilities at the site are discussed in the PIKA WP. Trailers and other temporary structures used as field office or storage will be anchored with rods and cables or steel straps with ground anchors such that the system will withstand expected wind conditions. The anchoring system will meet State and local standards for anchoring mobile trailer homes.

8.2 EMERGENCY RESPONSE PLANS

The site emergency response and contingency plans covering the following procedures are presented in Section 15.0 of the SSHP. As a minimum, the Emergency Response Plans in the SSHP include the following:

1. Procedures and tests;
2. Spill plans;
3. Firefighting plan;
4. Posting of emergency telephone numbers;
5. Medical Support, to include on-site medical support and off-site medical arrangements including rescue and medical duties for those employees who are to perform them; the name of on-site personnel trained in first aid and CPR.

8.3 PLAN FOR PREVENTION OF ALCOHOL AND DRUG ABUSE

8.3.1 Introduction

This section presents the PIKA alcohol and drug abuse prevention policies. The Drug-Free Workplace Act of 1988 set as a goal the elimination of the effects of

illegal drugs in the workplace. Because of the inherently hazardous nature of the work performed by the PIKA personnel, the importance of creating and maintaining a safe drug-free working environment is paramount. The performance of every employee must, at all times, support the company's mission to conduct site operations with a high level of productivity, reliability, judgment, and safety.

The management of the PIKA is thoroughly committed to providing a drug-free workplace for all employees. Drug and/or alcohol use and abuse are incompatible with the PIKA high standards of performance, safety, and quality. As a term of employment all employees agree to refrain from the use, distribution, possession, manufacture, or dispensing of a controlled substance, and drug and/or alcohol abuse. Violation of this policy may result in administrative action to include termination of employment.

8.3.2 Substance Use and Abuse Testing/Screening Policy

Employee drug or substance use or abuse testing/screening conducted by the PIKA in support of this policy will be conducted at no expense to the employee, and, except for drug/substance use testing conducted for pre-employment, employees will receive reasonable compensation for the time required for participation in any drug or substance testing/screening. The drugs or substances for which the PIKA may conduct testing includes, but is not limited to: amphetamines, barbiturates, cocaine metabolites, methadone, opiates, phencyclidine (PCP), Marijuana (THC) and ethyl alcohol. As a matter of policy, the PIKA will strictly implement and enforce the policies listed below.

1. Employees will not work or report for work if impaired by any authorized or controlled substance without management's prior approval and coordination. Pick-up and drop-off (impaired employee transportation) will be coordinated by the CESHM/Site Safety Officer to ensure safety. Management’s approval will be limited to lawful medications, based on an assessment of the employee's ability to perform their regular or other assigned duties safely and efficiently.

2. No employee will use any alcohol or a controlled substance (properly prescribed to the approved employee by name from a licensed physician) on site.
3. Applicants for employment are subject to substance abuse screening as part of their baseline or pre-assignment physical examinations.
4. All the PIKA employees are subject to substance abuse screening at any time as directed by the CESHM or on a random, nondiscriminatory basis. Refusal to submit to such screening will result in removal from the project site and/or termination of employment.
5. Substance use or abuse screening may be conducted when an employee is involved in either a job-related accident or job-related incident.

8.3.3 Prescription Medications

PIKA project personnel may possess and use prescription medications and "over-the-counter" medications provided that all of the following apply:

1. The prescription medication has been prescribed by an authorized medical practitioner for the current use (within the past 12 months) of the employee, and the medication is in its original container with a valid pharmacy label.
2. The employee does not consume the prescribed, or over-the-counter, medication in quantities greater than, or more frequently than that directed on the label.
3. Employees in possession of prescribed medications shall not allow any other person to consume any amount of their prescribed medication.
4. In the event that the prescribed medication could cause adverse side effects, or where the medication indicates warnings relevant to side effects affecting the operation of equipment or machinery, the employee shall inform the SUXOS prior to engaging in project operations while under the influence of the medication (i.e., having taken the medication within the past 12 hours).

While the on-site use of prescription and over-the-counter medications is authorized, under the requirements listed above, the PIKA reserves the right to have a licensed physician determine if the employee's use of the medication could adversely affect

the individual or could increase the potential for injury or illness to the employee or other site personnel. If consumption of the medication could lead to adverse safety or health effects, the CESHM may, on the advice of the licensed physician, limit or suspend the employee's work activities.

8.3.4 Suspicion Inspections and Testing

For the purposes of ensuring compliance with the prohibition against the unauthorized possession of controlled substances, employees may be subject to random and reasonable suspicion inspections and testing. An employee's company clothing, locker, closet, work area, desk files, company motor vehicle, and similar areas are subject to inspection. Similarly, an employee's privately owned vehicle, lunch box, and like containers are subject to such inspections when brought to any work site. At no time will an employee be physically touched during an inspection, and only outer clothing will be required to be removed for inspection or search. No person or property search (except for searches of the PIKA-owned, rented, or leased properties), urine drug test, or Breathalyzer test will be conducted without the employee's consent. Refusal to submit to a legal inspection, or request for testing, will result in employee removal from site activities until further inspection or testing can determine the potential for prohibited drug or substance use or abuse.

8.4 SITE SANITATION PLAN

Personal hygiene and sanitation facilities will be established on site IAW 29 CFR 1910.120(n) and the PIKA ESHP-512 to ensure personnel maintain good personal hygiene. Site-specific sanitation requirements will be specified in the SSHP and will address as a minimum personal washing area, toilet facilities, and a lunch/break area.

8.5 ACCESS AND HAUL ROAD PLAN

Not required for this operation, but if one becomes needed, it will be developed as an addendum to the site project WP.

8.6 RESPIRATORY PROTECTION PLAN

Based upon the hazards of this project, the use of respiratory protection is not anticipated. If it becomes necessary a plan will be developed IAW the PIKA ESHP-513 Respirator Program which is presented in Attachment 3 of this APP.

8.7 HEALTH HAZARD CONTROL PROGRAM

The SSHP developed for this project and presented in Attachment 2 of this APP meets the requirements of the Health Hazard Control Program as outlined in EM 385-1-1, Paragraph 06.A.02.

8.8 HAZARD COMMUNICATION PLAN

HAZCOM training will be provided for all site personnel who will use products containing hazardous substances. This training complies with the requirements of the OSHA HAZCOM Standard, 29 CFR 1910.1200. This training will be provided upon initial assignment to the site and prior to use of the products containing hazardous substances. Supplemental HAZCOM training will be scheduled and presented whenever a new hazardous substance is introduced into the work area or an employee changes job location where new products are encountered. The requirements for HAZCOM training are outlined in the ESHP-509 of the CESHP. Additional site-specific HAZCOM data is provided in paragraph 10.13 of the SSHP.

8.9 PROCESS SAFETY MANAGEMENT PLAN

A process safety management plan is not required for this project since no highly hazardous chemicals are anticipated as defined by in paragraph 06.B.04 of EM 385-1-1.

8.10 LEAD ABATEMENT PLAN

This plan will not be required for this APP since no occupational exposures to lead are anticipated during this project.

8.11 ASBESTOS HAZARD ABATEMENT PLAN

This plan will not be required for this APP since no occupational exposures to asbestos are anticipated during this project.

8.12 RADIATION SAFETY PROGRAM

It is not anticipated that this plan will be required since radiation exposure is not anticipated.

8.13 ABRASIVE BLASTING

It is not anticipated that this plan will be required since abrasive blasting is not anticipated.

8.14 HEAT/COLD STRESS MONITORING PLAN

The PIKA procedures for the evaluation and control of heat and cold stress are presented in Section 9.0 of the SSHP.

8.15 CRYSTALLINE SILICA MONITORING PLAN

It is not anticipated that this plan will be required since exposure to crystalline silica is not anticipated.

8.16 NIGHT OPERATIONS LIGHTING PLAN

This plan should not be required since work should not be conducted during the night when artificial lighting would be required.

8.17 FIRE PREVENTION PLAN

The fire prevention plan for this project is presented in Section 13 of the SSHP and is also addressed in Sections 10.5 of the SSHP.

8.18 WILD LAND FIRE MANAGEMENT PLAN

Based upon the SOW and site-specific data, a Wild Land Fire Management Plan is not required for this project.

8.19 HAZARDOUS ENERGY CONTROL PLAN

The hazardous energy control plan for this project is presented in Section 5.9 of the SSHP.

8.20 CRITICAL LIFT PLAN

It is not anticipated that this plan will be required since critical lifts, as defined in paragraph 16.H.01 of USACE EM 385-1-1, should not be necessary for the completion of this project.

8.21 CONTINGENCY PLAN FOR SEVERE WEATHER

The severe weather plan for this project is presented in Section 12 of the SSHP.

8.22 FLOAT PLAN

It is not anticipated that this plan will be required since boat-borne water operations are not anticipated.

8.23 SITE- SPECIFIC FALL PROTECTION & PREVENTION PLAN

Since this is a site-specific plan, the fall prevention plan for this project is presented in Section 10.10 of the SSHP.

8.24 DEMOLITION PLAN

It is not anticipated that this plan will be required for the operations as demolition or blasting is not required.

8.25 EXCAVATION AND TRENCHING PLAN

It is not anticipated that this plan will be required for the operations as Excavation and Trenching are not components of the SOW.

8.26 EMERGENCY RESCUE FOR TUNNELING

It is not anticipated that this plan will be required for the operations since tunneling is not anticipated.

8.27 UNDERGROUND CONSTRUCTION FIRE PREVENTION/PROTECTION PLAN

It is not anticipated that this plan will be required for the operations since underground construction is not anticipated.

8.28 COMPRESSED AIR PLAN

It is not anticipated that this plan will be required for the operations since no tasks will include the need to supply compressed air.

8.29 FORMWORK AND SHORING ERECTION AND REMOVAL PLANS

It is not anticipated that this plan will be required for the operations since formwork and shoring erection and removal should not be required.

8.30 PRECAST CONCRETE PLAN

It is not anticipated that this plan will be required for the operations since the use of precast concrete should not be required.

8.31 LIFT SLAB PLANS

It is not anticipated that this plan will be required for the operations since slab lifting should not be required.

8.32 STEEL ERECTION PLAN

It is not anticipated that this plan will be required for the operations since steel erection should not be required.

8.33 SSHP

A SSHP for this project has been developed and is included in Attachment 1 of this APP.

8.34 BLASTING PLAN

It is not anticipated that this plan will be required for the operations since blasting should not be required.

8.35 DIVING PLAN

It is not anticipated that this plan will be required for the operations since underwater diving should not be required.

8.36 CONFINED SPACE PROGRAM

This plan is not required for this project since no confined space entry should be required during this project. If confined spaces are located and personnel entry is required, this paragraph will be amended and a confined space program added to this APP.

9.0 RISK MANAGEMENT PROCESSES

As presented in paragraph 1.5.4 of this APP, detailed project-specific hazards and controls shall be identified and provided by an Activity Hazard Analysis for each major phase/activity of work.

ATTACHMENT 1

SITE SAFETY AND HEALTH PLAN

SITE SAFETY AND HEALTH PLAN APPROVAL

Project: Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services

Site: Ravenna Army Ammunition Plant (RVAAP)

Site Location: Ravenna, Ohio

The Site Safety and Health Plan (SSHP) presented in this document has been developed for the US Army Corps of Engineers (USACE) Louisville District (CELRL). Procedures for the submission, approval, integration and implementation of changes to this SSHP are discussed within the body of the SSHP and will be followed whenever a change would significantly impact the safety of site personnel, the environment or off-site personnel. The PIKA personnel referenced below have reviewed and approved this SSHP for implementation once approval has been received from USACE.

Reviewed by: _____ Date: 02/24/11
Brian Stockwell
PIKA Project Manager

Reviewed by: _____ Date: 02/24/11
Lew Kovarik
PIKA UXO Safety Officer/Site Safety and Health Officer

Reviewed and Approved by: _____ Date: 02/24/11
Joseph Frydenger, CSP
PIKA Corporate Safety and Health Manager

TABLE OF CONTENTS

1.0 PIKA CORPORATE SAFETY AND HEALTH PLAN 1
1.1 GENERAL 1
1.2 SITE SAFETY AND HEALTH PLAN 1
1.2.1 Scope 1
1.2.2 Objective 2
1.3 SSHP APPROVAL AND COMPLIANCE BY SITE PERSONNEL 2
1.4 CHANGES TO THE APPROVED SSHP 3
1.5 REGULATIONS AND REFERENCES 4

2.0 SITE DESCRIPTION AND CONTAMINANT CHARACTERIZATION 6
2.1 RVAAP LOCATION AND HISTORY 6
2.1.1 RVAAP Location 6
2.1.2 RVAAP History 7
2.2 SITE CLIMATE 9
2.3 PROJECT TASKS 10
2.4 CONTAMINATION CHARACTERIZATION 10

3.0 HAZARD ANALYSIS AND RISK ASSESSMENT 13
3.1 INTRODUCTION AND GENERAL REQUIREMENTS 13
3.2 CHEMICAL HAZARDS 14
3.2.1 Exposure Standards 14
3.2.2 Risks of Exposures to On-site Chemicals 14
3.2.3 Risk of Exposures Task Related Chemicals 14
3.3 PHYSICAL HAZARDS 15
3.4 BIOLOGICAL HAZARDS 16

4.0 SAFETY & HEALTH ORGANIZATION & RESPONSIBILITIES 17
4.1 GENERAL STAFF INFORMATION 17
4.2 PIKA PROGRAM MANAGER 17
4.3 PROJECT MANAGER (PJM) 17
4.4 CORPORATE SAFETY AND HEALTH MANAGER (CESHM) 18
4.5 SITE SUPERVISOR/SENIOR UXO SUPERVISOR 19
4.6 UNEXPLODED ORDNANCE SAFETY OFFICER 19
4.7 GENERAL SITE PERSONNEL 20
4.8 SUBCONTRACTORS 21

5.0 TRAINING 23
5.1 GENERAL INFORMATION 23
5.2 CFR 1910.120 TRAINING REQUIREMENTS 23
5.2.1 40-Hour General Site Worker Training 23
5.2.2 24-Hour Occasional Site Worker Training 23
5.2.3 Three-Day On-Site Training 23

5.2.4 8-Hour Annual Refresher Training 24
5.2.6 Supervisor and Management Training 24
5.3 SITE-SPECIFIC AND HAZARD INFORMATION TRAINING 25
5.3.1 Site-Specific Information Training 25
5.3.2 Hazard-Specific Information Training 25
5.4 VISITOR TRAINING 26
5.4.1 General Requirements for All Site Visitors 26
5.4.2 Visitors Remaining Outside the Exclusion Zone (EZ) 26
5.4.3 Visitors Entering the Exclusion Zone (EZ) 27
5.5 FIRST AID AND CARDIOPULMONARY RESUSCITATION TRAINING 27
5.6 BLOODBORNE PATHOGEN TRAINING 27
5.7 HAZARD COMMUNICATION TRAINING 28
5.8 FIRE EXTINGUISHER TRAINING 28
5.9 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT) 28
5.10 DAILY SAFETY MEETINGS 28
5.10.1 Daily Safety Briefing 29
5.10.2 Daily Safety Observer Report 29
5.11 WEEKLY SAFETY BRIEFING 29
5.12 ADDITIONALLY REQUIRED OSHA TRAINING 29
5.13 DOCUMENTATION OF OSHA TRAINING 30

6.0 PERSONAL PROTECTIVE EQUIPMENT PROGRAM 31
6.1 USE OF ENGINEERING CONTROLS 31
6.2 GENERAL REQUIREMENTS 31
6.3 HAZARD-SPECIFIC AND TASK-SPECIFIC PPE SELECTION 32
6.4 PPE ASSOCIATED WITH VARIOUS PPE LEVELS 32
6.4.1 Level D PPE 32
6.5 PPE TRAINING 33
6.6 ACTION LEVELS FOR UP/DOWN GRADING PPE 33
6.7 PPE INSPECTION, MAINTENANCE AND STORAGE 33
6.8 EMERGENCY RESPONSE EQUIPMENT 34

7.0 MEDICAL SURVEILLANCE 35
7.1 PURPOSE AND SCOPE 35
7.2 GENERAL REQUIREMENTS 35
7.3 PHYSICIANS STATEMENT 35
7.4 MEDICAL SURVEILLANCE EXAMINATIONS 35
7.4.1 Pre-Assignment Health Assessment 36
7.4.2 Supplemental Examination 36
7.4.3 Follow-up Health Assessments 36
7.5 EMERGENCY AND NON-EMERGENCY MEDICAL TREATMENT 36
7.5.1 Treatment of Minor Injuries 37
7.5.2 Treatment of Serious Injuries 37

8.0 SITE AND PERSONNEL MONITORING PLAN 38
8.1 GENERAL 38
8.2 PERSONAL MONITORING REQUIREMENTS 38
8.2.1 Real-Time Direct-Reading Monitoring 38
8.2.2 Integrated Breathing Zone Sampling 38
8.3 MONITORING SCHEDULE AND FREQUENCY 39
8.4 TEMPERATURE EXTREME MONITORING 39
8.5 NOISE MONITORING PROCEDURES 40
8.6 MONITORING EQUIPMENT CALIBRATION AND MAINTENANCE 40

9.0 HEAT AND COLD STRESS 41

10.0 ESHPS, ENGINEERING CONTROLS, AND WORK PRACTICES 42
10.1 GENERAL 42
10.2 ENGINEERING CONTROLS 43
10.3 SITE RULES / PROHIBITIONS 43
10.3.1 Buddy System Procedures 43
10.3.2 Eating, Drinking, and Smoking Restrictions 43
10.3.3 Standing Site Rules 44
10.4 MATERIAL HANDLING PROCEDURES 46
10.5 HOT WORK AND FIRE PROTECTION/PREVENTION 46
10.5.1 Hot Work Practices 46
10.5.2 Causes of Fires and Explosions 47
10.5.3 Fire Prevention 47
10.5.4 Fire Protection 47
10.6 ELECTRICAL SAFETY PROCEDURES 47
10.7 EXCAVATION AND TRENCHING SAFETY 48
10.8 MACHINERY GUARDING 48
10.9 LOCKOUT / TAGOUT 49
10.10 FALL PROTECTION 50
10.11 HAZARD COMMUNICATION 50
10.12 ILLUMINATION 50
10.13 SANITATION 50
10.13.1 Water Supply 50
10.13.2 Toilet Facilities 51
10.13.3 Washing Facilities 51
10.13.4 Site Housekeeping 51
10.14 SIGNS AND LABELS 52
10.15 POWER AND HAND-TOOL OPERATION 52
10.16 BIOLOGICAL HAZARDS 52
10.17 USE OF PRODUCTS CONTAINING HAZARDOUS MATERIALS 53
10.18 DAILY AND WEEKLY SAFETY INSPECTIONS 53
10.19 PERIODIC CORPORATE SAFETY AND HEALTH INSPECTIONS 54

11.0 SITE CONTROL 55
11.1 CENTER OF OPERATIONS 55
11.2 SECURITY PROCEDURES 55
11.3 SITE MAPS 55
11.4 SITE COMMUNICATIONS 55
11.5 BUDDY SYSTEM 56

12.0 PERSONNEL/EQUIPMENT DECONTAMINATION AND HYGIENE 57
12.1 PERSONNEL HYGIENE AND DECONTAMINATION 57
12.1.1 Level D Decontamination 57
12.2 EQUIPMENT HYGIENE 57

13.0 EQUIPMENT DECONTAMINATION 58

14.0 EMERGENCY EQUIPMENT AND FIRST AID 59

15.0 EMERGENCY RESPONSE AND CONTINGENCY PLAN 61
15.1 INTRODUCTION 61
15.2 PRE-EMERGENCY PLANNING 61
15.2.1 Identification of Potential Emergencies 61
15.2.2 Identification/Coordination of Emergency Services 62
15.2.3 Initial Incident Reporting Procedures 62
15.3 PERSONNEL ROLES, AUTHORITY AND COMMUNICATIONS 62
15.3.1 SUXOS 62
15.3.2 UXOSO 63
15.3.3 On-Site Emergency Response Personnel 63
15.3.4 Off-Site Emergency Response Services 63
15.3.5 Communications 64
15.4 POSTED INSTRUCTIONS AND EMERGENCY CONTACTS 65
15.4.1 Emergency Fire Recognition and Prevention 65
15.4.1.1 Small Fires 65
15.4.1.2 Large Fires 66
15.4.2 Inclement Weather 66
15.5 CRITERIA AND PROCEDURES FOR SITE EVACUATION 67
15.5.1 Emergency Alerting Procedures 67
15.5.2 Employee Alarm System 68
15.5.3 Evacuation Routes and Assembly Points 68
15.5.4 Site Security and Control During Emergencies 69
15.6 EMERGENCY PPE AND EQUIPMENT 69
15.6.1 General Requirements 69
15.6.2 Portable Fire Extinguishers 69
15.6.3 First Aid Kit Requirements 70
15.6.4 Eye Washes 71
15.7 DECONTAMINATION AND TREATMENT OF INJURED PERSONNEL 71
15.7.1 General 71

15.7.2 Assessing the Emergency 71
15.7.3 Rescue and Response Actions 72
15.7.4 Treatment of Injured/Ill Personnel 73
15.7.5 Post-Emergency Follow-up 74
15.7.6 Documentation 75
15.8 ROUTE MAPS TO MEDICAL TREATMENT FACILITY 75
15.8.1 General Instructions 75
15.8.2 Directions to the Designated Medical Facility 76
15.9 COMMUNITY ALERT PROGRAM 78
15.10 SPILL CONTAINMENT 79
15.10.1 Spill Response Supplies 79
15.10.2 Spill Response 79

16.0 LOGS, REPORTS AND RECORDKEEPING 81
16.1 SAFETY LOG 81
16.2 INJURY/ILLNESS/ACCIDENT REPORTS 81
16.3 TRAINING LOG 81
16.4 VISITOR LOG 82

LIST OF FIGURES AND TABLES

Table 1: Weather Data 9

Table 2: Type of Contaminants 11

Table 3: Occupational Exposure & Toxicological Properties for Contaminants with Occupational Health Concerns 12

Figure 1: Safety and Health Chain of Command 22

Table 4: Task-Specific PPE Assignments 32

Table 5: Site Monitoring Schedule and Action Levels 39

Table 6: General Site Rules and Prohibitions 45

Table 7: Work Zone Rules and Prohibitions 45

Table 8: Emergency Equipment Requirements 60

Table 9: Emergency Telephone Numbers 64

LIST OF ACRONYMS

ºF	Degrees Fahrenheit
ACGIH	American Conference of Governmental Industrial Hygienists
AHA	Activity Hazard Analysis
ALS	Advanced Life Support
APP	Accident Prevention Plan
BBP	Bloodborne Pathogens
BEIs	Biological Exposure Indices
BLS	Basic Life Support
BZ	Breathing Zone
CELRL	USACE - Louisville District, Louisville, Kentucky
CFR	Code of Federal Regulations
COR	Contracting Officer's Representative
CPR	Cardiopulmonary Resuscitation
CESHM	Corporate Environmental Safety and Health Manager
CESHP	Corporate Environmental Safety and Health Program
CSIT	Corporate Safety Inspection Team
CSP	Certified Safety Professional
DDESB	Department of Defense Explosive Safety Board
DoD	Department of Defense
EC	Emergency Coordinator
EM	Engineering Manual
EMM	Earth-Moving Machinery
EMS	Emergency Medical Service
EMT	Emergency Medical Technician
ER	Engineering Regulation
ESHP	Environmental Safety and Health Procedure
EZ	Exclusion Zone
FM	Facility Manager
ft	Feet
GFCI	Ground-Fault Circuit Interrupters
GOCO	Government-Owned Contractor Operated

HAZCOM	Hazard Communication
HAZWOPER	Hazardous Waste Operations and Emergency Response
HTRW	Hazardous Toxic and Radiological Waste
IAW	In Accordance With
IRP	Installation Restoration Program
LO/TO	Lockout/Tagout
LL	Load Line
MC	Munitions Constituents
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MI	Multi-Increment
mm	Millimeter
MSDS	Material Safety Data Sheet
MSP	Medical Surveillance Program
NGB	National Guard Bureau
NIOSH	National Institute for Occupational Safety and Health
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
OSHA	Occupational Safety and Health Administration
PIKA	PIKA International, Inc.
PjM	Project Manager
PM	Program Manager
PPE	Personal Protective Equipment
RVAAP	Ravenna Army Ammunition Plant
SOW	Scope of Work
SS	Site Supervisor
SSHP	Site Safety and Health Plan
SSHO	Site Safety and Health Officer
SUXOS	Senior UXO Supervisor
SWP	Safe Work Practices
SZ	Support Zone
TLVs	Threshold Limit Values
TP	Technical Paper

TWA	Time Weighted Average
UL	Underwriters Laboratories
USACE	U.S. Army Corps of Engineers
USP&FO	United States Property and Fiscal Officer
UXO	Unexploded Ordnance
UXOSO	UXO Safety Officer
WP	Work Plan
WZ	Work Zone

1.0 PIKA CORPORATE SAFETY AND HEALTH PLAN

1.1 GENERAL

PIKA International, Inc. (PIKA) corporate policy requires the use of all feasible hazard controls when there is a potential for personnel to be exposed to chemical, physical, or biological hazards. To implement this policy, PIKA has developed and implemented a comprehensive Corporate Environmental Safety and Health Program (CESHP). This program has been designed and developed by PIKA's full-time Corporate Environmental Safety and Health Manager (CESHM) with the support and consultation of PIKA's environmental management personnel. The PIKA CESHP was developed to comply with the requirements of the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) standards found in 29 Code of Federal Regulations (CFR) 1910.120 and 29 CFR 1926. The PIKA CESHP not only meets the requisite OSHA requirements, but also meets the applicable requirements of the standards, regulations, and references listed in section 1.5.

1.2 SITE SAFETY AND HEALTH PLAN

1.2.1 Scope

This Site Safety and Health Plan (SSHP) was developed for the field activities associated with the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops in the former Ravenna Army Ammunition Plant (RVAAP), Ravenna, Ohio. The Accident Prevention Plan (APP) to which this SSHP is attached will be the overall safety and health management document of the project while this SSHP will present more of the site specific data associated with the Scope of Work (SOW).

The tasks involved with the site investigation at the RVAAP Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops area are discussed briefly in section 2.0 of the Work Plan (WP) and the Activity Hazard Analysis (AHA's) form for each site task with potential hazards that would require the use of engineering controls,

administrative controls, or personal protective equipment (PPE) to minimize worker exposure is presented in Attachment 2 of the APP. All site personnel are required to read the PIKA SSHP in order to familiarize themselves with the tasks to be completed under this project.

1.2.2 Objective

The primary objective of this SSHP is to provide PIKA with an effective tool for the anticipation, identification, evaluation, control, and/or elimination of recognized or potential safety and health hazards anticipated with this project. The secondary objective of this SSHP is to provide PIKA with an effective communication medium for providing site personnel task-specific and site-specific hazard information, as well as hazard control information they will use to mitigate or eliminate the risks of exposure to site and task hazards. Contingency plans and emergency response procedures have been developed for emergencies that may reasonably occur and are presented in this SSHP.

1.3 SSHP APPROVAL AND COMPLIANCE BY SITE PERSONNEL

All PIKA, subcontractor, and Government personnel involved in this project are required to read this document prior to participation in any on-site tasks that involve potential exposure to safety or health hazards. Questions related to the information in this SSHP will be addressed to, and resolved by, the PIKA Site Safety and Health Officer (SSHO), who will also meet the requirements for Unexploded Ordnance (UXO) Safety Officer (UXOSO) for this site, with consultation from the CESHM if needed. The SSHO will be referred to as UXOSO throughout this document for consistency.

After reading this SSHP, site personnel will complete the PIKA SSHP Review and Approval Form contained in Attachment 4 of the APP, indicating their understanding of, and willingness to comply with, the requirements in this SSHP. All site personnel will exercise caution at all times and will immediately report to the UXOSO any site conditions which may pose a safety or health hazard.

It is the responsibility of each manager, supervisor, individual employee and subcontractor to take notice of any unsafe situations and report them immediately so that proper action can be taken to eliminate them. Additionally, it is the responsibility of each employee to keep their personal safety and the safety of all site personnel uppermost in their mind at all times. Unsafe working habits, horseplay, etc., which could endanger the health and safety of others will not be tolerated. Disciplinary action up to, and including, termination will result from such actions.

1.4 CHANGES TO THE APPROVED SSHP

The levels of PPE and the safe work practices (SWPs) specified in this plan are based on the best available information from archival data, anticipated site conditions, and professional experience gained from operations PIKA has performed previously at Ravenna. It is understood that this SSHP is a living document, and the actual site tasks may require changes in PPE, monitoring, SWPs, or other elements of the SSHP. As such, this SSHP includes provisions for changing the levels/types of PPE used and monitoring procedures. These pre-approved changes are based upon anticipated site conditions and will be used only if applicable action levels and conditions are met and documented. Requests to downgrade or upgrade PPE or monitoring requirements will be made by the UXOSO to the CESHM and may be implemented once the PIKA CESHM has provided written approval.

If a previously un-assessed task is identified, or a proposed change requires a written revision of the SSHP, the Project Manager (PjM) will submit a written request for change to the PIKA CESHM with attached documentation. Approved changes to the SSHP and the modified pages of the SSHP will be forwarded to the Senior Unexploded Ordnance (UXO) Supervisor (SUXOS)/Site Supervisor (SS) and PjM upon approval by the CESHM. Notification and update pages will be sent to all stakeholders. If a proposed change involves the addition of a previously un-assessed task or significantly impacts the safety of on-site personnel, off-site personnel, or the environment, a written request for approval will be submitted to the U.S. Army Corps of Engineers – Louisville District (CELRL), Louisville, Kentucky.

Changes of this nature will not be allowed until written approval of CELRL Contracting Officer's Representative (COR) has been received and the SSHP updated.

1.5 REGULATIONS AND REFERENCES

The applicable sections of the regulations and references listed below will be used in conjunction with this SSHP to ensure the safety and health of on-site personnel and the local community:

- RVAAP Facility-Wide Health and Safety Plan (USACE 2001a).
- Current versions of the OSHA General Industry (29 CFR 1910) and Construction Standards (29 CFR 1926).
- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs®) and Biological Exposure Indices (BEIs®) for 2010.
- National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards, No. 2005-151.
- The PIKA CESHP (this document will be on-site and available to site personnel during the project).
- Department of Defense (DoD) 6055.09-STD, *DoD Ammunition and Explosives Safety Standards*.
- Safety and Health Requirements Manual, US Army Corps of Engineers EM385-1-1, 15 September 2008.
- USACE Engineering Regulation (ER) 385-1-95, Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations, 30 March 2007.
- USACE EM 385-1-97, Explosives Safety and Health Requirements Manual.
- USACE, EM 1110-1-4009, *Military Munitions Response Actions*.

- NIOSH/OSHA/USCG/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. (DHHS (NIOSH) Publication No. 85-115).
- OSHA 29 CFR 1910.120, Hazardous Waste Operations Emergency Response (HAZWOPER)
- Occupational Safety and Health Guidance Manual for Hazardous Waste Activities (NIOSH/OSHA/US Geological Survey/EPA).
- Department of Defense Explosive Safety Board (DDESB) Technical Paper (TP) 16, *Methodologies for Calculating Primary Fragment Characteristics*.
- DDESB TP-18 *Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel*.

2.0 SITE DESCRIPTION AND CONTAMINANT CHARACTERIZATION

2.1 RVAAP LOCATION AND HISTORY

2.1.1 RVAAP Location

When the RVAAP Installation Restoration Program (IRP) began in 1989, the RVAAP was identified as a 21,419 acre installation. The property boundary was resurveyed by the Ohio Army National Guard (OHARNG) over a two year period (2002 and 2003) and the actual total acreage of the property was found to be 21,683 acres. As of February 2006, a total of 20,403 acres has been transferred to the National Guard Bureau (NGB) and subsequently licensed to the OHARNG for use as a military training site known as Camp Ravenna. The current RVAAP consists of 1,280 acres scattered throughout Camp Ravenna.

Camp Ravenna is in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 kilometers (3 miles) east northeast of the city of Ravenna and approximately 1.6 kilometers (1 mile) northwest of the city of Newton Falls. The RVAAP portions of the property are solely located within Portage County. Camp Ravenna/RVAAP is a parcel of property approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garret, McCormick, and Berry roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east. Camp Ravenna is surrounded by several communities: Windham on the north; Garrettsville 9.6 kilometers (6 miles) to the northwest; Newton Falls 1.6 kilometers (1 mile) to the south east; Charlestown to the southwest; and Wayland 4.8 kilometers (3 miles) to the south.

When RVAAP was operational, Camp Ravenna did not exist and the entire 21,683-acre parcel was a government-owned contractor operated (GOCO) industrial facility. The RVAAP IRP encompasses investigation and cleanup of past activities over the entire 21,683 acres of the former RVAAP, references to the RVAAP in this document

are considered to be inclusive of the historical extent of RVAAP, unless otherwise specifically stated.

2.1.2 RVAAP History

Production at the facility began in December 1941 with the primary missions of depot storage and ammunition loading. The installation was divided into two separate units - the Portage Ordnance Depot and the Ravenna Ordnance Plant. The Portage Ordnance Depot's primary mission was storage of munitions and components, while the mission of the Ravenna Ordnance Plant was loading and packing major caliber artillery ammunition and the assembly of munitions initiating components that included fuzes, boosters and percussion elements. In August 1943, the installation was re-designated the Ravenna Ordnance Center and again in November 1945 as the Ravenna Arsenal. The plant was placed in standby status in 1950 and operations were limited to renovation, demilitarization and normal maintenance of equipment, along with storage of ammunition and components.

The plant was reactivated during the Korean Conflict to load and pack major caliber shells and components. All production ended in August 1957, and in October 1957 the installation was again placed in a standby condition. In October 1960, the ammonium nitrate line was renovated for demilitarization operations which involved melting explosives out of bomb casings for subsequent recycling. These operations commenced in January 1961. In July 1961, the plant was again deactivated. In November 1961, the installation was divided into the Ravenna Ordnance Plant and an industrial section, with the entire installation then being designated as the RVAAP.

In May 1968, RVAAP began loading, assembling, and packing munitions on three load lines (LLs) and two component lines in support of the Southeast Asia Conflict. These facilities were deactivated in August 1972. The demilitarization of the M71A1 90-millimeter (mm) projectile extended from June 1973 until March 1974. Demilitarization of various munitions was conducted from October 1982 through 1992.

Until 1993, RVAAP maintained the capability to load, assemble and pack military ammunition. As part of the RVAAP mission, the inactive facilities were maintained in a standby status by keeping equipment in a condition to permit resumption of production within prescribed limitations. In September 1993, the RVAAP was placed in inactive caretaker status, and subsequently changed to modified caretaker status. The LLs and associated real estate were determined to be excess by the Army.

A total of 20,403 acres of the former 21,683 acre RVAAP was transferred to the United States Property and Fiscal Officer (USP&FO) for Ohio for use by OHARNG as a military training site. The current RVAAP consists of 1,280 acres in several distinct parcels scattered throughout Camp Ravenna. The RVAAP and Camp Ravenna are co-located on contiguous parcels of property.

CC-RVAAP-80 Area Specific Description

CC-RVAAP-80 consists of the Group 2 Propellant Can Tops area. Propellant can lids or tops were identified on the ground surface/near surface at the southern end of the former Group 2 Ammunition Storage Area. These materials are typically classified as RRD (similar to munitions packaging materials). This site was never used as classified as operational range. It is believed that the discarded propellant can tops might qualify as inert scrap metal.

The propellant can tops located at the south end of Group 2 were initially identified by OHARNG trainees in the winter of 2008. The propellant can tops were observed in the vegetated area located immediately south of the ammunition storage magazines in the vicinity of the southern railroad spur lines. This area consists of approximately 539,572 square ft (12.4 acres).

The site is a low probability site in regard to encountering Munitions and Explosives of Concern (MEC). Therefore, only Munitions and Explosives of Concern (MEC) construction support will be needed for the project. However, if prior to this project or during any phase of this project MEC are found at the site, the project may be

stopped and the site will need to be re-evaluated and potentially assigned a new probability rating.

RVAAP- 09 Load Line 2 Specific Description

Former excavation activities conducted at Load Line 2 (RVAAP -09) have resulted in the accumulation of water within the building DB-802 footprint. Restoration activities are now planned at this location, and the accumulated water needs to be removed from the excavation to assist in the restoration of the site.

NOTE: As per the requirements of the SOW, the water removal services are to coincide with the BRACD contractor's schedule. To that end, the water removal services were conducted by PIKA from May 3, 2010 through May 18, 2010 to facilitate the June 2010 restoration activities at LL2 building 802. All water removal services were conducted in accordance with Ohio EPA requirements. A copy of the Ohio EPA e-mail correspondence relative to approval for discharging the surface water to ground surface is provided in Appendix G.

2.2 SITE CLIMATE

Table 1 gives a summary of the area climate data including the average monthly temperature highs and lows, along with monthly temperature record highs and lows. Average monthly precipitation is also presented. Due to its location in northeast Ohio, the climate is relatively moderate, but can be severe at times.

TABLE 1: WEATHER DATA

Month	Avg. High	Avg. Low	Mean	Avg. Precip.	Record High	Record Low
January	31°F	15°F	23°F	2.50 inches	71°F (1950)	-25°F (1994)
February	34°F	17°F	26°F	2.40 inches	69°F (1999)	-22°F (1934)
March	45°F	26°F	36°F	3.40 inches	81°F (1986)	-7°F (1901)
April	57°F	36°F	47°F	3.50 inches	87°F (1986)	2°F (1923)
May	69°F	47°F	58°F	3.90 inches	93°F (1911)	24°F (1923)
June	77°F	55°F	66°F	4.00 inches	100°F (1988)	33°F (1966)

July	81°F	60°F	71°F	3.80 inches	101°F (1936)	43°F (1966)
August	79°F	58°F	69°F	3.60 inches	102°F (1918)	38°F (1982)
September	72°F	52°F	63°F	4.00 inches	102°F (1953)	27°F (1915)
October	61°F	41°F	52°F	3.20 inches	88°F (1953)	20°F (1962)
November	48°F	32°F	41°F	3.70 inches	80°F (1961)	-2°F (1929)
December	36°F	21°F	29°F	3.60 inches	73°F (1982)	-15°F (1989)

2.3 PROJECT TASKS

The field tasks listed below are those to which site personnel may be exposed to site and task related safety and health hazards. Additional information related to the physical steps and equipment that will be used to accomplish these tasks is presented in greater detail within Section 2.0 of the project WP. As part of the project training, all site personnel will read the WP and be familiar with the steps.

- Mobilization
- Conduct site preparation to include access surveys, vegetation removal and Geophysical Data Collection
- Accomplish Multi-Increment (MI) surface sampling
- Dewatering
- Site restoration and demobilization

2.4 CONTAMINATION CHARACTERIZATION

The information provided by RVAAP, and PIKA's institutional knowledge of the facility provides PIKA with a means of compiling a summary of hazardous substances and safety and health hazards likely to be encountered during site operations. Hazardous substances are those materials that can threaten human health and/or environmental well being if the substance has been improperly disposed of or uncontrollably released into the environment. This phrase is used to

describe chemical contaminants to which site personnel may be exposed as a result of the release or burial of hazardous wastes capable of causing harm. While the munitions constituents (MC) and Range Related Debris (RRD) that may be encountered during this project may cause minor skin exposure, it is not anticipated that these items will serve as a source of chemical contamination toward personnel. A description of the risk of exposure to the hazardous substances is presented in paragraph 3.2.2.

TABLE 2: TYPE OF CONTAMINANTS

Contaminant of Concern	Concentration Ranges	Media Where Found	Locations Onsite
Propellant: *Nitroglycerine *Nitroguanidine *Nitrocellulose	Trace residual	Within RRD	Throughout the CC-RVAAP-80 Propellant Can Tops Areas
Perchlorate	Trace residual	Within RRD	Throughout the CC-RVAAP-80 Propellant Can Tops Areas
* Note: Constituents possible associated with the propellants on site			

TABLE 3: OCCUPATIONAL EXPOSURE & TOXICOLOGICAL PROPERTIES FOR CONTAMINANTS WITH OCCUPATIONAL HEALTH CONCERNS

CONTAMINANT OF CONCERN	OSHA PEL	ACGIH TLV	ACGIH & OSHA STEL	NIOSH IDLH	IP eV	Vapor Pressure (mm/hg)	Route of Exposure	Symptoms of Exposure
NITROGLYCERINE	2 mg/m^3	0.46 mg/m^3	2 mg/m^3	.1 mg/m^3	NA	.0003	INH, ING, ABS, CON	Throbbing headache, dizziness, nausea, vomit, abdominal pain, hypotension, flush, palpitations, methemoglobinemia, delirium, Central Nervous System depressant/depression, angina, skin irritation
NITROGUANIDINE	NA	NA	NA	NA	NA	.12	INH, ING, ABS, CON	Irritation eyes, skin, Nausea, vomiting, diarrhea, respiratory tract irritation
NITROCELLULOSE	NA	NA	NA	NA	NA	181	INH, ABS, ING, CON	Irritation eyes, skin, headache, asphyxiation, nausea, vomiting, diarrhea, intoxication, nasal/throat irritation
(AMMONIUM) (MAGNESIUM) (POTASSIUM) (SODIUM) (LITHIUM) PERCHLORATES*	NA	NA	NA	NA	NA	NA	INH, ABS, ING, CON	Red eyes, irritation to skin, Diarrhea, difficulty breathing, vomiting, headache

INH=Inhalation ING=Ingestion ABS= Skin Absorption CON=Skin or mucous membrane contact NA=Not applicable or available
*All are commonly used in production of explosives. All share almost identical Health & Safety data information.

3.0 HAZARD ANALYSIS AND RISK ASSESSMENT

3.1 INTRODUCTION AND GENERAL REQUIREMENTS

During the development of this SSHP, all known, or anticipated, chemical, physical, or biological hazards that may pose a threat to the well-being of site personnel have to the greatest extent possible been identified, and the risk of exposure to each has been assessed. The nature of the site and the tasks to be performed, along with the MEC hazards indicate that the overall level of hazard due to exposure to chemical contaminants is low while the risk of exposure to physical hazards is very high.

To ensure the safety and health of site personnel and the public, and to comply with the hazard assessment requirements of the OSHA PPE standard (29 CFR 1910.132(d)), PIKA has generated AHA's form for each site task with potential hazards that would require the use of engineering controls, administrative controls, or PPE to minimize worker exposure. The AHA's for this project are presented in Attachment 2 of the APP. The UXOSO and the team leaders will use the AHA's to brief site personnel on the type and degree of hazard to be expected during site operations and the means to safeguard themselves from the hazards.

The hazard analyses and risk assessments presented in this SSHP have used the best available data. All site personnel must understand that the evaluation of site characteristics and hazards is an ongoing process that will continue throughout the duration of the project. All personnel must be vigilant in recognizing workplace hazards and bring them to the attention of the team leader, the SUXOS, and/or the UXOSO. If changes occur in the level or types of hazards present, the UXOSO will inform the PIKA CESHM of the change. Based upon his evaluation, the CESHM will either modify an existing AHA or develop a separate AHA for the newly introduced task. Any additions to the approved SSHP will be reviewed and approved by the responsible PIKA personnel and submitted to the CELRL Program Manager (PM) for final approval. Once approved, the changes will be added to the WP.

3.2 CHEMICAL HAZARDS

3.2.1 Exposure Standards

To provide optimal protection, the USACE position will be followed and enforced using the criteria on providing protection from exposure through inhalation, ingestion, skin absorption, or physical contact, to any chemical, biological, or physical agent in excess of the acceptable limits specified in the most recently published ACGIH guidelines, "Threshold Limit Values and Biological Exposure Indices," or by OSHA, whatever is more stringent. For the purpose of this site plan, the term used for the most stringent standard is the Occupational Exposure Limit (OEL). In addition, all cases between ACGIH and other standards or regulations the most stringent shall prevail. PIKA will comply with all applicable standards and regulations to reduce contaminants levels As Low As Reasonably Achievable (ALARA).

3.2.2 Risks of Exposures to On-site Chemicals

Project specific tasks are related to conducting a geophysical survey and surface soil sampling operations and MEC discovery is not expected. While the RRD items within CC-RVAAP-80 which personnel could be handling and be exposed to during this project may potentially contain bulk or residues from propellants, the potential for personnel to receive an occupational exposure is believed to be remote. Personnel will wear gloves and conduct operations outdoors in a well ventilated area to further minimize the risk of exposure.

No other chemical hazards to which personnel may be exposed are expected.

3.2.3 Risk of Exposures Task Related Chemicals

Exposure to chemicals may occur during tasks that require the use of products that contain hazardous materials. The products that will be used on-site that contain hazardous materials include: insect repellant, spray paint, explosive demolition

materials, gasoline, and diesel fuel. During the use of these materials, personnel exposures will be controlled and minimized by limiting the quantities that will be used at any one time and using the products in well-ventilated areas. Additionally, the SWPs and PPE outlined in this SSHP will be used as necessary to further reduce or eliminate the potential for personnel exposure to these hazardous materials. If site activities are modified, or if evidence of environmental chemical contamination is found, the potential for chemical exposure will be re-evaluated.

3.3 PHYSICAL HAZARDS

Due to the nature of the planned site operations, the potential and risk for exposure to physical hazards is low for this project. Physical hazards that are anticipated during site operations include:

- Flammable/explosive materials to include, gasoline and diesel fuel.
- Lifting hazards such as back strain, pulled muscles and tendons, pinched/crushed fingers and toes.
- Slip, trip and fall hazards associated with uneven terrain, ground cover, exposed tree/brush stumps, rocks, vegetation growth, and snow and ice accumulation.
- Inclement weather such as heavy rain, thunder/lightning storms, and tornados.
- Exposure to high temperatures and humidity.
- Rusting metal items that are present in the site soils, and other items that may cause cut, scrape, puncture, splinter or laceration injuries.

Site personnel will receive appropriate instructions on the physical hazards associated with operating equipment and tools, and maintenance and hazard control as discussed in the applicable PIKA Environmental Safety and Health Procedures (ESHP's). Site personnel will also be instructed to remain alert to the presence of potential physical hazards and to immediately report any previously unidentified physical hazards to their Team Leader who will notify the UXOSO. The PIKA UXOSO is responsible for evaluating each day's field operations with respect to potential

physical hazards. Any suspect or known physical hazards, and the specific procedures to control them, will be reviewed during the daily safety briefing. Procedures for reducing or eliminating the physical hazards are discussed in section 10.0 of this SSHP.

3.4 BIOLOGICAL HAZARDS

The RVAAP is home to a number of rare and potentially dangerous fauna and flora. When the weather becomes warm, the biological hazards anticipated for this project include: stinging insects like bees, wasps and hornets; ticks; mosquitoes; chiggers; spiders; and, poisonous plants, such as poison ivy, oak and sumac. Employee awareness and the SWPs outlined in section 10.0 and the PIKA Biological Hazards ESHP-503 in Attachment 3 will be used to reduce, or eliminate, the risks associated with these hazards.

4.0 SAFETY & HEALTH ORGANIZATION & RESPONSIBILITIES

4.1 GENERAL STAFF INFORMATION

Personnel that may be exposed to on-site safety or health hazards are subject to, and will comply with this SSHP. At no time will site personnel conduct tasks or operations in a manner that conflicts with the safety, health, or environmental precautions expressed in this SSHP. Ensuring site safety is a joint effort promoted by all site personnel; however, the personnel listed in sections 4.2 through 4.6 have been given key safety-related responsibilities and are part of the on-site safety and health chain of command. The project safety and health organizational chart is presented in Figure 1.

4.2 PIKA PROGRAM MANAGER

PIKA Program Manager (PM), Ms. Kathleen Anthony is ultimately responsible for the safety and health of all PIKA personnel and for ensuring the integration of safety and health practices into every facet of PIKA's business practices. It is PIKA's fundamental belief that the safety and health of each worker is paramount to all other aspects of conducting work, and the responsibility for safety and health starts with the PIKA PM and flows through PIKA PjM's to the site personnel. This owner and management "buy-in" to safety and health sets the standard for all PIKA employees.

4.3 PROJECT MANAGER (PJM)

The Project Manager (PjM) for this project will be Brian Stockwell who is responsible for the successful performance of the project. To achieve success, this project must be completed in a safe and healthful manner. Therefore, as related to safety and health, the PjM will:

- Manage and provide the funding, man power, and equipment resources needed to safely conduct site operations.
- Review this SSHP and have a thorough understanding of its requirements.
- Furnish copies of the WP and SSHP to site personnel for their review.
- Coordinate with the CESHM to ensure that all anticipated project-specific safety and health issues have been addressed in this SSHP.
- Coordinate the assignment of subcontractors and ensure that subcontractor personnel and equipment meet the requirements of the WP and SSHP.
- Consult and support the PIKA SUXOS regarding safety and health issues.
- Coordinate with the CESHM to ensure site compliance with the SSHP and the PIKA CESHP.
- Communicate with the RVAAP Facility Manager (FM) regarding site and task hazards that could impact safe site operations.

4.4 CORPORATE SAFETY AND HEALTH MANAGER (CESHM)

The PIKA CESHM is Joseph Frydenger, a board Certified Safety Professional (CSP) with experience in industrial hygiene, safety, and hazardous waste. Mr. Frydenger has completed the OSHA HAZWOPER Hazardous Materials Technician and supervisor training requirements in accordance with (IAW) 29 CFR 1910.120. He will provide occupational safety and health technical support to the UXOSO and other project personnel. As the CESHM, he will:

- Report directly to the PIKA President regarding safety and health issues.
- Develop, approve, and seal this SSHP.
- Coordinate with the PIKA UXOSO for field implementation of this SSHP.
- Communicate and consult with the PM, SUXOS, and UXOSO.
- Evaluate and authorize any changes to this SSHP.
- Conduct, or assist in the presentation of, site, task and hazard-specific training.
- Directly interface with, and relay safety and health concerns to the CELRL PM.

- Conduct periodic site safety and health audits.
- Ensure site and personnel compliance with the PIKA CESHP.

4.5 SITE SUPERVISOR/SENIOR UXO SUPERVISOR

The Site Supervisor (SS) for this project will also meet the requirements of DDESB Technical Paper (TP) 18 for Senior UXO Supervisor (SUXOS), and will be referred to as SUXOS throughout this document for consistency. The SUXOS for this site will be Mr. Melvin Lau. Mr. Lau has completed the OSHA 40-hour HAZWOPER site worker and refresher training, and the 8-hour Supervisor/Manager training requirements IAW 29 CFR 1910.120. Mr. Lau will be responsible for the on-site management of all PIKA field operations. As the SUXOS, Mr. Lau will:

- Ensure the safety and health issues have been addressed in the SOW.
- Consult and coordinate with the PjM for the implementation of site tasks and coordinate with subcontractors regarding schedule and contract requirements.
- Schedule and present the operational portion of the daily safety briefing.
- Enforce compliance with this SSHP and the WP.
- Maintain copies (onsite) of current training certificates.
- Act as the lead technical consultant for all on-site MEC related matters.

4.6 UNEXPLODED ORDNANCE SAFETY OFFICER

The UXOSO for this project will be Mr. Lew Kovarik who will be responsible for the on-site implementation of the safety and health requirements presented in this SSHP. Mr. Kovarik has completed the OSHA 40-hour HAZWOPER site worker and refresher training, the 30-Hour OSHA Occupational Safety for the Construction Industry or equivalent and the 8-hour Supervisor/Manager training requirements IAW 29 CFR 1910.120 and is trained and certified in first aid and cardiopulmonary resuscitation (CPR). Additionally, as the UXOSO, Mr. Kovarik will meet the training and experience requirements outlined in DDESB TP-18. To ensure on-site safety and health, the UXOSO will:

- Initiate and authorize a "Stop Work" order for any imminent safety or health concerns.
- Implement and enforce the requirements outlined in this SSHP.
- Conduct the safety portion of the daily safety briefings.
- Conduct and document site training related to site-specific hazards.
- Specify proper levels of PPE IAW the requirements of this SSHP.
- Implement and enforce the PIKA Alcohol/Drug Abuse Policy.
- Investigate injuries, illnesses, accidents, incidents, and near misses.
- Conduct visitor orientation, daily safety inspections, and weekly safety audits.
- Ensure field implementation of the PIKA CESHP.
- Manage and maintain on-site safety documentation as required

4.7 GENERAL SITE PERSONNEL

It is the responsibility of all personnel assigned to the site to ensure safe and healthful conduct of site operations. Therefore, all project personnel involved in site activities will:

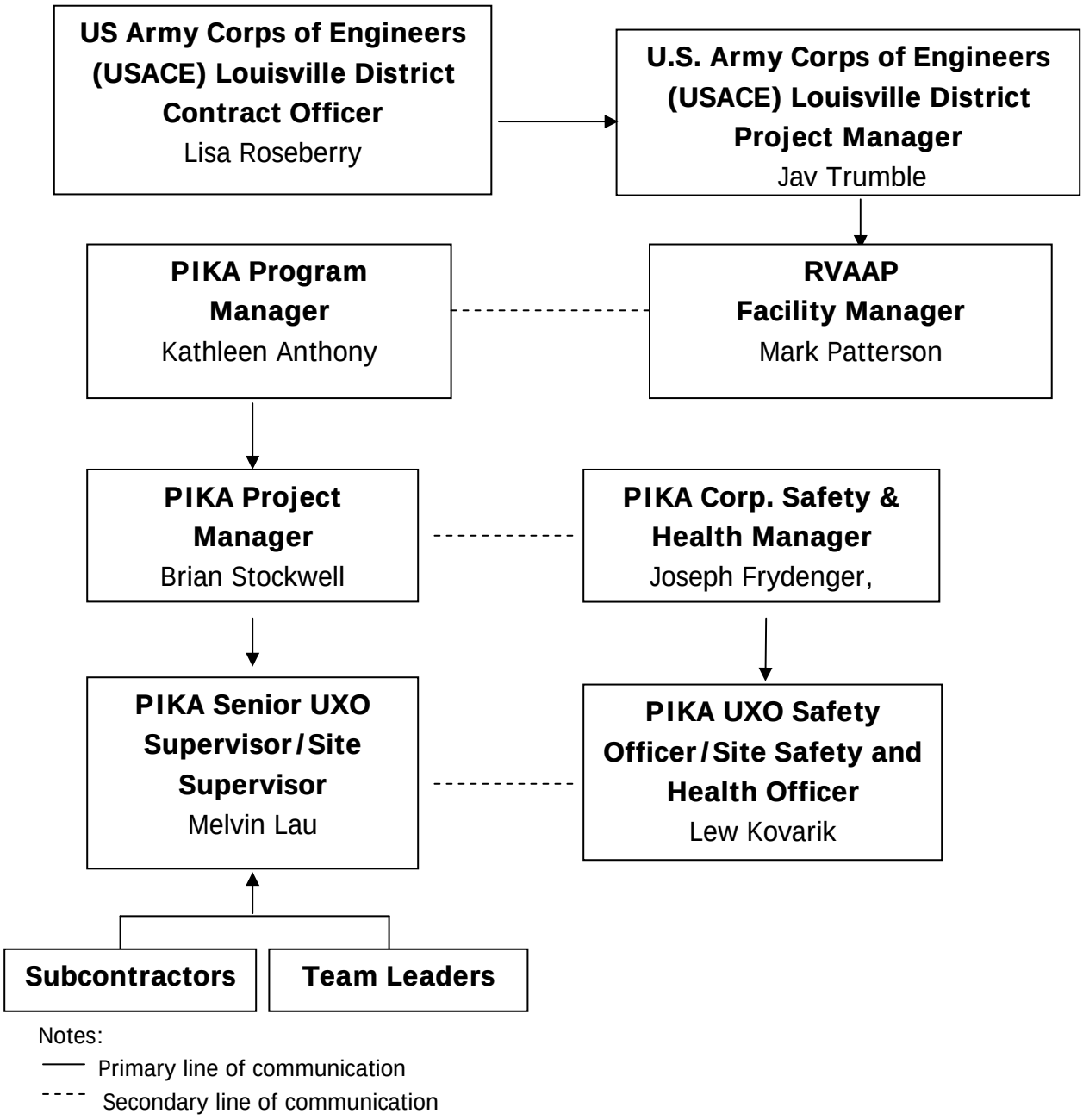
- Comply with this SSHP and all other required safety and health guidelines.
- Take all necessary precautions to protect themselves and fellow site personnel.
- Remain alert to the presence of potentially harmful conditions/situations and immediately inform the UXOSO of the hazard.
- Perform only those tasks that they can do safely and for which they have received appropriate training.
- Notify the UXOSO of any special medical conditions (i.e., allergies, contact lenses, diabetes) or medications, which could affect their ability to safely perform site operations.
- Prevent the spillage and splashing of environmentally hazardous materials.
- Practice good housekeeping by keeping the work area neat, clean, and orderly.

- Report all injuries immediately, no matter how minor, to the UXOSO.
- Maintain equipment in working order and report defects to the UXOSO.
- Inspect and use the PPE required by the SSHP or the UXOSO.

4.8 SUBCONTRACTORS

Any subcontractors working for PIKA on this project site will be responsible for providing site personnel who have read, understand, and will comply with this SSHP, as well as the subcontractors' own project plans. The subcontractor must provide documentation that the personnel assigned to the project have the training and medical surveillance required by this SSHP. The subcontractor will also be responsible for providing equipment that is in good repair, safe for operations, and free from any obvious hazards.

FIGURE 1: Safety and Health Chain of Command



5.0 TRAINING

5.1 GENERAL INFORMATION

All personnel regularly entering the project site must successfully complete the training required in this section prior to participation in assigned site operations. Documentation of the training will be maintained at the PIKA corporate office and the PIKA field office. Copies of the training certificates for the PIKA personnel assigned to this project are provided in Attachment 5 of this document.

5.2 CFR 1910.120 TRAINING REQUIREMENTS

5.2.1 40-Hour General Site Worker Training

All site workers (including Occasional Site Workers) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40-hours of HAZWOPER training. Copies of the training certificates will be maintained in the office trailer at the site, and supplied to Vista (RVAAP's Operating Contractor).

5.2.2 24-Hour Occasional Site Worker Training

Workers regularly on-site who work in areas where exposure potentials have been assessed and determined to be under permissible or published exposure limits and who will not be required to use respiratory protection shall have received a minimum of 24-hours of HAZWOPER training. To qualify for this level of training, the areas where these personnel work should not pose a threat of exposure to health hazards or the possibility of an emergency developing. Copies of the training certificate will be maintained in the office trailer at the site, and supplied to Vista (RVAAP's Operating Contractor).

5.2.3 Three-Day On-Site Training

All PIKA on-site and subcontractor personnel will receive a minimum of three days of on-site field experience under the direct supervision of a trained, experienced supervisor. This training will be to familiarize site personnel with the site-specific organization, PPE, and emergency response procedures. The three-day on-site training is site-specific and will be documented using the Three-day On-site Training Form (Attachment 4). The UXOSO will complete and maintain this form and will ensure that all personnel receive this training and sign the form.

5.2.4 8-Hour Annual Refresher Training

All PIKA and subcontractor personnel who have attended the 40-hour or 24-hour HAZWOPER course will receive a minimum of eight-hours of refresher training annually. This training will cover relevant topics from the 40-hour HAZWOPER and the eight-hour management/supervisor courses, as well as critiques of any incidents that have occurred in the past year and other related topics. Training records will be maintained at the site trailer and supplied to Vista (RVAAP's Operating Contractor).

5.2.5 30-Hour OSHA Construction Safety

The UXOSO will have received the 30-hour OSHA Occupational Safety for the Construction Industry or equivalent as specified in EM 385-1-1. He will maintain competency through 24 hours of formal safety and health related coursework every four years.

5.2.6 Supervisor and Management Training

Managers and other personnel who are directly responsible for the performance of hazardous waste operations, or who directly supervise on-site personnel, will have received the 40-hour HAZWOPER training and shall also have eight additional hours of specialized supervisory training as specified in 29 CFR 1910.120(e).

5.3 SITE-SPECIFIC AND HAZARD INFORMATION TRAINING

5.3.1 Site-Specific Information Training

Site-specific training will provide personnel with important information related to site operations. This training will be included in the three-day on-site training requirements outlined in section 5.2.3, and cover the following site-specific training topics:

- Site history and background.
- Site organization and chain of command.
- Proper use, maintenance and cleaning of required PPE.
- Emergency response procedures, assignments, and contacts.
- Facility-specific requirements.

5.3.2 Hazard-Specific Information Training

Hazard-specific information training will be presented using the PIKA Hazard Information Program that meets the requirements specified in 29 CFR 1910.120 (i). This training will be presented to all personnel involved in site operations and will inform personnel about the degree, nature, and level of exposure likely to occur as a result of participation in site activities. This training will cover the following topics:

- Physical and toxicological properties of any hazardous materials expected to be found on-site.
- Physical hazards associated with site operations, including those hazards listed for the site tasks as outlined in AHA's (Attachment 2).
- Biological hazards that may be encountered on-site including identification and protective methods and what to do if exposure occurs.
- SWPs and other hazard control techniques used to minimize exposure.

5.4 VISITOR TRAINING

Site visitors are defined as persons who: (1) are not employed at the project site; (2) do not routinely enter restricted work areas; and (3) spend short periods at the site (i.e., 1 to 2 days per visit). Site visitors may include client personnel, PIKA personnel, commercial vendors, auditors or inspectors from Federal, State, or Local regulatory agencies, or political representatives. It is the responsibility of all site personnel to maintain a watch for visitors approaching the site and immediately notify the SUXOS or UXOSO of the presence of the visitor. Visitors are required to comply with the general requirements listed in section 5.3 and will meet the appropriate requirements specified below depending upon the part of the site they will be visiting.

5.4.1 General Requirements for All Site Visitors

Regardless of the purpose of the site visit or the control zones to be entered, the following requirements will apply to all site visitors prior to their entry into the site:

- The PIKA UXOSO and SUXOS will be notified of the nature/duration of the visit.
- The RVAAP FM or Office Manager will be notified in advance of any visit. The SUXOS will provide the information to the RVAAP security personnel.
- Visitors will sign in the Visitor Log by recording their names, date of visit, and the name of the company or agency represented.
- A PIKA representative will escort site visitors while in the area.
- Visitors will comply with the safety/health requirements described below.

5.4.2 Visitors Remaining Outside the Exclusion Zone (EZ)

Visitors wishing to observe site activities from outside the EZ will receive general hazard information training, which incorporates:

- Location and description of potential hazards and risks.
- A short briefing about the chemical hazards found on-site.

- Areas of the site that are closed to visitors.
- The site evacuation plan and emergency procedures.
- Other topics as deemed appropriate.

5.4.3 Visitors Entering the Exclusion Zone (EZ)

Any visitors requesting entry into the EZ will be subject to the same site-specific and hazard information training as specified in section 5.3 of this SSHP. This training will be conducted prior to the visitor entering the EZ. Visitors requesting entry to an EZ will also be required to present documentation of OSHA HAZWOPER training and medical surveillance, consistent with the requirements for the general site employees. Visitors must be escorted by qualified personnel while in the EZ, and no more than two visitors will be permitted in the EZ at any given time.

5.5 FIRST AID AND CARDIOPULMONARY RESUSCITATION TRAINING

At least two full-time PIKA site employees will be trained and certified in first aid and CPR. The UXOSO will be one of the two site personnel so trained. The training will be equivalent to that provided by the American Red Cross. Once trained, these employees will be given the responsibility of initial first aid response to injured employees whenever other medical support personnel are not immediately available.

5.6 BLOODBORNE PATHOGEN TRAINING

The PIKA first aid-trained personnel are responsible for rendering aid in the event of an injury or accident. The first aid/CPR trained personnel who have a potential for occupational exposure to blood or other potentially infectious body fluids will receive training as outlined in the 29 CFR 1910.1030(g)(2) and the PIKA Bloodborne Pathogens (BBP) ESHP-508 Exposure Control Plan.

A detailed discussion related to the training required prior to personnel using PPE is presented in section 6.6 of this SSHP. It is essential that all site personnel fully

understand the need for the PPE, as well as the limitations and proper care of the PPE.

5.7 HAZARD COMMUNICATION TRAINING

Hazard Communication (HAZCOM) training will be provided for all site personnel who will use products containing hazardous substances. This training complies with the requirements of the OSHA HAZCOM Standard, 29 CFR 1910.1200. This training will be provided upon initial assignment to the site and prior to use of the products containing hazardous substances. Supplemental HAZCOM training will be scheduled and presented whenever a new hazardous substance is introduced into the work area or an employee changes job location where new products are encountered. The requirements for HAZCOM training are outlined in the HAZCOM ESHP-509 presented in Attachment 3 of the APP.

5.8 FIRE EXTINGUISHER TRAINING

All PIKA site personnel will be trained in the general principles of fire extinguisher selection and use, and the hazards associated with incipient-stage fire fighting (i.e., fighting a fire that has just begun). This training will be provided initially and annually thereafter.

5.9 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

All site personnel involved in the use of lockout/tagout (LO/TO) devices for the control of hazardous energy will receive on-site training in the proper implementation of the LO/TO ESHP-521. All training will comply with 29 CFR 1910.147. LO/TO. Training requirements are detailed in the PIKA LO/TO ESHP-521 in Attachment 3 of the APP. Only Qualified personnel will perform LO/TO work.

5.10 DAILY SAFETY MEETINGS

5.10.1 Daily Safety Briefing

Prior to each day's operations, all PIKA and subcontractor personnel who will work within the EZ will be given a safety briefing by the UXOSO. This briefing will identify the anticipated site activities and the potential hazards that could be encountered and will review weather conditions and weather-related hazards; use of safety equipment; emergency notification, evacuation and medical procedures; accident prevention; relevant WP/SSHP topics; lessons learned; and near misses. Documentation related to the Daily Safety Briefing topics and attendance will be maintained on-site.

5.10.2 Daily Safety Observer Report

Each day one PIKA employee will be assigned to present the Daily Safety Observer report for the next day. This person will observe activities that day and note issues of particular safety concern. The Safety Observer report will be given prior to the Daily Safety Briefing to document and present the issues relevant to the day's activities.

5.11 WEEKLY SAFETY BRIEFING

Once per week, (usually Monday) a weekly safety briefing will be presented in addition to the daily safety briefing. This briefing will consist of information about site hazards or general safety/health issues relevant to the site personnel, and will be presented by the UXOSO or a speaker selected by the UXOSO. All site personnel will attend the training, and the UXOSO will document this training on the PIKA Documentation of Training Form (see Attachment 4).

5.12 ADDITIONALLY REQUIRED OSHA TRAINING

Additional OSHA-required training as deemed necessary by the CESHM or UXOSO will be provided. The training may be related to specific chemical contaminants or

task-specific hazards such as heavy equipment, hand-tool operation, specialized PPE, etc.

5.13 DOCUMENTATION OF OSHA TRAINING

All on-site personnel are required to provide documentation or certification of training completion prior to participating in site activities. A copy of all on-site personnel training certificate or documentation will be furnished to the RVAAP operating contractor for records of training. Without appropriate documentation, personnel will be prohibited from entering hazardous areas or engaging in hazardous site activities.

6.0 PERSONAL PROTECTIVE EQUIPMENT PROGRAM

6.1 USE OF ENGINEERING CONTROLS

OSHA 1910.120(g), 1910.132, and 1910.134 requires that whenever occupational exposures to chemical or physical hazards exist at levels in excess of established action levels; the primary objective will be to apply accepted engineering controls. When engineering controls are not available, a reasonable combination of administrative controls (i.e., written safe work practices) and PPE may be used. For this project, the typical engineering controls include machinery guards installed on equipment or tools by the manufacturer. The guards will be removed only for the purposes of equipment maintenance and LO/TO and will be replaced prior to returning the equipment to service.

6.2 GENERAL REQUIREMENTS

All personnel performing operations on-site will be required to use the level of PPE specified in the AHAs found in Attachment 2 of the APP. Additional information on the selection and use of PPE is presented in ESHP-514 of this SSHP. This SSHP makes provisions for use of Level D, and Level C PPE according to the hazards associated with the SOW tasks. The PPE levels will be reassessed and the PIKA CESHM contacted if any of the following events occur:

- Appearance of previously unidentified chemicals or conditions.
- Changes in ambient weather conditions that impact the use of assigned PPE.
- Introduction of new task or change of a previously assigned/evaluated task.

For project tasks assigned after the approval of this SSHP, the PIKA CESHM and the UXOSO, will assess the task hazards, assign the appropriate PPE level, complete AHA's, and forward it to the CO/COR. Upon approval, the new form will be incorporated as an attachment of this SSHP and forwarded to all stakeholders.

6.3 HAZARD-SPECIFIC AND TASK-SPECIFIC PPE SELECTION

Table 4 lists the primary tasks, and when applicable the sub-tasks, that are anticipated for this project. Next to each planned task/sub-task is listed the initial level of PPE to be worn. Modifications to Table 4 may be required and levels of PPE may be changed according to the results of on-site monitoring discussed in section 8.0 of this SSHP. Revisions to this table will only be made upon approval of the PIKA CESHM. Those tasks/subtasks listed have PPE levels assigned and are detailed in the AHA's. These tasks have conditional specifications listed in the AHA's that will be assessed by the UXOSO prior to startup, with the actual PPE level determined by the UXOSO.

TABLE 4: INITIAL TASK-SPECIFIC PPE ASSIGNMENTS

Task To Be Performed	Initial Level of PPE
Mobilization and site set-up / demobilization and site closure	D
Access Surveys	D
Vegetation Removal	D
Geophysical Survey	D
Multi-Increment (MI) Surface Samples	D
Site Restoration	D

6.4 PPE ASSOCIATED WITH VARIOUS PPE LEVELS

6.4.1 Level D PPE

The Level D PPE to be used will consist of the following:

- Work clothes or coveralls (cotton).
- Leather work gloves (to be used whenever hands require protection from cuts and abrasions).
- Chemical protective sampling gloves for soil sampling operations.
- Hard hat (Required when working around heavy equipment or where an overhead hazard exits).

- Safety-toed work boots.
- Safety glasses (to be used whenever an eye impact hazard exists).
- Ear plugs or muffs (as required for working in areas of high noise).
- ANSI Class II Reflective Vest (when working around heavy equipment/vehicles).

6.5 PPE TRAINING

As specified by 29 CFR 1910.132, all site personnel who are required to use PPE will be given training in the use, care, and limitations of the PPE they are to use. Prior to PPE use, the affected personnel will demonstrate an understanding of the training and their ability to properly use the assigned PPE. Personnel will be retrained if the level or type of PPE being used changes. PPE training will address the following topics:

1. PPE selection decisions and when and what PPE is needed.
2. How to properly don, doff, adjust, and wear PPE.
3. The limitations of specific pieces/types of PPE.
4. The proper care, maintenance, limitations, and disposal of PPE.

6.6 ACTION LEVELS FOR UP/DOWN GRADING PPE

The PIKA CESHM will provide final approval for any upgrading/downgrading of PPE based upon applicable site measurements.

6.7 PPE INSPECTION, MAINTENANCE AND STORAGE

Site personnel using PPE will keep their PPE clean and in good working condition. PIKA will provide cleansing wipes, wash sprays and cloths, towelettes, or equivalent cleaning supplies for cleaning PPE. Additionally, PIKA will establish and maintain a PPE storage area where field personnel may store their PPE. All site personnel will be responsible for daily inspections of their PPE to ensure that it is maintained in safe working order. PPE that is worn-out or defective will be brought to the attention of the UXOSO. PPE that can be repaired by replacing parts (i.e.,

replacement of scratched lenses on safety glasses) will be maintained IAW manufacturer instructions, or replaced as needed. PPE that cannot be restored to operational condition will be discarded and replaced as needed.

6.8 EMERGENCY RESPONSE EQUIPMENT

For this project, no additional or special levels of PPE are being specified for emergency situations. For all site operations, approved first aid, emergency response supplies, ropes and harnesses will be available on-site. Each field team will have and maintain first aid supplies consisting of:

- A 16-Unit first aid kit (containing the minimum requirements of USACE EM 385-1-1) with burn protection kit, which all meet or exceed OSHA suggested requirements.
- Portable eye wash bottles for use during transportation to the 15-minute eye wash station.
- Burn kit with bandages.
- Trauma bandages.
- A fire blanket.
- Fire extinguisher.

Additional first aid and emergency response supplies will be maintained on-site as required by section 15.6 of this SSHP. With the exception of fire extinguishers that require a monthly inspection, all emergency response and first aid equipment will be inspected initially and then weekly thereafter to ensure adequate supplies and proper operational condition. Each team will have a fire extinguisher in the site vehicle and additional fire extinguishers will be available at fuel storage areas. Additional information related to fire extinguisher types and sizes and spill response equipment that must be available is presented in section 15.6 of this SSHP. An emergency eye wash station that complies with ANSI Z-358.1 will be available in the office/equipment storage area. No safety showers will be required because there is no potential for personnel being drenched with hazardous substances that can pose a threat to the skin.

7.0 MEDICAL SURVEILLANCE

7.1 PURPOSE AND SCOPE

As part of its CESHP, PIKA has established a comprehensive Medical Surveillance Program (MSP) to assist in the prevention, diagnosis, and treatment of occupational illnesses and injuries sustained during operations on hazardous waste sites. The medical surveillance requirements of this section will apply to all site personnel with exposure potential to significant safety and health hazards.

7.2 GENERAL REQUIREMENTS

Medical examinations of personnel as required by the MSP will be conducted by, or under the supervision of, a licensed physician, who is board-certified in Occupational Medicine or has had experience in the recognition, evaluation, and treatment of occupational diseases.

7.3 PHYSICIANS STATEMENT

Upon completion of a health assessment, the physician will provide the results of the examination to the employee, and a written physician's statement will be provided to PIKA. The physician's statement will include, as a minimum, the following: 1) the employee's name and social security number; 2) a statement that the employee is qualified to participate in hazardous toxic and radiological waste (HTRW) related site activities; 3) the physician's recommended limitations upon the employee's assigned work, if any; and 4) any supplemental or follow-up examinations or tests which the physician believes are required to complete the assessment. Copies of the medical clearance forms for the PIKA personnel assigned to this project are provided in Attachment 5 of this document. Certification of these employees participation in PIKA's medical surveillance program is provided in Attachment 6.

7.4 MEDICAL SURVEILLANCE EXAMINATIONS

7.4.1 Pre-Assignment Health Assessment

The pre-assignment health assessment will be conducted prior to personnel participation in site activities involving potential exposure to chemical or physical hazards. The pre-assignment health assessment will have been conducted within the past 12 months.

7.4.2 Supplemental Examination

Any site worker who has been injured, received a health impairment, developed signs or symptoms from possible overexposure, or received an overexposure will undergo a supplemental examination. The physician will determine the contents of this examination and will certify the employee's fitness to return to work prior to reassignment. The physician will specify any work restrictions in writing.

7.4.3 Follow-up Health Assessments

The physician will notify PIKA, and the employee, if a work-related condition is detected that requires additional testing or assessment. Upon conclusion of the follow-up health assessment the physician will provide a statement regarding the employee's fitness for work.

7.5 EMERGENCY AND NON-EMERGENCY MEDICAL TREATMENT

Prompt and effective non-emergency and emergency medical treatment will be provided for site personnel who require medical attention resulting from injuries or illnesses occurring during site operations. The treatment requirements of this section are not designed to provide for the diagnosis or treatment of non-occupational injuries or illnesses, unless immediate medical attention is needed to prevent loss of life, relieve suffering, or preclude permanent injury that would result if treatment were delayed. Route maps and instructions to the OSHA physical clinic and the hospital identified in this section are included in section 15.8 of this SSHP.

7.5.1 Treatment of Minor Injuries

For minor injuries, the two on-site PIKA personnel with first aid/CPR training will provide the initial first aid response. If deemed necessary by the UXOSO, for non-emergency first aid treatment the injured person will be taken to an OSHA physical clinic. Treatment for non-emergency first aid will be provided by the Med Group, Stow, Ohio. If it is determined by the UXOSO that additional/advanced medical treatment is required, the UXOSO will determine if the injured person should be transported using a site vehicle or if an ambulance is required. If the UXOSO determines that a site vehicle may be used, a first aid-trained attendant will accompany the driver and injured person for the trip to the hospital designated for non-critical injuries. Advanced medical treatment for illnesses or injuries that occur on-site will be provided by the Robinson Memorial Hospital in Ravenna, Ohio.

If ambulance service is required, the UXOSO will contact RVAAP Post 1 security personnel to summon emergency ambulance services. A PIKA representative will meet the ambulance at the main gate and escort it to the accident site. An on-board emergency medical technician (EMT) will provide basic life support (BLS) and other care as required by the nature of the injury. EMT-Is and Paramedics will provide advanced life support (ALS).

7.5.2 Treatment of Serious Injuries

In the event that the UXOSO requests ALS, the PIKA first aid personnel will provide initial support in an effort to stabilize the injured person until the ambulance service arrives. Once on-site, the EMT-Is and paramedic personnel will not only provide ALS services, but will also make the determination as to which hospital the injured party will be transported, and the mode of transportation. EMT personnel may elect to use ground transportation or summon helicopter air ambulance service for transporting the injured person to a trauma center. Again, Robinson Memorial Hospital in Ravenna, Ohio will be the first choice for serious injuries, unless otherwise determined by the medical response personnel.

8.0 SITE AND PERSONNEL MONITORING PLAN

8.1 GENERAL

On-site monitoring will be conducted during site activities to evaluate potential hazards that may be encountered. The on-site monitoring will assist in determining the effectiveness of control measures, the need for changing the PPE requirements, and the effectiveness of safe work practices. Direct-reading, real-time instruments will be used whenever possible to detect and quantify site hazards. If a reading exceeds the action levels specified in Table 5, the UXOSO will take the steps to correct the situation or minimize the exposure.

8.2 PERSONAL MONITORING REQUIREMENTS

8.2.1 Real-Time Direct-Reading Monitoring

Table 5 represents the initial real-time monitoring requirements to be employed during project tasks. Monitoring frequency may be changed by the PIKA CESHM based upon the results of previous monitoring or the detection of factors that indicate a potential for exposure. The monitoring equipment to be used to assess exposure hazards for this project will include:

1. Sound level meter - Used as a screening device to measure sound power emitted by a source.
2. Noise dosimeter - Used to calculate the 8-hour time-weighted average (TWA) exposure.
3. Digital ambient air thermometer - Used to assess heat and cold stress effects IAW section 9.0 of this SSHP.

8.2.2 Integrated Breathing Zone Sampling

Integrated breathing zone (BZ) sampling is not expected for these Tasks.

TABLE 5: SITE MONITORING SCHEDULE AND ACTION LEVELS

Hazard	Equipment	Monitoring Frequency/Location	
Heat Stress	Digital Thermometer	Daily when ambient temperatures are expected to exceed 78.8°F for acclimatized workers, 72.5°F for unacclimatized workers, and 70.0°F for workers using impermeable or semi-impermeable clothing	
		Action Level	Action to be Taken
		Above ACGIH criteria as outlined in ESHP-506	Institute physiological monitoring and appropriate controls as outlined in ESHP-506
Hazard	Equipment	Monitoring Frequency/Location	
Cold Stress	Digital Thermometer	Every four hours once ambient temperature becomes less than 60.8 ºF.	
		Action Level	Action to be Taken
		Above ACGIH guidelines as presented in ESHP-507	See paragraph 5.2 of ESHP-507in to determine appropriate controls.
Hazard	Equipment	Monitoring Frequency/Location	
Noise	Sound Level Meter	Conducted during initial operation of high noise equipment, and periodically thereafter, according to the recommendations of the EODT CESHM.	
		Action Level	Action to be Taken
		Whenever noise levels in the hearing zone exceed 85 dBA.	Conduct noise dosimetry as outlined below. Issue hearing protection devices to affected personnel.
	Equipment	Monitoring Frequency/Location	
	Noise Dosimeter	Whenever noise levels in the hearing zone exceed 85 dBA.	
		Action Level	Action to be Taken
		Noise readings greater than 80 dBA 8-hour time-weighted average.	Report dosimeter readings to the CESHM to ensure hearing protection devices are adequate for the level of noise experienced.

8.3 MONITORING SCHEDULE AND FREQUENCY

Exposure monitoring will focus on the potential for exposure to physical and chemical hazards. Table 5 identifies the type of monitoring equipment to be used, the frequency at which the monitoring will be performed, the method to be employed, the action level, and the response if the action level is exceeded.

8.4 TEMPERATURE EXTREME MONITORING

Heat and cold stress monitoring will be conducted IAW the guidelines presented in PIKA ESHPs 506 and 507 respectively (Attachment 3). This monitoring will be conducted by, or at the direction of, the UXOSO and will be used to minimize

physiological effects in the event that temperature extremes are experienced during site operations. The guidance presented in Table 5 will be used by the UXOSO to determine when and what type of heat and cold stress monitoring will be conducted.

8.5 NOISE MONITORING PROCEDURES

High noise levels are anticipated during the operation of brush clearing equipment. The noise levels will be monitored to determine if hearing protection devices will be required and to ensure that the level of hearing protection being used is adequate. At the start of potential high noise operations, sound level readings will be taken in the hearing zone of the affected personnel. Noise dosimetry will be conducted for any operation where sound level readings indicate a potential for exposures above 85 dBA.

8.6 MONITORING EQUIPMENT CALIBRATION AND MAINTENANCE

All sampling and monitoring instrumentation used on-site will be calibrated and/or response-checked IAW the manufacturer's specifications before and after use each day. If an instrument fails to calibrate or respond correctly, a backup unit will be available on-site. The faulty instrument will be removed from service until it is repaired IAW manufacturer's specifications.

9.0 HEAT AND COLD STRESS

PIKA's procedures for the evaluation and control of heat and cold stress are presented in PIKA's heat and cold stress prevention ESHPs in Attachment 3 of the APP. If weather conditions exceed the temperatures outlined in the ESHPs of this SSHP, the UXOSO will implement the monitoring and personnel controls outlined in the specified ESHPs.

10.0 ESHPS, ENGINEERING CONTROLS, AND WORK PRACTICES

10.1 GENERAL

This section outlines the engineering controls, SWPs, and Standing Site Orders that will be followed by all site personnel to eliminate, or reduce the risk of exposure to recognized site hazards. These control measures are presented as a working guide for site personnel and are not intended to cover all PIKA, OSHA, or USACE compliance issues. The PIKA Corporate Safety and Health Program and the task-specific ESHPs will be available on-site. Since the ESHPs are generic in nature and are intended to compliment this SSHP, many of the ESHPs may contain information that may be superfluous to this project. Prior to, and during site operations, the UXOSO and SUXOS will carefully read the ESHPs and determine which ESHP provisions apply to this project. All site personnel will comply with the following guidelines:

1. The applicable regulatory requirements of 29 CFR 1910 and 29 CFR 1926 will be followed during all site activities.
2. All site personnel will immediately report to the UXOSO any conditions that do not comply with, or are not addressed by this SSHP.
3. Site personnel will wear the PPE as specified in section 6.3 of this SSHP.
4. Any bites or stings received from wildlife will be reported to the UXOSO, who will then determine the appropriate course of action to be taken to treat the bite.
5. Personnel in vegetated or wooded areas will wear long-sleeve shirts with the sleeves rolled down to reduce contact with, and injury from, hazardous or poisonous plants.
6. Site personnel will inform the UXOSO of any known medical conditions that may cause, or result in, an adverse health condition. This includes hypersensitive allergic reactions to stinging and biting insects or contact with poisonous plants, diabetes, high blood pressure, skin or eye sensitivity to sunlight and UV radiation, chronic illness, and acute illnesses, such as a cold,

the flu, or stomach/intestinal disorders. Persons with known hypersensitive allergic reactions to stinging/biting insects or toxic plants will carry appropriate emergency medical antidotes on their person at all times when on-site.

7. Site personnel will not participate in horseplay or other prohibited acts that could cause harm or injury to site personnel, property, or the environment.

10.2 ENGINEERING CONTROLS

When personnel exposure to site hazards is unavoidable, OSHA regulations specify that engineering controls be used whenever feasible to remove the potential for personnel exposure. During project activities, the engineering controls listed below will be used:

1. All guards located on equipment will be maintained in place unless removal is needed for maintenance. Removal of guards for maintenance will require assessment by the UXOSO for potential application of LO/TO procedures.
2. All powered hand tools will be operated with the manufacturer's guards in place.

10.3 SITE RULES / PROHIBITIONS

10.3.1 Buddy System Procedures

All work conducted within a work zone will be performed using the buddy system, and at no time will personnel work alone.

10.3.2 Eating, Drinking, and Smoking Restrictions

Eating and smoking during on-site operations will be limited to designated areas, at designated break times, and only after personnel have washed their face and hands. At no time will personnel smoke within the EZ.

10.3.3 Standing Site Rules

To maintain safety and health awareness, a list of standing site rules has been developed that outlines the practices that must be followed at all times. These standing orders will be enforced by the UXOSO, and violators will be subject to disciplinary action. The general standing orders for the site and the Work Zone (WZ) are listed in Tables 6 and 7.

TABLE 6: General Site Rules and Prohibitions

1. Running and horseplay are prohibited in all areas of the site.
2. Ignition of flammable materials in any work area is prohibited, unless approved in writing by the UXOSO.
3. Buddy system procedures will be enforced during all site operations.
4. Only the minimum number of personnel necessary to perform work tasks in a safe and efficient manner will be present in the work area.
5. Site personnel will check in with the UXOSO prior to leaving and again upon returning to the site.
6. Site visitors are to be escorted by UXO-qualified PIKA personnel at all times.
7. Site personnel will perform only those tasks they are qualified to perform.
8. Site personnel will remain aware of site conditions at all times and will alert the UXOSO to any changes that could pose a hazard to site personnel, the environment, or the public.
9. All site personnel are cautioned not to walk, kneel or sit on any surface with potential leaks, spills of contamination.
10. Remember, “When in doubt, don't.” Ask questions first.

TABLE 7: Work Zone Rules and Prohibitions

1. No matches, lighters, or spark sources are allowed in any designated WZ.
2. No personnel will enter a designated WZ without authorization from the SUXOS or UXOSO.
3. No eating, drinking, or other hand to mouth/face activity will be permitted in a WZ unless proper hygiene has been performed, and then only in designated areas of the WZ.
4. Use of fluids in the WZ will only be allowed after hands and face have been washed or wiped with a disposable towelette.
5. Always have your buddy with you in this zone, and follow the buddy system procedures.
6. No personnel will be allowed in the WZ without appropriate training, medical surveillance and PPE as specified by the SSHP.
7. Remain alert to site conditions and report any changes or unusual occurrences to the UXOSO.

8. Verbal communication will be available at all times between the WZ and off-site emergency resources via Post 1.
9. Remember: Site Safety and Health Are Everyone's Responsibility. Do your part.

10.4 MATERIAL HANDLING PROCEDURES

Site personnel will exercise care in lifting and handling heavy or bulky items. Materials being lifted either mechanically or manually will not be moved or suspended over personnel. Whenever heavy or bulky material is to be moved manually, the size, shape, and weight of the object and the distance and path of movement must be considered to prevent joint and back injuries. The following hierarchy will be followed in selecting a means for material handling:

1. Movement of the material by mechanical device (i.e., lift truck, crane, etc.).
2. Movement by manual means using mechanical aid (i.e., dolly or cart).
3. Movement manually with protective equipment (i.e., lifting belt or lifting monitor).

The lifting fundamentals and requirements are presented in PIKA ESHP-522 in Attachment 3 of the APP. The lifting procedures in this ESHP will be followed whenever personnel are required to lift objects. The personal lifting limitation of 50 pounds will be followed at all times. Requirements for handling drums are presented in ESHP-404 of the APP.

10.5 HOT WORK AND FIRE PROTECTION/PREVENTION

10.5.1 Hot Work Practices

Hot work is not expected for this Project. If hot work tasks are identified, procedures will be enacted IAW ESHP 303 Welding and Cutting and ESHP 511 Fire Prevention. RVAAP will be notified and Hot Work Permits completed and authorized prior to initiation.

10.5.2 Causes of Fires and Explosions

Although fires and explosions may arise spontaneously, they are more commonly the result of carelessness during the conduct of site activities. Potential causes of explosions/fires include the following:

- Ignition of explosive/flammable gases or vapors by external sources.
- Agitation of shock or friction-sensitive compounds.
- Sudden release of materials under pressure.
- Combustion of grass or brush due to contact with the hot exhaust system when site vehicles are parked in dry brushy/grassy areas.

10.5.3 Fire Prevention

Explosions and fires not only pose the obvious hazards of intense heat, open flames, smoke inhalation, and flying objects, but may also cause the release of toxic chemicals into the environment. Site personnel involved with potentially flammable material or operations will follow the guidelines listed in PIKA ESHP-511 (Attachment 3) to prevent fires and explosions.

10.5.4 Fire Protection

To ensure adequate fire protection, the UXOSO will inspect the site to ensure that all flammable and combustible materials are safely stored in appropriately configured storage areas and containers. The UXOSO will also ensure that no flammable or combustible materials are stored near any sources of ignition and that sources of ignition are removed a safe distance from storage areas. Portable fire extinguishers will be located on-site IAW the requirements in section 15.6.3 of this SSHP.

10.6 ELECTRICAL SAFETY PROCEDURES

Electrical tools and apparatus safety will follow OSHA Standard 29 CFR 1910.137(2). These requirements include, but are not limited to the following:

- All electrical equipment will carry the Underwriters Laboratories (UL) or Factory Mutual Engineering Corporation seal.
- Flexible cord passing through work areas will be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, or pinching.
- Patched, oil-soaked, worn, or frayed electric cords or cables will not be used.
- Extension cords or cables will not be fastened with staples, hung from nails, or suspended by wire.
- All electrical tools and equipment will be grounded by a multi-conductor cord having an identified grounding conductor and a multi-contact polarized plug-in receptacle.
- Semi-portable equipment, floodlights, and work lights will be grounded, and the protective ground will maintained during moving unless supply circuits are de-energized.
- Tools protected by a system of double insulation, or its equivalent, need not be grounded.
- UL listed ground fault circuit interrupters (GFCIs), calibrated to trip within the threshold values of 5 ma $\pm$ 1 ma, are required on all circuits used for portable electric tools.
- Flexible cord sets will be UL listed, contain the number of conductors required for the service plus an equipment ground wire and will be classified as hard usage or extra hard usage (identified by "outdoor" or "WA" printed on the jacket).

10.7 EXCAVATION AND TRENCHING SAFETY

No excavation or trenching operations that will require personnel to enter a potentially hazardous trench are anticipated for this project.

10.8 MACHINERY GUARDING

The requirements found in Subpart O of 29 CFR 1910, section 16B of USACE EM 385-1-1 will be followed to protect site personnel from unguarded moving machinery and equipment. The general provisions listed below will be followed:

- All reciprocating, rotating or moving parts of machinery or equipment will be guarded IAW manufacturer's specifications.
- All hot surfaces of equipment will be guarded or insulated to prevent injury and fire.
- No guard, safety appliance, or device will be removed from machinery or equipment or made ineffective except when making repairs, lubrication, or adjustments, and then only after the power has been shut off.
- All guards or safety appliances removed for repair, lubrication, or adjustments will be replaced immediately upon completion of said activity and before the power is restored.

10.9 LOCKOUT / TAGOUT

There is a potential that some maintenance operations on equipment and facilities will require the control of energized systems. Energized systems are defined as those systems that contain residual or stored energy, or are connected to an energy source. Site operations involving the construction, installation, set up, adjustment, modification, inspection, maintenance or servicing of machines or equipment may require the use of LO/TO procedures to ensure the protection of site personnel. These activities may include the lubrication, cleaning or unjamming of machines or equipment, and making adjustments where site personnel are exposed to the unexpected energizing or startup of the equipment or the release of hazardous energy. During the initial startup of site operations, the CESHM and UXOSO will determine what potential site operations may require the use of LO/TO procedures to control energized systems. The UXOSO will then have the responsibility to apply the PIKA LO/TO ESHP-521 (Attachment 3). Under no circumstances will any personnel be permitted to perform work on energized equipment. In addition only qualified personnel will be permitted to perform a LO/TO and perform work on equipment.

10.10 FALL PROTECTION

Fall Protection situations and measures are not expected during this project. If fall protection tasks are identified, procedures will be put in place, RVAAP will be notified, and authorization received prior to initiation.

10.11 HAZARD COMMUNICATION

In order to comply with the requirements of the OSHA HAZCOM Standard, 29 CFR 1910.1200 and the requirements of EM 385-1-1, section 01.B.04, the UXOSO will ensure that the personnel have received HAZCOM training prior to the time of initial site assignment or when they begin working with hazardous substances. PIKA subcontractors will also comply with the requirements presented above and will supply the PIKA UXOSO with copies of the Material Safety Data Sheet (MSDSs) for any materials brought on-site which contain hazardous substances.

10.12 ILLUMINATION

In order to control the potential for injury or illness involved with situations where site personnel have limited visibility, PIKA personnel, as a general rule, will conduct on-site operations from 30 minutes after sunrise to 30 minutes before sunset. All office and storage facilities will be supplied with adequate artificial or ambient light to ensure the safe performance of operations within the facility.

10.13 SANITATION

10.13.1 Water Supply

An adequate supply of potable (drinkable) water will be provided on-site at all times and will be supplied IAW the following provisions:

- Containers will be clearly marked, be capable of being tightly closed, equipped with a tap, maintained in a sanitary manner, and cleaned at least weekly.
- Separate sanitary containers will be provided for the storage of unused cups and for the disposal of the used.
- Water or other supplied beverages will not be dipped from the container by any means, and use of a common cup will not be allowed.
- Use of non-potable water is not anticipated; however, if containers of such water are used, they will be conspicuously labeled “Caution: water unfit for drinking, washing, or cooking.”

10.13.2 Toilet Facilities

Where a project site is not provided with sanitary facilities, temporary toilet facilities will be located at the site. Chemical toilets will be used by PIKA to fulfill this requirement. Each temporary toilet will be naturally lighted, have ventilation, be lockable from the inside, and be serviced weekly. The minimum requirements for toilet facilities can be found in the OSHA Standard 29 CFR 1910.120(n).

10.13.3 Washing Facilities

Hand and face washing facilities will be used by all personnel exiting the WZ and prior to eating, drinking, tobacco use, or other hand-to-face activities. Due to the remoteness of the site and the lack of immediately available water resources, hand wipes and rinse water will be provided for on-site hand and face washing. Where possible, PIKA will acquire a portable, refillable hand washing station for placement inside the Support Zone (SZ).

10.13.4 Site Housekeeping

All work areas will be maintained in a clean/neat fashion, free of loose debris and scrap. Any materials/equipment not being used will be removed and stored or disposed of accordingly. All work areas will be supplied with a trash receptacle that

includes a lid. The contents of all trash receptacles will either be removed from the site daily or emptied daily into an on-site central storage container that will be tightly closed each night prior to departure from the site.

10.14 SIGNS AND LABELS

An important element of site safety involves using signs and labels to provide personnel with information related to hazardous operations, areas, and materials. To ensure effective communication of these hazards, the requirements of OSHA 29 CFR 1910.145 will be implemented whenever signs, tags, or labels are used on-site.

10.15 POWER AND HAND-TOOL OPERATION

To control the hazards associated with power tool and hand tool operation, personnel will follow the requirements outlined in 29 CFR 1910, Subpart P, 29 CFR 1926, Subpart I, and the safe work practices listed in the PIKA Power and Hand Tool ESHP-520 (Attachment 3).

10.16 BIOLOGICAL HAZARDS

During this project site personnel may experience exposure to biological hazards such as: stinging insects like bees, wasps and hornets; and, biting arthropods such as spiders and ticks. Site personnel will read the PIKA Biological Hazards ESHP-503 (Attachment 3) to determine the biological hazards and the controls to be used. The UXOSO will be responsible for providing briefings and selecting from the Biological Hazards ESHP and identifying the requisite controls for any biological hazards identified. Employee awareness and the safe work practices outlined in the Biological Hazards ESHP should reduce the risk associated with these hazards.

Wild animals encountered on the site will be allowed to leave on their own. If a wild animal becomes trapped, PIKA personnel will call a local animal control service to remove the animal.

During warm weather conditions when bee, wasps or hornets are present those personnel with known allergies to stings will maintain an epinephrine auto-injector (provided by their personal physician) in their work area and will notify the UXOSO that they are allergic to stings.

10.17 USE OF PRODUCTS CONTAINING HAZARDOUS MATERIALS

It is anticipated that there will **not** be a potential for airborne exposure to the hazardous materials used on-site. However, some products used have the potential for skin contact hazards. To help ensure personnel safety from hazardous materials, PIKA personnel will follow the SWPs listed below:

- All site personnel who use hazardous materials will review the MSDS for each product used.
- All products with airborne exposure hazards (i.e., gasoline and other fuels, spray paints, etc.) will be used outdoors or in well-ventilated areas. Personnel will stand upwind when dispensing the product.
- Personnel will utilize protective gloves when using or dispensing a product with a skin contact hazard.
- Only those personnel, who have received appropriate HAZCOM training, as outlined in section 5.7 of this SSHP, will use a product containing hazardous materials.
- Personnel will immediately wash any affected skin that accidentally comes in contact with a hazardous material identified as being a skin contact hazard.

10.18 DAILY AND WEEKLY SAFETY INSPECTIONS

Daily inspections will be conducted by the UXOSO to ensure that site operations and personnel are complying with this SSHP and other regulatory requirements. The results of these inspections will be recorded in the Safety Log and documented on the PIKA Safety Inspection and Audit Log form. Any site or operational discrepancies identified will be noted on this form, and the results of the inspection will be reported to the SUXOS. On a weekly basis, the UXOSO will conduct a

compliance audit of the site. This audit will also be noted in the Safety Log and then documented on the PIKA Safety Inspection and Audit Log.

10.19 PERIODIC CORPORATE SAFETY AND HEALTH INSPECTIONS

During the course of this project, the PIKA CESHM/CSP will make periodic inspections of the project to ensure the continued compliance of the project with applicable safety and health regulations. During these inspections, the CESHM will be escorted by the UXOSO and together the two will comprise the Corporate Safety Inspection Team (CSIT). PIKA views the audits conducted by the CESHM to be essential to the safe and healthful performance of site operations and as such the CSIT will be permitted the same site access as other site teams.

11.0 SITE CONTROL

11.1 CENTER OF OPERATIONS

In the event of an accident involving the total evacuation of site personnel, the PIKA field office trailer located along Paris-Windham Road will act as the primary staging area for accountability, with the PIKA field office at the main gate (bldg 1038) serving as a secondary assembly area for the final count.

11.2 SECURITY PROCEDURES

PIKA personnel will be required to check in at Post 1 upon entering RVAAP and to check out upon departing RVAAP.

11.3 SITE MAPS

Prior to initiation of site activities, a site map will be available that will detail the following information: site size; restricted areas; designated assembly points; the site access routes; staging areas and any other information deemed necessary by the SUXOS or UXOSO. The site map will be used by the UXOSO during the site safety training and the daily safety briefings. Maps of the project site are included in Appendix B of the WP.

11.4 SITE COMMUNICATIONS

Effective on-site and off-site communication is an integral part of site control and will be established prior to initiation of site activities. On-site communication will be used to coordinate site operations, maintain site control, pass along safety information, coordinate work/rest periods and alert site personnel to emergency situations. Means of communicating with RVAAP Post 1 personnel to contact off-site resources will be available at all times to ensure effective communication with off-site management personnel and emergency response services. All site personnel will be familiar with the different methods of both on-site and off-site

communication. The methods PIKA will use for on and off-site communication will include:

1. On-site communications consisting of portable radios, as well as air horns, bullhorns, sirens or hand signals as needed for communications.
2. Off-site communications will be accomplished using cellular telephones. Each team will have two means of communication for summoning off-site support via Post 1.

11.5 BUDDY SYSTEM

An important element in controlling personnel exposure to site hazards is the implementation of buddy system procedures. These procedures ensure that no site personnel are allowed to work without another qualified worker present to provide assistance. At all times buddies should:

1. Observe their buddy for signs of exposure to site hazards or stresses.
2. Observe the site area in which they are working for hazards.
3. Remain within verbal or visual contact with their buddy at all times.
4. Notify the team leader and/or field office if emergency assistance is needed.

12.0 PERSONNEL/EQUIPMENT DECONTAMINATION AND HYGIENE

12.1 PERSONNEL HYGIENE AND DECONTAMINATION

Personal hygiene and sanitation (ESHP-512) facilities will be established on-site IAW 29 CFR 1910.120(n) to ensure personnel maintain good personal hygiene. These facilities will include a personal washing area, toilet facilities, and a lunch/break area. No hazardous chemical decontamination procedures will be required for the Level D PPE, and all PPE will be maintained and cleaned IAW the requirements of section 6.8.

12.1.1 Level D Decontamination

No hazardous chemical decontamination procedures will be required for the Level D PPE. All PPE will be maintained and cleaned IAW the requirements of section 6.8.

12.2 EQUIPMENT HYGIENE

Equipment used in the field, to include PPE, will be cleaned and inspected at the end of each workday IAW the requirements of paragraph 13.0 of this SSHP.

13.0 EQUIPMENT DECONTAMINATION

Equipment used in the field will be cleaned weekly, with the exception of any equipment used in the removal of poison ivy which will be decontaminated with poison ivy cleaner prior to being placed in vehicles or stored. In the event that any equipment is found to be defective it will be brought to the attention of the SUXOS or UXOSO. All environmental sampling equipment will be decontaminated in accordance with the requirements of the RVAAP Facility Sampling and Analysis Plan.

14.0 EMERGENCY EQUIPMENT AND FIRST AID

For this project, no additional or special levels of PPE are being specified for emergency situations. For all site operations, approved first aid and emergency response supplies will be available on-site. Each field team that functions away from the PIKA field office will have and maintain first aid supplies consisting of:

- A 16-Unit or 25-person first aid kit with added BBP kits capable of protecting two first aid providers set up with the minimum requirements of USACE EM 385-1-1 that exceeds the required OSHA suggested contents.
- Portable eye wash bottles.
- Burn kit with bandages.
- Trauma bandages.
- A fire blanket.
- Fire extinguisher.

Additional first aid and emergency response supplies will be maintained on-site as required in Table 8 of this SSHP. With the exception of fire extinguishers that require a monthly physical inspection, all emergency response and first aid equipment will be inspected initially and then weekly thereafter to ensure proper operational condition. Each team will have a fire extinguisher in the site vehicle and additional fire extinguishers will be used for any temporary fuel storage areas established. The emergency eye wash station that complies with ANSI Z-358.1 will be available in the office/equipment storage area.

TABLE 8: EMERGENCY EQUIPMENT REQUIREMENTS

Emergency Equipment	No. Per Location	Area Where Item(s) Will Be Stored	Operation Requiring Specified Equipment
First Aid/Burn Kit/Burn Blanket/CPR Mask/	1 ea.	Each team within the WZ	All operations
Portable Eye Wash Kit	1 ea.	Each team within the WZ	Operations involving hazardous materials that could splash
15- Minute Eye Wash	1 ea.	Field office trailer	All operations
Biohazard Kit	2 ea.	Each team within the WZ and in the UXOSO vehicle	All operations
Large Medical Kit with Trauma Supplies	1 ea.	1 in UXOSO vehicle	All operations
Portable Stretcher and/or Backboard	1 ea.	1 in UXOSO vehicle	All operations
Air Horn	1 ea.	Each team within the WZ	All operations
Spill Containment/ Cleanup Supplies	Varies	Field office trailer	Operations involving hazardous materials
Fire Extinguisher	1 ea.	Each team, vehicle, and flammable storage area	All operations

15.0 EMERGENCY RESPONSE AND CONTINGENCY PLAN

15.1 INTRODUCTION

Thorough pre-planning, proper design, and implementation of the required emergency response contingencies can dramatically reduce the frequency and severity of emergencies. If an emergency does occur, quick, decisive action will be required since even short delays can create or escalate life-threatening situations. To ensure rapid, effective response to a site emergency, the procedures and contingency plans outlined in this section will be implemented prior to and during the conduct of any site activities involving exposure to safety and health hazards.

15.2 PRE-EMERGENCY PLANNING

Prior to the start of site operations, PIKA will have contacted and met with appropriate local authorities to inform them of the activities to be performed under this SSHP and the potential hazards that these activities pose to site personnel, the environment, and the public. The SUXOS and UXOSO will confirm information from the local authorities related to the type of emergency services available, including any contact phone numbers or procedures needed to summon the services. The UXOSO will be responsible for ensuring that the telephone numbers and procedures for contacting local emergency services are posted IAW the requirements of this section.

15.2.1 Identification of Potential Emergencies

During the development of this SSHP potential safety and health hazards associated with the planned site activities were identified. These hazards were assessed to determine nature and type of emergency they could cause. Contingency plans for responding to the potential emergencies have been developed and are included in this section. The potential emergencies that may result during the conduct of site activities are:

1. Personal injury from the unintentional detonation of MEC.
2. Injury or illness associated with physical or biological hazards.
3. Fire.
4. Inclement weather.
5. Spill of hazardous materials [small quantities (< 5 gallons) of fuel or oil].

15.2.2 Identification/Coordination of Emergency Services

Prior to the initiation of site activities, the UXOSO will contact local emergency services to verify the availability of requisite services and to confirm the means used to summon those services. It will be the responsibility of the SUXOS to ensure that off-site communications (via RVAAP Post 1 security) are available at all times. Site operations will not be conducted unless means of off-site communications are established. The telephone numbers for all emergency services and contacts are presented in this plan and will be posted in the office/break area and in all site vehicles. All site personnel will be aware of the procedures for obtaining off-site emergency services.

15.2.3 Initial Incident Reporting Procedures

Once an emergency has occurred, team members will sound the air horn alarm and the respective team leader will establish radio contact with the UXOSO and the SUXOS. This will initiate site evacuation and mobilization of PIKA first aid/CPR response personnel. Once informed of the emergency, the SUXOS will ensure notification to RVAAP Post 1, and then will ensure that all teams are aware of the situation and are involved in the proper response procedures.

15.3 PERSONNEL ROLES, AUTHORITY AND COMMUNICATIONS

15.3.1 SUXOS

Upon notification of an emergency situation, the SUXOS will assume the role of the Emergency Coordinator (EC). As the EC, the SUXOS will have overall responsibility for coordinating the efforts of the PIKA on-site response actions, as well as the off-site emergency response agencies. Additionally, the SUXOS will ensure that required off-site emergency services have been summoned and will also be responsible for notifying and coordinating all relevant federal, state and local regulatory and response agencies. The SUXOS/EC will be assisted by the UXOSO.

15.3.2 UXOSO

During an emergency situation, the UXOSO will have specific duties that are assigned by virtue of the need to maintain separation of safety and health from operations. However, as appropriate, the UXOSO will provide assistance to the SUXOS/EC during response actions. In the event that the SUXOS is incapacitated, the UXOSO will assume the duties of the SUXOS/EC.

15.3.3 On-Site Emergency Response Personnel

During site activities PIKA personnel will act, to the greatest extent possible, in the role of on-site emergency response personnel. The PIKA SUXOS will designate the personnel assigned to emergency response tasks prior to initiation of site activities involving the potential for an on-site emergency. PIKA on-site emergency response personnel will receive training in the response actions that they will be authorized to, and may be directed to, perform during a site emergency.

15.3.4 Off-Site Emergency Response Services

The off-site emergency resources presented in Table 9 will be contacted by the EC in the event of an emergency.

TABLE 9 - EMERGENCY TELEPHONE NUMBERS

****CONTACT POST 1 VIA RADIO COMMUNICATION OR BY PHONE AT 330-358-2017 FOR ALL EMERGENCY NOTIFICATIONS****

The numbers listed below are for information only

Service / Contact	Agency / Position	Telephone Number
Land or Air Ambulance	Ravenna City Fire Department Ravenna, OH	911 Operator, or 330-297-5738
OSHA clinic	Med Group 3913 Darrow Rd, Suite #100 Stow, OH, 44224	330-688-7900
Emergency Hospital Care	Robinson Memorial Hospital 6847 N Chestnut Street Ravenna, OH 44266	330-297-0811
Police	Portage County Sheriff Office	330-296-5100 or 330-325-1023
Police	Trumbull County Sheriff Office	330-675-2508
Ravenna City Fire Dept	Ravenna, OH	911 Operator or 330-296-5783
Closest Military EOD Unit	731st Ordnance Company (EOD), Wright Patterson AFB, OH	937-257-0436 or 937-257-0664
Lisa Roseberry	USACE Contracting Officer	502-315-6190
Glen Beckham	USACE Project Manager	502-315-6799
Mark Patterson	RVAAP Facility Manager	330-358-7311
Brian Stockwell	PIKA Project Manager	Office 330-385-7135 Cellular 330-352-6955
Kathleen Anthony	PIKA Program Manager	Office – 916-920-9146 Cellular – 713-724-2893
Joseph Frydenger, CSP	PIKA Safety and Health Mgr.	Cellular 217-855-9466
Melvin Lau	PIKA SUXOS	Cellular 330-352-5305
Lew Kovarik	PIKA UXOSO	Cellular 330-352-9887

15.3.5 Communications

Emergency communications will be available and maintained during all on-site operations. Radio and cellular phone communications will be used between the field teams and the field office. The field office will have radio and cellular phone communication to security personnel at Post 1, as well as the PIKA RVAAP project office. In the event of an emergency, Post 1 will be contacted to summon off-site emergency services.

15.4 POSTED INSTRUCTIONS AND EMERGENCY CONTACTS

Evacuation routes, assembly points, emergency and site control procedures, OSHA clinic and hospital routes, and emergency numbers will be discussed each day at the daily safety briefing to ensure all site personnel are familiar with this information. A route map to the OSHA clinic and the hospital and the list of emergency contacts presented in Table 9 will be posted in all PIKA office and storage areas and maintained in all site vehicles. All site personnel will be familiar with the location of these lists and maps, and will be aware of the location of the closest telephone and/or radio communications.

15.4.1 Emergency Fire Recognition and Prevention

15.4.1.1 Small Fires

A small fire is defined as a fire that can be extinguished with a 4A:20 B:C fire extinguisher. In the event of a small fire, site personnel will take the following actions:

- The SUXOS and UXOSO will be immediately notified of the occurrence of the fire by PIKA site personnel.
- All unnecessary personnel will be evacuated to an upwind location.
- Under the initial direction of the PIKA Team Leader, as directed by the SUXOS, PIKA personnel will extinguish the fire from an upwind location.
- The SUXOS will request emergency response assistance (ambulance, fire, police) as needed for any injuries or exposures to smoke or other hazardous chemicals via Post 1.

- PIKA personnel will not attempt to extinguish a fire, even a small one, if explosives are involved, and all site personnel will evacuate the site if explosives are involved.
- After the fire is extinguished, an investigation will be initiated to determine the cause of the fire and to identify any operational changes that may be required to prevent future fires.

15.4.1.2 Large Fires

In the event that a large fire occurs, or if a small fire cannot be extinguished and develops into a large fire, the following actions will be taken:

- PIKA site personnel will immediately notify the SUXOS and UXOSO.
- All unnecessary personnel will be evacuated to an upwind assembly point.
- The SUXOS will summon the local fire department and any other emergency response services (police, ambulance, hospital, etc.) as needed for the treatment of injuries or exposures via Post 1.
- To the extent that it can be safely accomplished, the SUXOS will direct site personnel to move vital equipment/supplies from the fire's path.
- To the safest extent possible, and with available resources, PIKA personnel will fight the fire from an upwind location.
- At no time will attempts be made to extinguish a fire involving explosives and all personnel will evacuate the site if the fire involves explosives.
- After the fire is extinguished, an investigation will be initiated to determine the cause of the fire and to identify any operational changes that may be required to prevent future fires.

15.4.2 Inclement Weather

In the event of inclement weather, such as heavy precipitation, electrical storms, high winds, snowstorms, dense fog, or extremely cold weather, it may be necessary to cease site operations and evacuate the site. The UXOSO will be responsible for obtaining the local weather on a daily basis and advising the SUXOS of the forecast.

If necessary, the weather service will be contacted on a more frequent basis. If inclement weather occurs, the procedures outlined below will be followed until the inclement weather passes.

- **Heavy Precipitation**: In the event that heavy precipitation is imminent, or occurs suddenly, site operations may have to be halted if in the opinion of the UXOSO it would cause unsafe conditions. If so determined, equipment will be secured, and site personnel will retreat to shelter. The determination to re-start operations will be the responsibility of the SUXOS, who will consult with the UXOSO to ensure site conditions are safe for re-entry and continuation of operations.
- **Thunderstorms**: Thunderstorms, with their associated lightning, present a significant hazard to site personnel. A severe thunderstorm watch announcement indicates that a severe thunderstorm is possible. A severe thunderstorm warning signifies that a severe thunderstorm has been sighted, or detected by radar, and may be approaching. Work may continue at the work site during severe thunderstorm watches; however, site work will cease and the EZ will be evacuated during a severe thunderstorm warning for the site area. Activities will not resume until 30 minutes have past since last observed lightning flash or clap of thunder heard.
- **High Winds**: High winds can create conditions that threaten the safety and health of site personnel. If the UXOSO determines that the wind levels on-site present a hazard to site personnel, site operations will be halted and site personnel will assemble in the field office area. If wind levels are high enough, the UXOSO may even require the evacuation of the entire site until such time as conditions improve. The determination to restart operations will be the responsibility of the SUXOS in consultation with the UXOSO to ensure site conditions are safe for re-entry and continuation of operations.

15.5 CRITERIA AND PROCEDURES FOR SITE EVACUATION

15.5.1 Emergency Alerting Procedures

It will be the responsibility of the SUXOS to ensure that off-site communications are available at all times. Site operations will not be conducted unless off-site communications are established. The telephone numbers for all emergency services and contacts are listed in Table 9. The emergency phone numbers will be posted in the office/break area, and all site personnel will be aware of the procedures for obtaining off-site emergency services.

15.5.2 Employee Alarm System

To alert on-site team members, each PIKA Team Leader and the UXOSO will have an air horn that will be sounded to inform personnel in the immediate area of an emergency. The effectiveness of the air horn will be tested during initiation of site activities to ensure that all site personnel can clearly hear the alarm above operational noise levels. If operational noise levels prevent site personnel from hearing the air horn alarm, other means of notification will be used.

To alert personnel of the occurrence of an emergency, one long blast on the air horn will be the signal to evacuate the site immediately. The initial assembly point will be located in a safe area as identified during the daily safety briefing each morning. Once personnel are assembled, the SUXOS will conduct a head count of all team personnel. Once accounted for, personnel will communicate with the SUXOS and await instructions from the SUXOS, which may include: further evacuation from the site, emergency response instructions; or any other instructions deemed necessary by the SUXOS.

15.5.3 Evacuation Routes and Assembly Points

Prior to the initiation of site operations, the UXOSO and the SUXOS, will identify the evacuation routes and assembly points for the various areas of the site. These routes and assembly points will be identified on the site map and will be communicated each morning to site personnel during the daily safety briefing.

15.5.4 Site Security and Control During Emergencies

During an emergency, site security and control are paramount to controlling the possible negative effects of the emergency. Upon notification of an emergency, each team leader will be responsible for locating, assembling, and controlling their team personnel. If the team leader is unable to perform this role, the duty will be passed to another team member. Once the team has evacuated the site to the assembly point, each team leader will maintain control over their team until the SUXOS or UXOSO takes control by verbally informing the team leader that the control has been transferred. This level of personnel control is needed to ensure no personnel are forgotten and that no personnel attempt any response action on their own without the knowledge of the SUXOS or UXOSO.

PIKA personnel, as directed to do so by the SUXOS, will initially conduct site access control and security. If PIKA personnel are needed for other response actions, the SUXOS will request assistance from the RVAAP FM, who will then be responsible for requesting security and access control services from the local Police Department.

15.6 EMERGENCY PPE AND EQUIPMENT

15.6.1 General Requirements

The emergency equipment listed in Table 8 will be on-site, stored in the location indicated and available for use during the operation specified. Emergency equipment assigned to a team will be maintained in proper working order and staged near the team operational area as directed by the team leader. The UXOSO will conduct an inspection of all emergency equipment at least weekly to ensure completeness and proper working order.

15.6.2 Portable Fire Extinguishers

Fire extinguishers will be stored in well-marked locations where they can be readily accessed and will be stored in locations where they are protected from damaging environmental elements. The UXOSO will ensure that all fire extinguishers are visually inspected monthly and that these inspections are documented. All site personnel will be advised of the location and operation of fire extinguishers and will be informed of the procedures to be followed in the event of a fire. Emergency procedures for small and large fires and explosions are found in 15.4.1. Fire extinguisher requirements and storage locations are as follows:

- Flammable/combustible liquid storage will have at least one 4A:20 B:C fire extinguisher located within 7.5 to 23 meters (25 to 75 feet) of the storage area.
- All vehicles will be equipped with a fire extinguisher of not less than 10B units.
- All vehicles used in the transport of explosives will be equipped with two fire extinguishers of not less than 10BC units or higher.
- Temporary offices or support locations will be equipped with a fire extinguisher of not less than 10B units.

At least one portable fire extinguisher having a rating of not less than 20:B units will be located at each WZ, with a similar extinguisher placed near the torch cutting operation area where the fire watch person is stationed.

15.6.3 First Aid Kit Requirements

To ensure that adequate first aid supplies are available, the size and number of first aid kits will be sufficient to accommodate the maximum number of people (including government personnel and visitors) on-site at any given time. Standard 16-unit first aid kits will be located with each team and two EMT-type trauma kits will be maintained on-site. Additionally, all first aid kits will be provided with adequate water, gel burn bandages, and other supplies necessary to cleanse burns, wounds, or lesions. The first aid supplies listed in Table 8 have been assessed and approved

by PIKA's consulting licensed physician, and a copy of this approval will be maintained on-site during operations.

15.6.4 Eye Washes

Portable eyewash bottles will be readily available in each WZ where there is a potential for hazardous materials to contact the eyes. Portable eye wash bottles will be available for immediate use while the injured person is transported to the area where the 15-minute eye flushing station will be available. After flushing, the eyes will be bandaged lightly and the person transported to the appropriate medical facility for further evaluation and treatment.

15.7 DECONTAMINATION AND TREATMENT OF INJURED PERSONNEL

15.7.1 General

The chemical hazards associated with this are limited and no specific chemical washes/rinses will be necessary during emergency decontamination.

15.7.2 Assessing the Emergency

A key element to the successful treatment of an injured worker is the effective assessment of the emergency prior to the initiation of action. If on-site PIKA or off-site emergency personnel are to enter the site in response to the emergency, the SUXOS will assess the incident to identify and record vital information about the site and situation. This data will be passed on to response personnel and will include, to the extent possible, the items listed below:

- What happened (i.e., type of incident; cause of incident; the time the incident occurred; extent of chemical release; including route of migration; and extent of damage to structures, equipment, and terrain).
- Where on the project site the incident has occurred.

- Personnel/casualties involved, such as number, location, and condition of victims, treatment that may be required and missing personnel.
- What could happen from this point (i.e., potential for fire or explosion, coupled with release of hazardous materials, location of all personnel in relation to hazardous areas, and potential for emergency affecting the general public or the environment).
- Steps needed to resolve the situation such as equipment and personnel needed for rescue and hazard mitigation; number of uninjured personnel available for response; resources available on-site; resources available from off-site response groups and agencies; time needed for off-site response resources to reach the site; and hazards involved in rescue and response.

15.7.3 Rescue and Response Actions

At no time will site personnel attempt an emergency response or rescue until the situation has been assessed and the appropriate response outlined by the SUXOS or UXOSO. Ensuring that the incident has been properly assessed and that the appropriate actions have been selected will ensure that further injuries do not occur due to poor response planning. Based on the information collected during the emergency assessment, the SUXOS or UXOSO will select the relevant response and rescue actions that will be taken. The rescue actions that may be needed are listed below, with some actions possibly being performed concurrently and some of the actions not being required:

- Personnel evacuation to a safe location upwind of the incident.
- Enforce the buddy system and allow no one to enter the site unattended.
- Survey casualties to locate all victims, assess their condition, and determine the resources needed for casualty stabilization and transportation.
- Assess existing and potential hazards and decide whether and how to respond.
- Request aid by contacting the required off-site personnel or facilities, such as ambulance, fire department, police, etc, via Post #1.

- Allocate personnel and equipment to rescue and initiate incident response operations.
- Control the situation and use measures to prevent the situation from migrating further.
- Assign PPE IAW the nature and type of emergency.
- Extricate victims and assist them from the area.
- Decontaminate personnel, if necessary, by removing outer clothing only if it can be done without causing further danger or damage to the affected personnel.
- Stabilize injured personnel and administer any medical procedures that are necessary before the victims can be moved.
- Transport the affected personnel via the predetermined mode as determined by their injury.
- Record to whom the incident occurred, the time it occurred, and the destination and condition of the casualty at the time of transport.
- Record disposition, condition, and location of all personnel affected by the emergency.

15.7.4 Treatment of Injured/Ill Personnel

In the event of an emergency involving personal injury or illness, immediate, appropriate response will be the key to preventing further injury/illness and providing comfort to the affected party. If any site personnel are injured, or if they are overcome by illness, the applicable procedures listed below will be followed:

- Upon notification of the occurrence and the nature of the injury/illness, the SUXOS and the UXOSO will respond to the location where the injury/illness has occurred.
- The severity of the injury/illness will be assessed, the required first aid support will be provided, and the SUXOS or UXOSO will initiate the procedures needed to ensure rapid, efficient transportation of the affected person to appropriate medical support, if required.

- If immediate transportation to a medical facility is required, the SUXOS will immediately request for emergency services. If deemed necessary by the emergency service operator, an air ambulance may be summoned to transport the affected party.
- Any life threatening injuries that are beyond minor first aid will require summoning Emergency Medical Service (EMS). The injury will be described to facilitate the determination as to whether BLS or ALS is needed. The UXOSO, or designated representative may transport (along with the First Aid provider) injured personnel with minor (any non-life threatening injury beyond standard first aid) to the designated medical facility; however if any doubt over the severity of the injury exists, the EMS will be summoned.

15.7.5 Post-Emergency Follow-up

Before normal site activities can resume, the site and personnel must be prepared and equipped to handle another emergency. It is also imperative that all federal and local regulatory agencies be notified of the emergency, as necessary. Therefore, the following activities must be conducted prior to restart of site activities:

- Notify all appropriate governmental agencies as required (i.e., OSHA must be notified if there have been any fatalities or three or more personnel hospitalized).
- Restock and clean all equipment and supplies used or damaged in the emergency.
- The PIKA PjM, CESHM, SUXOS and UXOSO will conduct an accident investigation to determine the cause of the emergency and what preventative measures can be taken to ensure the emergency does not occur again.
- The PIKA PjM and CESHM, SUXOS and UXOSO will conduct an emergency response critique to assess the effectiveness of the emergency response procedures and to identify any areas requiring improvement.
- Complete the PIKA and RVAAP required accident forms.

- Review and revise as needed the site operational and emergency response procedures, and if necessary, update the SSHP to reflect the new procedures.

15.7.6 Documentation

Documentation related to the emergency will be recorded in a legible, accurate, and complete fashion. Documentation will be recorded as soon as possible (within 24 hours or sooner) after the emergency to ensure it is recorded while the events are vivid in the minds of the personnel involved. The information recorded will include:

- A listing of the personnel involved, including personnel on-site, site personnel who responded, personnel in charge, and off-site groups or agencies that responded.
- A chronological record of events.
- A listing of the actions taken to minimize the effects of or mitigate the emergency.
- The results from any air monitoring conducted during the emergency, and if applicable, results of environmental samples.
- An assessment of the potential exposures received by site personnel and the surrounding public.
- A recording of the injuries or illnesses which occurred as a result of the emergency.

15.8 ROUTE MAPS TO MEDICAL TREATMENT FACILITY

15.8.1 General Instructions

During the daily safety briefing, the UXOSO will review the instructions for obtaining medical attention and transporting site personnel to the hospital. All site vehicles will be provided with copies of the site map and the directions provided in section 15.8.2 along with the OSHA clinic and the hospital route map. Standard first aid injuries will not require BLS/ALS service and ambulance transportation to the

hospital. If the UXOSO determines that an injured party (standard first aid injury) can be transported to medical attention using a site vehicle, the directions presented in section 15.8.2 and Attachment 4 along with the hospital route map will be used to transport the injured party to Robinson Memorial Hospital in Ravenna. Prior to the initiation of site activities, and periodically thereafter, the hospital route will be driven by the UXOSO to ensure that the route to the hospital is free of unanticipated delays.

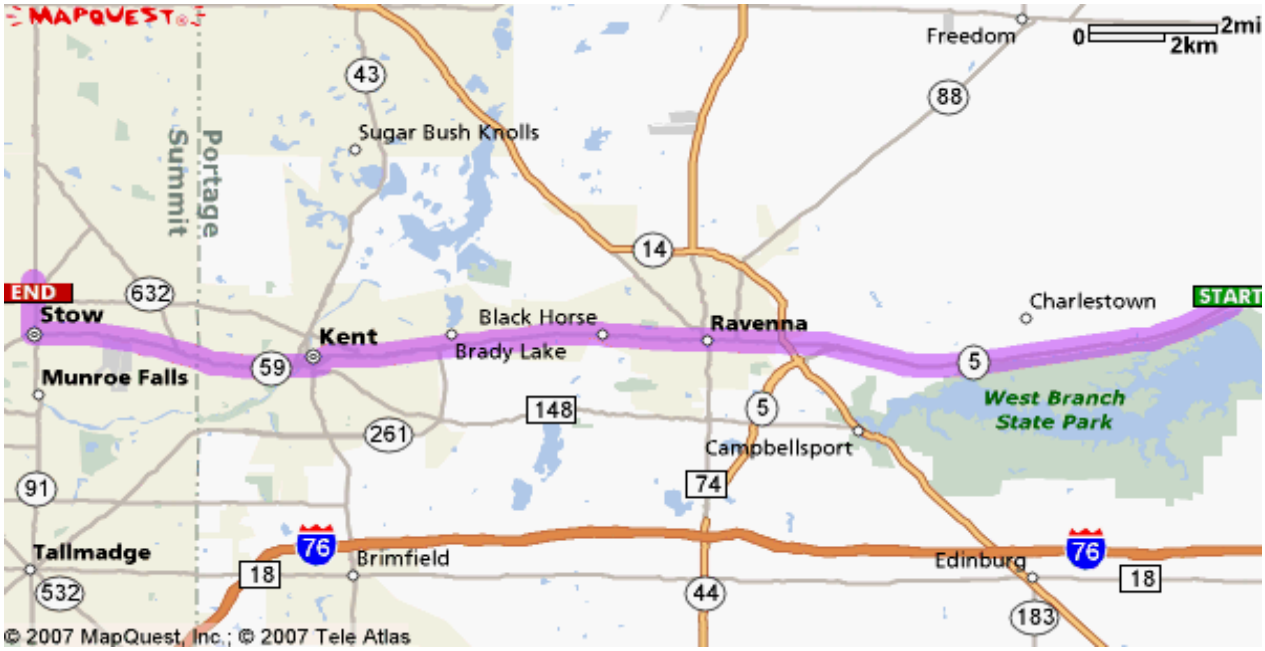
If BLS/ALS and ambulance service is required, the UXOSO will contact RVAAP Post 1 security personnel to summon emergency ambulance services. The 911 operator will provide the "best" level available to respond to the described injury. A PIKA representative will meet the ambulance at the main gate and escort it to the accident site. An on-board EMT will provide BLS and other care as required by the nature of the injury. EMT-Is and Paramedics will provide ALS.

15.8.2 Directions to the Designated Medical Facility

CLINIC MAP AND DIRECTIONS: Site personnel requiring non-emergency first aid treatment, as deemed necessary by the UXOSO will be taken to the medical facility described below:

Directions to Med Group
Summary: 19.62 miles (36 minutes)

Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services

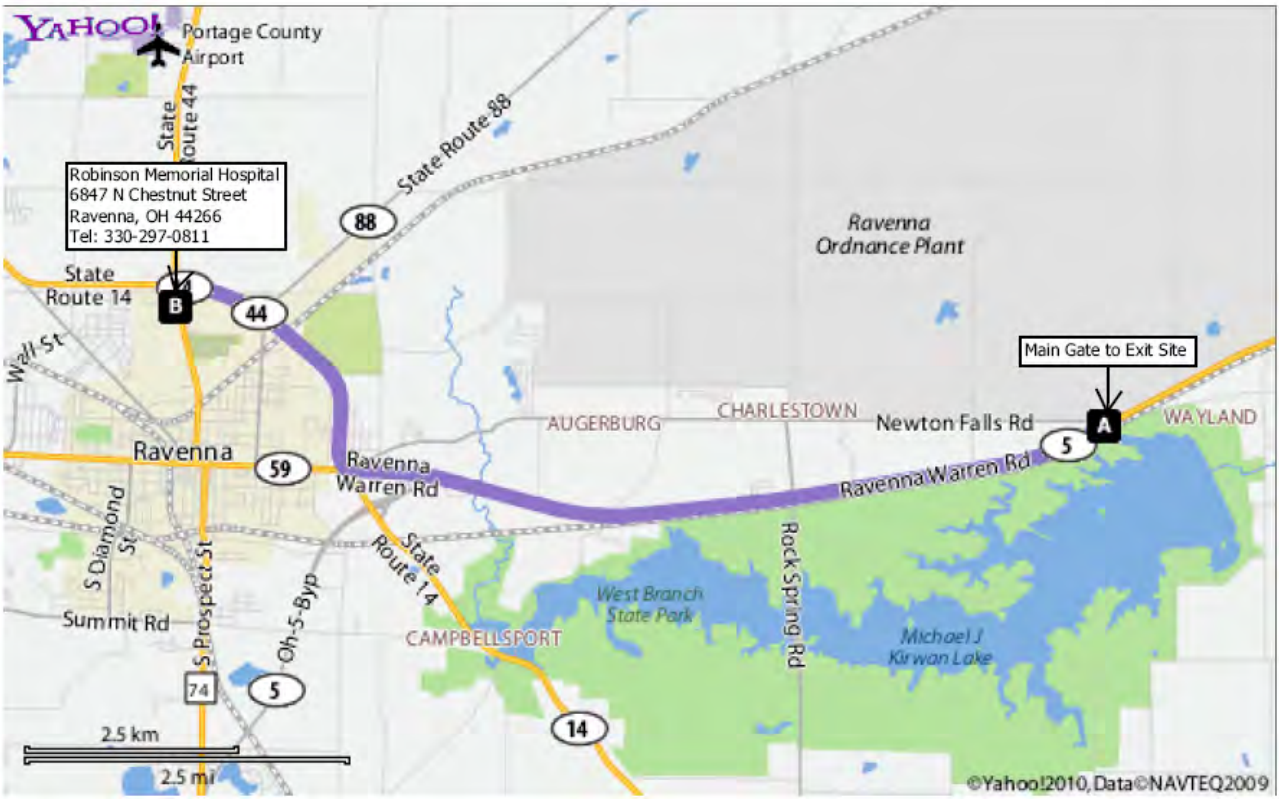


Instruction	For
Depart Main Gate to Exit Site on SR-5 [Ravenna Warren Rd] (West)	6.3 mi
Stay Straight to go onto OH-59	12.4 mi
Turn right onto Darrow Rd / OH-91	0.8 mi
Arrive at Med Group: 3913 Darrow Rd #100, Stow, OH 44244, Tel: (330) 688-7900	

Site personnel requiring care beyond first aid will be transported by ambulance or other means to the medical facility described below:

Directions to the Robinson Memorial Hospital Summary: 9.06 miles (11 minutes)

HOSPITAL MAP AND DIRECTIONS



Instruction	For
Depart Main Gate to Exit Site on SR-5 [Ravenna Warren Rd] (West)	6.5 mi
Turn RIGHT (North) onto SR-14	2.38 mi
Turn LEFT (South) onto (N) Chestnut St	0.18 mi
Arrive Robinson Memorial Hospital [6847 N Chestnut Street, Ravenna, OH 44266, Tel: (330) 297-0811	

15.9 COMMUNITY ALERT PROGRAM

It is not anticipated that any site operations will result in a potential emergency that would require PIKA to implement a community alert program. However, in the event that an unplanned event affects the local community, the SUXOS will notify the RVAAP FM of potential hazard.

15.10 SPILL CONTAINMENT

15.10.1 Spill Response Supplies

A portable spill response kit containing oil/solvent absorbent pillows/pads, non-sparking shovel, PPE and disposal supplies will be maintained in a readily accessible location where fuels, oils, solvents and other environmentally harmful materials are stored on-site. Upon notification of a spill, the UXOSO, or a party designated by the UXOSO, will transport this kit to the spill site for use by PIKA personnel in the cleanup of the spilled materials.

15.10.2 Spill Response

It is anticipated that site operations will not involve handling large containers of liquids that could be easily spilled. However, small containers (5 gallons or less) of gasoline or diesel fuel may be used and stored on-site. If material from these containers is spilled, PIKA personnel will follow these steps:

- The immediate area will be evacuated, ignition sources will be extinguished, and the SUXOS will be notified of the spill.
- The SUXOS, in conjunction with the UXOSO, will evaluate the situation to ensure it is safe for personnel to begin cleanup operations.
- The UXOSO will assign the level of protection to be worn by the spill response personnel.
- All required supplies will be assembled and positioned such that they are readily available to the spill response personnel.
- Spill response personnel will take measures to stop the spill and will, if applicable, use an absorbent or adsorbent to collect the spilled material.
- Using non-sparking tools, PIKA personnel will collect the contaminated soil, place it in a plastic bag, and place the bag in an approved container.
- The SUXOS will notify the PIKA PjM, who will notify the CELRL PM, Ohio Environmental Protection Agency (EPA) and the RVAAP FM that the spill

occurred and will brief them as to the cleanup actions that were taken by PIKA personnel.

- The PIKA PjM will contact the CELRL PM and Ohio EPA who will provide guidance on disposal of the contaminants and other actions that must be taken.

16.0 LOGS, REPORTS AND RECORDKEEPING

16.1 SAFETY LOG

The UXOSO will maintain a Safety Log and will be responsible for ensuring that all safety and health related activities and events are recorded in the log each day. At a minimum, the Safety Log should include, a reference to the conduct of the daily safety briefing, details of any accidents, injuries, illnesses, or near misses, details related to the conduct and outcome of internal and external audits, the reason for, and duration of, safety-related "stop work" orders, and any other issues pertaining to site or personnel safety or health.

16.2 INJURY/ILLNESS/ACCIDENT REPORTS

In the event that a reportable accident/incident occurs at the job site, the PIKA Accident/Near Miss Reporting form will be completed and forwarded the same day the accident/incident occurs to the RVAAP FM, the PjM and PIKA PM. In addition, if OSHA Form 300 needs to be completed, the UXOSO will forward the required information to the CESHM so the form may be completed as required. If a near miss occurs, the UXOSO will investigate the incident and report the results of the investigation using the PIKA Accident and Near Miss Report form. This form will be forwarded to the CESHM to be reviewed by the CESHM and PjM.

16.3 TRAINING LOG

The UXOSO is responsible for ensuring that all safety and health related training is documented in the Training Log and/or on the appropriate training forms. This log will include the initial site-specific training conducted prior to the start of site activities, the Daily/Weekly Safety Briefings, hazard-specific training, MEC refresher and recognition training, emergency response exercises, etc. The UXOSO will maintain this log and any associated training forms on-site.

16.4 VISITOR LOG

The UXOSO will be responsible for maintaining the PIKA site visitor's log, which will be used to record the entry and exit of all visitors, including PIKA; contractor visitors; or federal, state, or local officials who visit the site. All information required by the form will be completed by the site visitor and the UXOSO. No visitors will be allowed to enter the project site or WZs without completing the required information.

ATTACHMENT 2

CERTIFICATION OF ACTIVITY HAZARD ANALYSIS

ACTIVITY HAZARDS ANALYSIS

Risk Assessment Code (RAC): M

Date Prepared: 10-13-2010

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP

Job: Mobilization and Site Set-up, as well as Site Tear-down and Demobilization

Prepared By: Brian Stockwell, PjM

Reviewed By: Joseph Frydenger, CSP

Recommended Protective Clothing & Equipment:
Level D Leather outer gloves: Hard hat: Steel toed leather boots; Ear plugs or ear muffs; Safety Glasses; Chemical protective gloves when refueling.

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**

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
1. Mobilization a. Mobilize equipment and tools. b. Set up work zones, barricades, site control, erosion control c. Test and verify safe operating condition of project equipment and machinery d. Site and set up office trailer	General	Site personnel will be given task-specific briefings daily regarding the hazards associated with the task and the procedures used to control/mitigate the hazards. All personnel inside exclusion zone will wear a minimum of Level D PPE. All PIKA subcontractors will be required to read and sign-off on the PIKA ESHPs that affect their operations.	01.B.05
2. Demobilization a. Tear down work zones, barricades and site control b. Pack and ship equipment c. Load and demobilize machinery	Unauthorized Entry/Site access control	Site personnel will maintain a constant watch for intrusion of unauthorized personnel. Positive site access control will be established prior to on-site operations using barricades, signs or other methods to prevent unauthorized access during tasks that could cause exposure to MEC or other ES&H hazards.	28.B.02 (5.j)

ACTIVITY HAZARDS ANALYSIS

Date Prepared 10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Mobilization and Site Set-up, as well as Site Tear-down and Demobilization

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Heat Stress	This project will be conducted during spring and summer weather and as such heat stress will become an issue. When ambient temperatures exceed 75ºF, PIKA will implement the PIKA ESHP-506; Heat Stress Prevention. Personnel will be monitored for heat stress and will maintain adequate hydration.	06.I.02 – 06.I.04
	Cold Stress	It is not anticipated that this project will extend into winter months and as such cold stress should not become a significant issue for the safety of site personnel. However, should this project extend into fall and winter, and ambient temperatures are below 61°F, PIKA will implement the PIKA ESHP-507, Cold Stress Prevention, and personnel will be monitored for cold stress. Personnel will be evaluated daily to ensure they are properly clothed and able to work in the anticipated cold/wet conditions anticipated for that day by the SUXOS and UXOSO/SSHO.	06.I.06 – 06.I.13
	Adverse Weather	When there are warnings or indications of impending severe weather, conditions will be monitored and appropriate precaution taken to protect personnel and property as specified in the SSHP. All site operations will be suspended if lightning is detected within 5 miles of the site. The UXOSO/SSHO will consult the SSHP for other limiting weather conditions such as high winds, rain, etc.	06.I.01
	Slips, trips and falls	All personnel will maintain clean work areas	14.C

ACTIVITY HAZARDS ANALYSIS

Date Prepared 10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Mobilization and Site Set-up, as well as Site Tear-down and Demobilization

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		to remove trip hazards and will be aware of uneven walking and working surfaces. Good house keeping procedures will be implemented. Use three points of contact when entering/exiting equipment.	
	Physical Strain	Personnel will be cautioned about physical strain associated with strenuous activities that may be conducted at the site. Personnel will use caution to not over exert themselves or overstrain muscles and joints. Proper lifting techniques will be emphasized. Personnel will be cautioned of the higher potential for straining muscles in cold weather and for the need to stretch and work at a controlled pace.	01.C.01, 14.A
	Use of Hand and Power Tools	Hand and power tools will be selected to ensure that the right tool is being used for the right job and being used in the manner in which it was intended to be used. All hand and power tools will be inspected daily prior to use and any defective tools will be tagged and removed from service immediately. All portable electrical tools and equipment will be used with a Ground Fault Circuit Interrupter (GFCI) placed inline as close to the electrical supply source as possible. Personnel will follow the other requirements of PIKA ESHP-520, Hand and Power Tool Safety to ensure proper use of the hand and power tools anticipated for this project.	11.D.05 & 13.A
	Cuts and Lacerations	Level D PPE with leather gloves will be used per the SSHP for all tasks with a	05.A.01, 05.A.08

ACTIVITY HAZARDS ANALYSIS

Date Prepared 10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Mobilization and Site Set-up, as well as Site Tear-down and Demobilization

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		potential for cuts or lacerations. Personnel will be trained in the proper use and selection of the equipment and tools they must use to complete their tasks and the hazards of exposed metal and other cut hazards.	
	High Noise levels (>85 dBA)	Personnel exposed to greater than 85 dBA 8-hour Time-weighted average (TWA) will use hearing protection devices and the SSHO will implement ESHP-505. UXOSO/SSHO will monitor noise levels and establish hearing protection requirements for high noise areas.	05.C.01
	Biological	During both access surveys and vegetation clearing operations, it is anticipated that biological hazards will exist and PIKA will implement ESHP-503 Biological Hazards. Biological hazards that may be encountered include stinging and biting insects, hazardous plants, and snakes. Insect repellant will be used by site personnel as needed to repel hazardous insects. Site personnel will report to the UXOSO/SSHO and their team leader the presence of any hazardous animals, insects or plants.	06.D.01
	Skin contact with fuels	Flammable liquids will be kept in closed, approved containers. Chemical protective gloves will be worn when handling fuels. Training will be provided to employees handling flammable and combustible liquids, in addition to HAZCOM training. MSDS sheets will be provided and located in a location made known to all employees and	06.A.01 06.B.02

ACTIVITY HAZARDS ANALYSIS

Date Prepared 10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Mobilization and Site Set-up, as well as Site Tear-down and Demobilization

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		accessible during all work hours.	
	Eye irritation or burns	Use of insect repellant, fuels and other chemicals on site creates the potential for accidental spraying/splashing of chemicals into the eyes. Portable eye wash bottles will be located in the work zones and a 15-minute eye wash station will be located at the office/equipment storage location. Training will be provided to employees handling flammable and combustible liquids, in addition to HAZCOM training. MSDS sheets will be provided and located in a location made known to all employees and accessible during all work hours.	05.B.01
	UV Radiation	Site personnel will be cautioned about the possibility of sunburns and will use sunscreen with a minimum SPF 30 on exposed skin.	06.I.05
	Heavy Equipment Operation	Heavy equipment/brush clearing equipment operators will be trained on the use, inspection and maintenance of the heavy equipment they use, and all site personnel will be briefed regarding safe operation near heavy equipment. LO/TO will be used as determined by the UXOSO/SSHO for maintenance of heavy equipment. Safety vest when working within 50 feet of equipment.	06.A.02 – 18.A.01-.03
	Manual lifting of heavy objects	Personnel will use safe lifting procedures and lift with their legs and not their backs, as outlined in PIKA Manual Lifting and Material Handling Safety ESHP-522.	14.A.01-.04

ACTIVITY HAZARDS ANALYSIS

Date Prepared 10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Mobilization and Site Set-up, as well as Site Tear-down and Demobilization

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Pinch Points	All personnel will be advised of potential pinch points. When pinch points have been identified and cannot be eliminated, guards or barricades will be used. The pinch point area around the counter weight of excavators will be barricaded to prevent personnel from entering the area during operations.	13.A.03
	Overhead Hazards	Hard hats will be required in those areas with potential hazard of head injury and when working within 50 feet of heavy equipment operations. All protective head gear shall meet the requirements of the current ANSI Z89.1.	05.D.01 & 05.D.02
	Struck by equipment or vehicles	Personnel will wear ANSI Class II or higher reflective vests when working on-site when heavy equipment or vehicles are operating.	05.F
		All heavy equipment will be equipped with a functioning backup alarm and personnel backing site vehicles will sound the horn before backing up in areas with foot traffic.	18.B.01
	Spills / Leaks	A portable spill response kit containing absorbent pillows/pads, non-sparking shovel, PPE and disposal supplies shall be maintained in a readily accessible location per the SSHP. Employees will be made aware of its location and will be trained in its use if required to respond to a spill.	09.B.21 a & d
	Crush and Injury Hazards Due to Stored Energy (LO / TO)	Personnel will use ESHP-521 as directed by the UXOSO/SSHO for the maintenance and inspection of heavy equipment. All personnel conducting maintenance and servicing of heavy equipment will be trained	12.E

ACTIVITY HAZARDS ANALYSIS

Date Prepared 10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Mobilization and Site Set-up, as well as Site Tear-down and Demobilization

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		in the sources of stored energy and all heavy equipment maintenance will be assessed by the UXOSO/SSHO prior to initiating the task to determine if stored energy hazards will be created and to determine how they will be controlled. Following the assessment, all personnel will be trained on the level and type of stored energy hazard and their control techniques. This training will be documented by the UXOSO/SSHO.	
	Fire	Service or refueling areas will have at least one 20 BC fire extinguisher within 25-75 feet of dispenser. Equipment will be “Off” while refueling. Training will be provided to employees handling flammable and combustible liquids, in addition to HAZCOM training.	09.B.01 – 09.B.05 06.B.02

ACTIVITY HAZARDS ANALYSIS

Date Prepared 10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Mobilization and Site Set-up, as well as Site Tear-down and Demobilization

Equipment to Be Used	Inspections Required	Training Required
1. Hand Tools 2. Power Tools	Daily inspections of hand/power tools	40-Hour HAZWOPER 8-Hour Refresher Initial Site / Task Hazard Training PPE Training All personnel operating hand tools will be trained in proper inspection, maintenance and use of the hand tools.
3. Heavy equipment	Daily Inspection of Heavy Equipment Inspection of LO/TO equipment	Heavy equipment operators are required to be trained in the operation, inspection and maintenance of heavy equipment Personnel conducting maintenance and servicing will be provided LO/TO training as deemed necessary by the UXOSO/SSHO and as hazardous energy sources are identified. Only qualified personnel will perform a LO/TO on equipment.

ACTIVITY HAZARDS ANALYSIS

Risk Assessment Code (RAC): M

Date Prepared: 10-13-2010

Project: CRS CC-RVAAP-80 Group 2 Job: Access Surveys, Vegetation Propellant Can Tops, RVAAP Removal & Geophysical Data Collection

Prepared By: Brian Stockwell, PjM Reviewed By: Joseph Frydenger, CSP

Recommended Protective Clothing & Equipment:
Level D Leather outer gloves: Hard hat: Steel toed leather boots; Ear plugs or ear muffs; Safety Glasses; Chemical protective gloves when refueling.

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**

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
1. Access Surveys a. Provide anomaly avoidance in accordance with USACE EP 75-1-2. b. Clear and avoidance of footpaths, vehicular traffic routes and access ways. 2. Vegetation Removal a. Manual removal of brush, small trees and ground level vegetation. b. Mechanical removal of brush, small trees and ground level vegetation. c. Use of hand weed-eaters and chain saws.	General	Site personnel will be given task-specific briefings daily regarding the hazards associated with the task and the procedures used to control/mitigate the hazards. All personnel inside exclusion zone will wear a minimum of Level D PPE. All PIKA subcontractors will be required to read and sign-off on the PIKA ESHPs that affect their operations.	01.B.05
	Unauthorized Entry/Site access control	Site personnel will maintain a constant watch for intrusion of unauthorized personnel. Positive site access control will be established prior to on-site operations using barricades, signs or other methods to prevent unauthorized access during tasks that could cause exposure to MEC or other ES&H hazards.	28.B.02 (5.j)

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Access Surveys, Vegetation Removal & Geophysical Data Collection

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Noise, falling objects, dust and movement of EMM in proximity to personnel.	Machinery and mechanized equipment shall be operated only by designated qualified personnel certified by SUXOS. Equipment deficiencies observed at any time that effect safe operation shall be immediately corrected prior to continuance.	18.A
		Hearing protection ear plugs if > 85dBA and double protection ear muffs if > 105dBA. Hard hats to be worn around operating equipment and leather gloves. Machines or equipment shall not be operated in a manner that will endanger persons or property nor shall safe operating speeds or loads be exceeded.	05.C
		All self propelled construction equipment shall be equipped with a reverse signal alarm meeting OSHA requirements. The reverse signal alarms shall be in addition to use of signal persons.	18.B.01
	Heat Stress	This project will be conducted during spring and summer weather and as such heat stress will become an issue. When ambient temperatures exceed 75ºF, PIKA will implement the PIKA ESHP-506; Heat Stress Prevention. Personnel will be monitored for heat stress and will maintain adequate hydration.	06.I.02 – 06.I.04
	Cold Stress	It is not anticipated that this project will extend into winter months and as such cold stress should not become a significant issue for the safety of site personnel. However, should this project extend into fall and	06.I.06 – 06.I.13

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Access Surveys, Vegetation Removal & Geophysical Data Collection

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		winter, and ambient temperatures are below 61°F, PIKA will implement the PIKA ESHP-507, Cold Stress Prevention, and personnel will be monitored for cold stress. Personnel will be evaluated daily to ensure they are properly clothed and able to work in the anticipated cold/wet conditions anticipated for that day by the SUXOS and UXOSO/SSHO.	
	Adverse Weather	When there are warnings or indications of impending severe weather, conditions will be monitored and appropriate precaution taken to protect personnel and property as specified in the SSHP. All site operations will be suspended if lightning is detected within 5 miles of the site. The UXOSO/SSHO will consult the SSHP for other limiting weather conditions such as high winds, rain, etc.	06.I.01
	Slips, trips and falls	All personnel will maintain clean work areas to remove trip hazards and will be aware of uneven walking and working surfaces. Good house keeping procedures will be implemented. Use three points of contact when entering/exiting equipment.	14.C
	Physical Strain	Personnel will be cautioned about physical strain associated with strenuous activities that may be conducted at the site. Personnel will use caution to not over exert themselves or overstrain muscles and joints. Proper lifting techniques will be emphasized. Personnel will be cautioned of the higher potential for straining muscles in	01.C.01, 14.A

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Access Surveys, Vegetation Removal & Geophysical Data Collection

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		cold weather and for the need to stretch and work at a controlled pace.	
	Use of Hand and Power Tools	Hand and power tools will be selected to ensure that the right tool is being used for the right job and being used in the manner in which it was intended to be used. All hand and power tools will be inspected daily prior to use and any defective tools will be tagged and removed from service immediately. All portable electrical tools and equipment will be used with a Ground Fault Circuit Interrupter (GFCI) placed inline as close to the electrical supply source as possible. Personnel will follow the other requirements of PIKA ESHP-520, Hand and Power Tool Safety to ensure proper use of the hand and power tools anticipated for this project.	11.D.05 & 13.A
	Cuts and Lacerations	Level D PPE with leather gloves will be used per the SSHP for all tasks with a potential for cuts or lacerations. Personnel will be trained in the proper use and selection of the equipment and tools they must use to complete their tasks and the hazards of exposed metal and other cut hazards.	05.A.01, 05.A.08
	High Noise levels (>85 dBA)	Personnel exposed to greater than 85 dBA 8-hour Time-weighted average (TWA) will use hearing protection devices and the SSHO will implement ESHP-505. UXOSO/SSHO will monitor noise levels and establish hearing protection requirements for high noise areas.	05.C.01

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Access Surveys, Vegetation Removal & Geophysical Data Collection

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Biological	During both access surveys and vegetation clearing operations, it is anticipated that biological hazards will exist and PIKA will implement ESHP-503 Biological Hazards. Biological hazards that may be encountered include stinging and biting insects, hazardous plants, and snakes. Insect repellant will be used by site personnel as needed to repel hazardous insects. Site personnel will report to the UXOSO/SSHO and their team leader the presence of any hazardous animals, insects or plants.	06.D.01
	Skin contact with fuels	Flammable liquids will be kept in closed, approved containers. Chemical protective gloves will be worn when handling fuels. Training will be provided to employees handling flammable and combustible liquids, in addition to HAZCOM training. MSDS sheets will be provided and located in a location made known to all employees and accessible during all work hours.	06.A.01 06.B.02
	Eye irritation or burns	Use of insect repellant, fuels and other chemicals on site creates the potential for accidental spraying/splashing of chemicals into the eyes. Portable eye wash bottles will be located in the work zones and a 15-minute eye wash station will be located at the office/equipment storage location. Training will be provided to employees handling flammable and combustible liquids, in addition to HAZCOM training. MSDS sheets will be provided and located in a location made known to all employees and	05.B.01

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Access Surveys, Vegetation Removal & Geophysical Data Collection

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		accessible during all work hours.	
	UV Radiation	Site personnel will be cautioned about the possibility of sunburns and will use sunscreen with a minimum SPF 30 on exposed skin.	06.I.05
	Heavy Equipment Operation	Heavy equipment/brush clearing equipment operators will be trained on the use, inspection and maintenance of the heavy equipment they use, and all site personnel will be briefed regarding safe operation near heavy equipment. LO/TO will be used as determined by the UXOSO/SSHO for maintenance of heavy equipment. Safety vest when working within 50 feet of equipment.	06.A.02 – 18.A.01-.03
	Manual lifting of heavy objects	Personnel will use safe lifting procedures and lift with their legs and not their backs, as outlined in PIKA Manual Lifting and Material Handling Safety ESHP-522.	14.A.01-.04
	Pinch Points	All personnel will be advised of potential pinch points. When pinch points have been identified and cannot be eliminated, guards or barricades will be used. The pinch point area around the counter weight of excavators will be barricaded to prevent personnel from entering the area during operations.	13.A.03
	Overhead Hazards	Hard hats will be required in those areas with potential hazard of head injury and when working within 50 feet of heavy equipment operations. All protective head gear shall meet the requirements of the	05.D.01 & 05.D.02

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Access Surveys, Vegetation Removal & Geophysical Data Collection

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		current ANSI Z89.1.	
	Struck by equipment or vehicles	Personnel will wear ANSI Class II or higher reflective vests when working on-site when heavy equipment or vehicles are operating.	05.F
		All heavy equipment will be equipped with a functioning backup alarm and personnel backing site vehicles will sound the horn before backing up in areas with foot traffic.	18.B.01
	Spills / Leaks	A portable spill response kit containing absorbent pillows/pads, non-sparking shovel, PPE and disposal supplies shall be maintained in a readily accessible location per the SSHP. Employees will be made aware of its location and will be trained in its use if required to respond to a spill.	09.B.21 a & d
	Crush and Injury Hazards Due to Stored Energy (LO / TO)	Personnel will use ESHP-521 as directed by the UXOSO/SSHO for the maintenance and inspection of heavy equipment. All personnel conducting maintenance and servicing of heavy equipment will be trained in the sources of stored energy and all heavy equipment maintenance will be assessed by the UXOSO/SSHO prior to initiating the task to determine if stored energy hazards will be created and to determine how they will be controlled. Following the assessment, all personnel will be trained on the level and type of stored energy hazard and their control techniques. This training will be documented by the UXOSO/SSHO.	12.E
	Fire	Service or refueling areas will have at least	09.B.01 – 09.B.05

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Access Surveys, Vegetation Removal & Geophysical Data Collection

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		one 20 BC fire extinguisher within 25-75 feet of dispenser. Equipment will be "Off" while refueling. Training will be provided to employees handling flammable and combustible liquids, in addition to HAZCOM training.	06.B.02
	Explosion and Overpressure	For all site operations with the potential for exposure to MEC, only those personnel essential to the operations shall be allowed inside the MSD presented in Table 3-1 of the Explosive Safety Submission.	28.B.02 (5.j) 33.A.03
	MEC	The site is a low probability site in regard to encountering MRC. Therefore, only UXO construction support will be needed for this project. However, if prior to this project or during any phase of this project MEC are found at the site, the project may be stopped and the site will need to be re-evluated and potentially assigned a new probability rating..	33.A.01

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Access Surveys, Vegetation Removal & Geophysical Data Collection

Equipment to Be Used	Inspections Required	Training Required
1. Gasoline powered weed eater 2. Hand Tools 3. Power Tools	Daily inspections of hand/power tools	40-Hour HAZWOPER 8-Hour Refresher Initial Site / Task Hazard Training PPE Training All personnel operating hand tools will be trained in proper inspection, maintenance and use of the hand tools.
3. Heavy equipment/brush clearing equipment such as tractor mounted brush hog etc.	Daily Inspection of Heavy Equipment Inspection of LO/TO equipment	Heavy equipment operators are required to be trained in the operation, inspection and maintenance of heavy equipment Personnel conducting maintenance and servicing will be provided LO/TO training as deemed necessary by the UXOSO/SSHO and as hazardous energy sources are identified. Only qualified personnel will perform a LO/TO on equipment.

ACTIVITY HAZARDS ANALYSIS

Risk Assessment Code (RAC): M

Date Prepared: 10-13-2010

Project: CRS CC-RVAAP-80 Group 2

Job: Geophysical Survey

Propellant Can Tops, RVAAP

Prepared By: Brian Stockwell, PjM

Reviewed By: Joseph Frydenger, CSP

Recommended Protective Clothing & Equipment:
Level D Leather outer gloves: Hard hat: Steel toed leather boots; Ear plugs or ear muffs; Safety Glasses; Chemical protective gloves when refueling.

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**

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
1. Geophysical Survey - General a. Survey investigation area into 200 feet by 200 feet grids. b. Conduct Geophysical Survey. c. Collect Surface soil samples	General	Site personnel will be given task-specific briefings daily regarding the hazards associated with the task and the procedures used to control/mitigate the hazards. All personnel inside exclusion zone will wear a minimum of Level D PPE. All PIKA subcontractors will be required to read and sign-off on the PIKA ESHPs that affect their operations.	01.B.05
	Unauthorized Entry/Site access control	Site personnel will maintain a constant watch for intrusion of unauthorized personnel. Positive site access control will be established prior to on-site operations using barricades, signs or other methods to prevent unauthorized access during tasks that could cause exposure to MEC or other ES&H hazards.	28.B.02 (5.j)

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Geophysical Survey

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Heat Stress	This project will be conducted during spring and summer weather and as such heat stress will become an issue. When ambient temperatures exceed 75ºF, PIKA will implement the PIKA ESHP-506; Heat Stress Prevention. Personnel will be monitored for heat stress and will maintain adequate hydration.	06.I.02 – 06.I.04
	Cold Stress	It is not anticipated that this project will extend into winter months and as such cold stress should not become a significant issue for the safety of site personnel. However, should this project extend into fall and winter, and ambient temperatures are below 61°F, PIKA will implement the PIKA ESHP-507, Cold Stress Prevention, and personnel will be monitored for cold stress. Personnel will be evaluated daily to ensure they are properly clothed and able to work in the anticipated cold/wet conditions anticipated for that day by the SUXOS and UXOSO/SSHO.	06.I.06 – 06.I.13
	Adverse Weather	When there are warnings or indications of impending severe weather, conditions will be monitored and appropriate precaution taken to protect personnel and property as specified in the SSHP. All site operations will be suspended if lightning is detected within 5 miles of the site. The UXOSO/SSHO will consult the SSHP for other limiting weather conditions such as high winds, rain, etc.	06.I.01
	Slips, trips and falls	All personnel will maintain clean work areas to remove trip hazards and will be aware of uneven walking and working surfaces. Good	14.C

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Geophysical Survey

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		house keeping procedures will be implemented. Use three points of contact when entering/exiting equipment.	
	Physical Strain	Personnel will be cautioned about physical strain associated with strenuous activities that may be conducted at the site. Personnel will use caution to not over exert themselves or overstrain muscles and joints. Proper lifting techniques will be emphasized. Personnel will be cautioned of the higher potential for straining muscles in cold weather and for the need to stretch and work at a controlled pace.	01.C.01, 14.A
	Use of Hand and Power Tools	Hand and power tools will be selected to ensure that the right tool is being used for the right job and being used in the manner in which it was intended to be used. All hand and power tools will be inspected daily prior to use and any defective tools will be tagged and removed from service immediately. All portable electrical tools and equipment will be used with a Ground Fault Circuit Interrupter (GFCI) placed inline as close to the electrical supply source as possible. Personnel will follow the other requirements of PIKA ESHP-520, Hand and Power Tool Safety to ensure proper use of the hand and power tools anticipated for this project.	11.D.05 & 13.A
	Cuts and Lacerations	Level D PPE with leather gloves will be used per the SSHP for all tasks with a potential for cuts or lacerations. Personnel will be trained in the proper use and selection of the equipment and tools they must use to	05.A.01, 05.A.08

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Geophysical Survey

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		complete their tasks and the hazards of exposed metal and other cut hazards.	
	High Noise levels (>85 dBA)	Personnel exposed to greater than 85 dBA 8-hour Time-weighted average (TWA) will use hearing protection devices and the SSHO will implement ESHP-505. UXOSO/SSHO will monitor noise levels and establish hearing protection requirements for high noise areas.	05.C.01
	Biological	During both access surveys and vegetation clearing operations, it is anticipated that biological hazards will exist and PIKA will implement ESHP-503 Biological Hazards. Biological hazards that may be encountered include stinging and biting insects, hazardous plants, and snakes. Insect repellant will be used by site personnel as needed to repel hazardous insects. Site personnel will report to the UXOSO/SSHO and their team leader the presence of any hazardous animals, insects or plants.	06.D.01
	Skin contact with fuels	Flammable liquids will be kept in closed, approved containers. Chemical protective gloves will be worn when handling fuels. Training will be provided to employees handling flammable and combustible liquids, in addition to HAZCOM training. MSDS sheets will be provided and located in a location made known to all employees and accessible during all work hours.	06.A.01 06.B.02
	Eye irritation or burns	Use of insect repellant, fuels and other chemicals on site creates the potential for accidental spraying/splashing of chemicals into the eyes. Portable eye wash bottles will	05.B.01

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Geophysical Survey

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		be located in the work zones and a 15-minute eye wash station will be located at the office/equipment storage location. Training will be provided to employees handling flammable and combustible liquids, in addition to HAZCOM training. MSDS sheets will be provided and located in a location made known to all employees and accessible during all work hours.	
	UV Radiation	Site personnel will be cautioned about the possibility of sunburns and will use sunscreen with a minimum SPF 30 on exposed skin.	06.I.05
	Heavy Equipment Operation	Heavy equipment/brush clearing equipment operators will be trained on the use, inspection and maintenance of the heavy equipment they use, and all site personnel will be briefed regarding safe operation near heavy equipment. LO/TO will be used as determined by the UXOSO/SSHO for maintenance of heavy equipment. Safety vest when working within 50 feet of equipment.	06.A.02 – 18.A.01-.03
	Manual lifting of heavy objects	Personnel will use safe lifting procedures and lift with their legs and not their backs, as outlined in PIKA Manual Lifting and Material Handling Safety ESHP-522.	14.A.01-.04
	Pinch Points	All personnel will be advised of potential pinch points. When pinch points have been identified and cannot be eliminated, guards or barricades will be used. The pinch point area around the counter weight of excavators will be barricaded to prevent personnel from	13.A.03

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Geophysical Survey

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		entering the area during operations.	
	Overhead Hazards	Hard hats will be required in those areas with potential hazard of head injury and when working within 50 feet of heavy equipment operations. All protective head gear shall meet the requirements of the current ANSI Z89.1.	05.D.01 & 05.D.02
	Struck by equipment or vehicles	Personnel will wear ANSI Class II or higher reflective vests when working on-site when heavy equipment or vehicles are operating.	05.F
		All heavy equipment will be equipped with a functioning backup alarm and personnel backing site vehicles will sound the horn before backing up in areas with foot traffic.	18.B.01
	Spills / Leaks	A portable spill response kit containing absorbent pillows/pads, non-sparking shovel, PPE and disposal supplies shall be maintained in a readily accessible location per the SSHP. Employees will be made aware of its location and will be trained in its use if required to respond to a spill.	09.B.21 a & d
	Crush and Injury Hazards Due to Stored Energy (LO / TO)	Personnel will use ESHP-521 as directed by the UXOSO/SSHO for the maintenance and inspection of heavy equipment. All personnel conducting maintenance and servicing of heavy equipment will be trained in the sources of stored energy and all heavy equipment maintenance will be assessed by the UXOSO/SSHO prior to initiating the task to determine if stored energy hazards will be created and to determine how they will be controlled. Following the assessment, all personnel will be trained on the level and	12.E

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Geophysical Survey

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		type of stored energy hazard and their control techniques. This training will be documented by the UXOSO/SSHO.	
	Fire	Service or refueling areas will have at least one 20 BC fire extinguisher within 25-75 feet of dispenser. Equipment will be “Off” while refueling. Training will be provided to employees handling flammable and combustible liquids, in addition to HAZCOM training.	09.B.01 – 09.B.05 06.B.02

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Geophysical Survey

Equipment to Be Used	Inspections Required	Training Required
1. Geophysical survey instruments 2. Hand Tools 3. Soil sampling equipment (hand augers, trowels and/or push probes) 4. Power Tools	Daily inspections of hand/power tools	40-Hour HAZWOPER 8-Hour Refresher Initial Site / Task Hazard Training PPE Training All personnel operating hand tools will be trained in proper inspection, maintenance and use of the hand tools.
3. Heavy equipment	Daily Inspection of Heavy Equipment Inspection of LO/TO equipment	Heavy equipment operators are required to be trained in the operation, inspection and maintenance of heavy equipment Personnel conducting maintenance and servicing will be provided LO/TO training as deemed necessary by the UXOSO/SSHO and as hazardous energy sources are identified. Only qualified personnel will perform a LO/TO on equipment.

ACTIVITY HAZARDS ANALYSIS

Risk Assessment Code (RAC): M

Date Prepared: 10-13-2010

Project: CRS CC-RVAAP-80 Group 2
Propellant Can Tops, RVAAP

Job: Site Restoration

Prepared By: Brian Stockwell, PjM

Reviewed By: Joseph Frydenger, CSP

Recommended Protective Clothing & Equipment:
Level D Leather outer gloves: Hard hat: Steel toed leather boots; Ear plugs or ear muffs; Safety Glasses; Chemical protective gloves when refueling.

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**

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
1. Site Restoration - General a. Removal of all materials and equipment. b. Removal of all project generated wastes and general trash.	General	Site personnel will be given task-specific briefings daily regarding the hazards associated with the task and the procedures used to control/mitigate the hazards. All personnel inside exclusion zone will wear a minimum of Level D PPE. All PIKA subcontractors will be required to read and sign-off on the PIKA ESHPs that affect their operations.	01.B.05
	Unauthorized Entry/Site access control	Site personnel will maintain a constant watch for intrusion of unauthorized personnel. Positive site access control will be established prior to on-site operations using barricades, signs or other methods to prevent unauthorized access during tasks that could cause exposure to MEC or other ES&H hazards.	28.B.02 (5.j)
	Heat Stress	This project will be conducted during spring and summer weather and as such heat stress will	06.I.02 – 06.I.04

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Site Restoration

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		become an issue. When ambient temperatures exceed 75ºF, PIKA will implement the PIKA ESHP-506; Heat Stress Prevention. Personnel will be monitored for heat stress and will maintain adequate hydration.	
	Cold Stress	It is not anticipated that this project will extend into winter months and as such cold stress should not become a significant issue for the safety of site personnel. However, should this project extend into fall and winter, and ambient temperatures are below 61°F, PIKA will implement the PIKA ESHP-507, Cold Stress Prevention, and personnel will be monitored for cold stress. Personnel will be evaluated daily to ensure they are properly clothed and able to work in the anticipated cold/wet conditions anticipated for that day by the SUXOS and UXOSO/SSHO.	06.I.05 – 06.I.13
	Adverse Weather	When there are warnings or indications of impending severe weather, conditions will be monitored and appropriate precaution taken to protect personnel and property as specified in the SSHP. All site operations will be suspended if lightning is detected within 5 miles of the site. The UXOSO/SSHO will consult the SSHP for other limiting weather conditions such as high winds, rain, etc.	06.I.01
	Slips, trips and falls	All personnel will maintain clean work areas to remove trip hazards and will be aware of uneven walking and working surfaces. Good house keeping procedures will be implemented. Use three points of contact when entering/exiting equipment.	14.C

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Site Restoration

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Physical Strain	Personnel will be cautioned about physical strain associated with strenuous activities that may be conducted at the site. Personnel will use caution to not over exert themselves or overstrain muscles and joints. Proper lifting techniques will be emphasized. Personnel will be cautioned of the higher potential for straining muscles in cold weather and for the need to stretch and work at a controlled pace.	01.C.01, 14.A
	Use of Hand and Power Tools	Hand and power tools will be selected to ensure that the right tool is being used for the right job and being used in the manner in which it was intended to be used. All hand and power tools will be inspected daily prior to use and any defective tools will be tagged and removed from service immediately. All portable electrical tools and equipment will be used with a Ground Fault Circuit Interrupter (GFCI) placed inline as close to the electrical supply source as possible. Personnel will follow the other requirements of PIKA ESHP-520, Hand and Power Tool Safety to ensure proper use of the hand and power tools anticipated for this project.	11.D.05 & 13.A
	Cuts and Lacerations	Level D PPE with leather gloves will be used per the SSHP for all tasks with a potential for cuts or lacerations. Personnel will be trained in the proper use and selection of the equipment and tools they must use to complete their tasks and the hazards of exposed metal and other cut hazards.	05.A.01, 05.A.08
	High Noise levels (>85 dBA)	Personnel exposed to greater than 85 dBA 8-hour Time-weighted average (TWA) will use hearing protection devices and the SSHO will	05.C.01

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Site Restoration

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		implement ESHP-505. UXOSO/SSHO will monitor noise levels and establish hearing protection requirements for high noise areas.	
	Biological	During both access surveys and vegetation clearing operations, it is anticipated that biological hazards will exist and PIKA will implement ESHP-503 Biological Hazards. Biological hazards that may be encountered include stinging and biting insects, hazardous plants, and snakes. Insect repellant will be used by site personnel as needed to repel hazardous insects. Site personnel will report to the UXOSO/SSHO and their team leader the presence of any hazardous animals, insects or plants.	06.D.01
	Skin contact with fuels	Flammable liquids will be kept in closed, approved containers. Chemical protective gloves will be worn when handling fuels. Training will be provided to employees handling flammable and combustible liquids, in addition to HAZCOM training. MSDS sheets will be provided and located in a location made known to all employees and accessible during all work hours.	06.A.01 06.B.02
	Eye irritation or burns	Use of insect repellant, fuels and other chemicals on site creates the potential for accidental spraying/splashing of chemicals into the eyes. Portable eye wash bottles will be located in the work zones and a 15-minute eye wash station will be located at the office/equipment storage location. Training will be provided to employees handling flammable and combustible liquids, in addition to HAZCOM training. MSDS sheets will be provided and	05.B.01

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Site Restoration

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		located in a location made known to all employees and accessible during all work hours.	
	UV Radiation	Site personnel will be cautioned about the possibility of sunburns and will use sunscreen with a minimum SPF 30 on exposed skin.	06.I.05
	Heavy Equipment Operation	Heavy equipment/brush clearing equipment operators will be trained on the use, inspection and maintenance of the heavy equipment they use, and all site personnel will be briefed regarding safe operation near heavy equipment. LO/TO will be used as determined by the UXOSO/SSHO for maintenance of heavy equipment. Safety vest when working within 50 feet of equipment.	06.A.02 – 18.A.01-.03
	Manual lifting of heavy objects	Personnel will use safe lifting procedures and lift with their legs and not their backs, as outlined in PIKA Manual Lifting and Material Handling Safety ESHP-522.	14.A.01-.04
	Pinch Points	All personnel will be advised of potential pinch points. When pinch points have been identified and cannot be eliminated, guards or barricades will be used. The pinch point area around the counter weight of excavators will be barricaded to prevent personnel from entering the area during operations.	13.A.03

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Site Restoration

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Overhead Hazards	Hard hats will be required in those areas with potential hazard of head injury and when working within 50 feet of heavy equipment operations. All protective head gear shall meet the requirements of the current ANSI Z89.1.	05.D.01 & 05.D.02
	Struck by equipment or vehicles	Personnel will wear ANSI Class II or higher reflective vests when working on-site when heavy equipment or vehicles are operating. All heavy equipment will be equipped with a functioning backup alarm and personnel backing site vehicles will sound the horn before backing up in areas with foot traffic.	05.F 18.B.01
	Spills / Leaks	A portable spill response kit containing absorbent pillows/pads, non-sparking shovel, PPE and disposal supplies shall be maintained in a readily accessible location per the SSHP. Employees will be made aware of its location and will be trained in its use if required to respond to a spill.	09.B.21 a & d
	Crush and Injury Hazards Due to Stored Energy (LO / TO)	Personnel will use ESHP-521 as directed by the UXOSO/SSHO for the maintenance and inspection of heavy equipment. All personnel conducting maintenance and servicing of heavy equipment will be trained in the sources of stored energy and all heavy equipment maintenance will be assessed by the UXOSO/SSHO prior to initiating the task to determine if stored energy hazards will be created and to determine how they will be controlled. Following the assessment, all personnel will be trained on the level and type of stored energy hazard and their control techniques. This training will be documented by	12.E

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Site Restoration

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		the UXOSO/SSHO.	
	Fire	Service or refueling areas will have at least one 20 BC fire extinguisher within 25-75 feet of dispenser. Equipment will be “Off” while refueling. Training will be provided to employees handling flammable and combustible liquids, in addition to HAZCOM training.	09.B.01 – 09.B.05 06.B.02

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: CRS CC-RVAAP-80 Group 2 Propellant Can Tops, RVAAP Job: Site Restoration

Equipment to Be Used	Inspections Required	Training Required
1. Hand Tools 2. Power Tools	Daily inspections of hand/power tools	40-Hour HAZWOPER 8-Hour Refresher Initial Site / Task Hazard Training PPE Training All personnel operating hand tools will be trained in proper inspection, maintenance and use of the hand tools.
3. Heavy equipment	Daily Inspection of Heavy Equipment Inspection of LO/TO equipment	Heavy equipment operators are required to be trained in the operation, inspection and maintenance of heavy equipment Personnel conducting maintenance and servicing will be provided LO/TO training as deemed necessary by the UXOSO/SSHO and as hazardous energy sources are identified. Only qualified personnel will perform a LO/TO on equipment.

ACTIVITY HAZARDS ANALYSIS

Risk Assessment Code (RAC): M

Date Prepared: 10-13-2010

Project: RVAAP-09: Load Line 2 RVAAP

Job: Dewatering

Prepared By: Brian Stockwell, PjM

Reviewed By: Joseph Frydenger, CSP

Recommended Protective Clothing & Equipment:
Level D Leather outer gloves: Hard hat: Steel toed leather boots; Ear plugs or ear muffs; Safety Glasses; Chemical protective gloves when refueling.

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**

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
Water Removal from LL2	General	Site personnel will be given task-specific briefings daily regarding the hazards associated with the task and the procedures used to control/mitigate the hazards. All personnel inside exclusion zone will wear a minimum of Level D PPE. All PIKA subcontractors will be required to read and sign-off on the PIKA ESHPs that affect their operations.	01.B.05
	Unauthorized Entry/Site access control	Site personnel will maintain a constant watch for intrusion of unauthorized personnel. Positive site access control will be established prior to on-site operations using barricades, signs or other methods to prevent unauthorized access during tasks that could cause exposure to MEC or other ES&H hazards.	28.B.02 (5.j)

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: RVAAP-09: Load Line 2, RVAAP Job: Dewatering

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Heat Stress	This project will be conducted during spring and summer weather and as such heat stress will become an issue. When ambient temperatures exceed 75ºF, PIKA will implement the PIKA ESHP-506; Heat Stress Prevention. Personnel will be monitored for heat stress and will maintain adequate hydration.	06.I.02 – 06.I.04
	Cold Stress	It is not anticipated that this project will extend into winter months and as such cold stress should not become a significant issue for the safety of site personnel. However, should this project extend into fall and winter, and ambient temperatures are below 61°F, PIKA will implement the PIKA ESHP-507, Cold Stress Prevention, and personnel will be monitored for cold stress. Personnel will be evaluated daily to ensure they are properly clothed and able to work in the anticipated cold/wet conditions anticipated for that day by the SUXOS and UXOSO/SSHO.	06.I.06 – 06.I.13
	Adverse Weather	When there are warnings or indications of impending severe weather, conditions will be monitored and appropriate precaution taken to protect personnel and property as specified in the SSHP. All site operations will be suspended if lightning is detected within 5 miles of the site. The UXOSO/SSHO will consult the SSHP for other limiting weather conditions such as high winds, rain, etc.	06.I.01
	Slips, trips and falls	All personnel will maintain clean work areas	14.C

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: RVAAP-09: Load Line 2, RVAAP Job: Dewatering

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		to remove trip hazards and will be aware of uneven walking and working surfaces. Good house keeping procedures will be implemented. Use three points of contact when entering/exiting equipment.	
	Physical Strain	Personnel will be cautioned about physical strain associated with strenuous activities that may be conducted at the site. Personnel will use caution to not over exert themselves or overstrain muscles and joints. Proper lifting techniques will be emphasized. Personnel will be cautioned of the higher potential for straining muscles in cold weather and for the need to stretch and work at a controlled pace.	01.C.01, 14.A
	Water	Wet surfaces can cause slips, trips and falls which result in immersion, becoming wedged/lodged and impacting dangerous protrusions.	25.A.06
	Excavations	Consider the water saturation of soils and the potential for collapse. Soils around the excavation may be muddy and slippery. Personnel must remain a minimum of six feet from the edge of excavations. Collapse of soils can result in personnel trapped by heavy soils. Heavy soils can result in compression injuries. Rescue planning may be necessary. All activities within the excavation should be by remote means. A competent person must be designated and available when work is performed immediately in/around excavations.	25.A

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: RVAAP-09: Load Line 2, RVAAP Job: Dewatering

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Use of Hand and Power Tools	Hand and power tools will be selected to ensure that the right tool is being used for the right job and being used in the manner in which it was intended to be used. All hand and power tools will be inspected daily prior to use and any defective tools will be tagged and removed from service immediately. All portable electrical tools and equipment will be used with a Ground Fault Circuit Interrupter (GFCI) placed inline as close to the electrical supply source as possible. Personnel will follow the other requirements of PIKA ESHP-520, Hand and Power Tool Safety to ensure proper use of the hand and power tools anticipated for this project.	11.D.05 & 13.A
	Cuts and Lacerations	Level D PPE with leather gloves will be used per the SSHP for all tasks with a potential for cuts or lacerations. Personnel will be trained in the proper use and selection of the equipment and tools they must use to complete their tasks and the hazards of exposed metal and other cut hazards.	05.A.01, 05.A.08
	High Noise levels (>85 dBA)	Personnel exposed to greater than 85 dBA 8-hour Time-weighted average (TWA) will use hearing protection devices and the SSHO will implement ESHP-505. UXOSO/SSHO will monitor noise levels and establish hearing protection requirements for high noise areas.	05.C.01
	Biological	During both access surveys and vegetation clearing operations, it is anticipated that	06.D.01

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: RVAAP-09: Load Line 2, RVAAP Job: Dewatering

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		biological hazards will exist and PIKA will implement ESHP-503 Biological Hazards. Biological hazards that may be encountered include stinging and biting insects, hazardous plants, and snakes. Insect repellant will be used by site personnel as needed to repel hazardous insects. Site personnel will report to the UXOSO/SSHO and their team leader the presence of any hazardous animals, insects or plants.	
	Skin contact with fuels	Flammable liquids will be kept in closed, approved containers. Chemical protective gloves will be worn when handling fuels. Training will be provided to employees handling flammable and combustible liquids, in addition to HAZCOM training. MSDS sheets will be provided and located in a location made known to all employees and accessible during all work hours.	06.A.01 06.B.02
	Eye irritation or burns	Use of insect repellant, fuels and other chemicals on site creates the potential for accidental spraying/splashing of chemicals into the eyes. Portable eye wash bottles will be located in the work zones and a 15-minute eye wash station will be located at the office/equipment storage location. Training will be provided to employees handling flammable and combustible liquids, in addition to HAZCOM training. MSDS sheets will be provided and located in a location made known to all employees and accessible during all work hours.	05.B.01
	UV Radiation	Site personnel will be cautioned about the	06.I.05

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: RVAAP-09: Load Line 2, RVAAP Job: Dewatering

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		possibility of sunburns and will use sunscreen with a minimum SPF 30 on exposed skin.	
	Heavy Equipment Operation	Heavy equipment/brush clearing equipment operators will be trained on the use, inspection and maintenance of the heavy equipment they use, and all site personnel will be briefed regarding safe operation near heavy equipment. LO/TO will be used as determined by the UXOSO/SSHO for maintenance of heavy equipment. Safety vest when working within 50 feet of equipment.	06.A.02 – 18.A.01-.03
	Manual lifting of heavy objects	Personnel will use safe lifting procedures and lift with their legs and not their backs, as outlined in PIKA Manual Lifting and Material Handling Safety ESHP-522.	14.A.01-.04
	Pinch Points	All personnel will be advised of potential pinch points. When pinch points have been identified and cannot be eliminated, guards or barricades will be used. The pinch point area around the counter weight of excavators will be barricaded to prevent personnel from entering the area during operations.	13.A.03
	Overhead Hazards	Hard hats will be required in those areas with potential hazard of head injury and when working within 50 feet of heavy equipment operations. All protective head gear shall meet the requirements of the current ANSI Z89.1.	05.D.01 & 05.D.02
	Struck by equipment or vehicles	Personnel will wear ANSI Class II or higher	05.F

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: RVAAP-09: Load Line 2, RVAAP Job: Dewatering

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		reflective vests when working on-site when heavy equipment or vehicles are operating. All heavy equipment will be equipped with a functioning backup alarm and personnel backing site vehicles will sound the horn before backing up in areas with foot traffic.	18.B.01
	Spills / Leaks	A portable spill response kit containing absorbent pillows/pads, non-sparking shovel, PPE and disposal supplies shall be maintained in a readily accessible location per the SSHP. Employees will be made aware of its location and will be trained in its use if required to respond to a spill.	09.B.21 a & d
	Crush and Injury Hazards Due to Stored Energy (LO / TO)	Personnel will use ESHP-521 as directed by the UXOSO/SSHO for the maintenance and inspection of heavy equipment. All personnel conducting maintenance and servicing of heavy equipment will be trained in the sources of stored energy and all heavy equipment maintenance will be assessed by the UXOSO/SSHO prior to initiating the task to determine if stored energy hazards will be created and to determine how they will be controlled. Following the assessment, all personnel will be trained on the level and type of stored energy hazard and their control techniques. This training will be documented by the UXOSO/SSHO.	12.E
	Fire	Service or refueling areas will have at least one 20 BC fire extinguisher within 25-75 feet of dispenser. Equipment will be “Off” while refueling. Training will be provided to	09.B.01 – 09.B.05 06.B.02

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: RVAAP-09: Load Line 2, RVAAP Job: Dewatering

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		employees handling flammable and combustible liquids, in addition to HAZCOM training.	

ACTIVITY HAZARDS ANALYSIS

Date Prepared (10-13-2010):

Project: RVAAP-09: Load Line 2, RVAAP Job: Dewatering

Equipment to Be Used	Inspections Required	Training Required
1. Trailer mounted 4-inch trash pump with in-line filters 2. Hand Tools 3. Power Tools	Daily inspections of hand/power tools	40-Hour HAZWOPER 8-Hour Refresher Initial Site / Task Hazard Training PPE Training All personnel operating hand tools will be trained in proper inspection, maintenance and use of the hand tools.
3. Heavy equipment	Daily Inspection of Heavy Equipment Inspection of LO/TO equipment	Heavy equipment operators are required to be trained in the operation, inspection and maintenance of heavy equipment Personnel conducting maintenance and servicing will be provided LO/TO training as deemed necessary by the UXOSO/SSHO and as hazardous energy sources are identified. Only qualified personnel will perform a LO/TO on equipment.

ATTACHMENT 3

PIKA ENVIRONMENTAL SAFETY AND HEALTH PROCEDURES

200-Series ESHPs Specific to Munitions and Explosives of Concern (MEC) Operations

ESHP-200	MEC Operations: MEC Forms
ESHP-201	MEC Operations: Soil Excavation
ESHP-202	MEC Operations: Soil Sifting Operations
ESHP-203	MEC Operations: Transportation of Explosives
ESHP-204	MEC Operations: MEC Quality Control
ESHP-205	MEC Operations: Inspection and Disposal of Munitions Debris and Scrap
ESHP-206	MEC Operations: Explosives Acquisition, Storage and Accountability
ESHP-207	MEC Operations: Disposal of MEC
ESHP-208	MEC Operations: UXOSO Procedures
ESHP-209	MEC Operations: Flash Furnace Operation

300-Series ESHPs Specific to Decommission and Demolition (D&D) and Construction Activities

ESHP-300	D&D Construction Forms
ESHP-301	Crane Safety
ESHP-302	Rigging Safety
ESHP-303	Welding, Cutting and Hot Work Safety
ESHP-304	Ladder and Stairway Safety
ESHP-305	Scaffolding Safety
ESHP-306	Fall Protection
ESHP-307	Pneumatic Tool Safety

400-Series ESHPs Specific to Hazardous and Toxic Waste (HTW) Activities

ESHP-401	Drill Rig Operation, Inspection and Maintenance
ESHP-402	Hazardous Materials Transportation
ESHP-403	Personnel & Equipment Decontamination
ESHP-404	Drum Handling & Removal

500-Series ESHPs Applicable Across Most PIKA Programs

ESHP-500	PIKA ES&H Forms
ESHP-501	Inspection by Others
ESHP-502	Incident Reporting and Recordkeeping
ESHP-503	Identification and Control of Biological Hazards
ESHP-504	Confined Space Entry
ESHP-505	Hearing Conservation & Noise Control
ESHP-506	Heat Stress and Strain Prevention
ESHP-507	Cold Stress Prevention
ESHP-508	Bloodborne Pathogen Control
ESHP-509	Hazard Communications
ESHP-510	Signs and Labeling
ESHP-511	Fire Protection and Prevention
ESHP-512	Sanitation, Housekeeping and Illumination
ESHP-513	Respiratory Protection
ESHP-514	Personal Protective Equipment
ESHP-515	Safe Vehicle Operation
ESHP-516	Vegetation Removal

ESHP-517	Forklift Operations, Inspection and Maintenance
ESHP-518	Heavy Equipment Operation, Inspection and Maintenance
ESHP-519	Excavation and Trenching Safety
ESHP-520	Hand and Power Tools
ESHP-521	Control of Hazardous Energy (Lockout/Tagout)
ESHP-522	Lifting & Material Handling Safety
ESHP-523	Electrical Safety
ESHP-524	Site Monitoring and Sampling
ESHP-525	SSHO Procedures
ESHP-526	Orientation Program

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide PIKA personnel with master copies of explosives safety and health forms referenced in PIKA's Munitions and Explosives of Concern (MEC) ESHPs.

2.0 SCOPE

This ESHP applies to PIKA projects where MEC-related activities are being conducted which require the use of 200-Series form as outlined in the relevant ESHPs. The 200-Series forms in this ESHP and their comparable Word Templates are the only versions of the forms to be used. Revisions to these 200-Series forms and the subsequent distribution of the revised forms will be made using PIKA's Document Control Program.

3.0 REFERENCES

No Federal, state or local regulations apply to this ESHP. However, the following PIKA policies and procedures are applicable to the implementation of this ESHP.

- The PIKA Corporate Environmental Safety and Health Program (CESHP).
- The PIKA ESHP-208, Unexploded Ordnance (UXO) Site Officer (UXOSO) ESHP.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) is responsible for both quality and safety on projects to which they are assigned. As such, the PM will be responsible for making sure that UXO personnel utilizing these forms do so in a manner that effectively and efficiently captures required project data. Additionally, the PM will also make sure that the Site Supervisor (SS) is provided ample administrative supplies to allow for the effective storage, maintenance and archiving of project-related MEC forms.

4.2 SITE SUPERVISOR

The SS will make sure that this ESHP is implemented and that the appropriate forms are used and completed by site supervisory personnel when required by the CESHP or the MEC ESHPs that apply to work conducted on the site. Where called upon by a form, the SS will review the form contents for completeness and accuracy and sign in the appropriate space provided.

4.3 QUALITY CONTROL (QC) SPECIALIST

The QC will be responsible for making sure that MEC-related forms relevant to the project are properly used, completed, stored, and maintained for the duration of the project. The QC will assist the SS as needed in the preparation of the MEC forms at the completion of the project for the effective archiving of the data. Prior to the conduct of

project tasks, the QC will review relevant ESHPs and complete forms referenced in the ESHPs in a timely and effective manner.

5.0 PROCEDURES

No procedures are required of this ESHP.

6.0 AUDIT CRITERIA

Forms attached to this document may be considered auditable items if they are required by a PIKA ESHP that applies to on-site operations.

7.0 ATTACHMENTS

The following forms are attached to this ESHP.

ESHF-201..... Shipping & Emergency Response Information for Hazardous Materials
ESHF-202.....Authorization List for Explosives Purchase, Receipt, & Transportation
ESHF-203..... DA 3020-R Magazine Data Card (original file available for printing)
ESHF-204..... MPPEH and RRD Inspection, Certification, and Chain of Custody Form
ESHF-205.....Demolition Shot Record
ESHF-206..... Flashing Furnace Pre-Operational Checklist
ESHF-207.....Flashing Furnace Post Start-Up Checklist
ESHF-208..... Flashing Furnace Maintenance Requirement Checklist
ESHF-209..... Weekly Explosive Accountability Report
ESHF-210.....DD 626 Motor Vehicle Inspection (Transporting Hazardous Material)
ESHF-211..... DD Form 1348-1A Issue/Release Receipt Document

ESHF-201: SHIPPING & EMERGENCY RESPONSE INFORMATION FOR HAZARDOUS MATERIALS

THIS VEHICLE IS TRANSPORTING HAZARDOUS MATERIALS					
Date Prepared:	**Date of Travel:**			**Page_____of_____**	
Proper Shipping Name	**Hazard**	**ID No**	**PG**	**Qty/Units**	**Weight**

Emergency notification.
In cases of accident, incident, breakdown or fire, prompt notification must be given.
FOR EMERGENCY RESPONSE INFORMATION, SEE BACK OF THIS FORM

Remarks:

Certification: This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Signature of Shipping Representative:	Signature(s) of Vehicle Operator(s):
24-Hour Emergency Assistance Telephone Numbers:	Work Hours Emergency Phone Numbers:

PIKA FORM ESHF-201 (front)

EMERGENCY RESPONSE INFORMATION

Guide Number 46 and 50 from the U.S. Department of Transportation Emergency Response Guide Book P 5800.6 are reproduced hereon. These guides are applicable to Hazard Class 1 Materials (Explosives). **M**ark an X in the appropriate box:

☐ **USE GUIDE 50 FOR EXPLOSIVES (1.4)** ☐ **USE GUIDE 46 FOR EXPLOSIVES 1.1, 1.2, 1.3, 1.5, AND 1.6**

For other hazardous materials or substances, annotate appropriate Emergency Response Guide Book Guide Number in the block below, and attach a copy of the guide number page or pages.

Guide Numbers:

GUIDE 46 (ERG 93)

POTENTIAL HAZARDS

FIRE OR EXPLOSION:
May explode and throw fragments 1 mile or more if fire reaches cargo.

HEALTH HAZARDS:
Fire May produce irritating or poisonous gases.

EMERGENCY ACTION

If fire reaches cargo, do not fight fire.

If you know or suspect that heavily-encased explosives, such as bombs or artillery projectiles are involved, stop traffic and begin to evacuate all persons, including emergency responders, from the area in all directions for 5000 feet (1 mile) for rail car or 4000 feet (3/4 mile) for tractor/trailer.

When heavily-encased explosives are not involved, evacuate the area for 2500 feet (½ mile) in all directions.

Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters= protective clothing will provide limited protection.

CALL Emergency Response Telephone Number on Shipping paper FIRST. If Shipping Paper NOT AVAILABLE or NO ANSWER, CALL CHEMTREC AT 1-800-424-9300.

FIRE

Cargo Fires: DO NOT FIGHT FIRE WHEN IT REACHES CARGO. Withdraw from area and let fire burn.

Truck and Equipment Fires: Try to prevent fire from reaching the explosive cargo compartment. Flood with water; if no water is available use dry chemical or earth.

Promptly isolate the scene by removing ALL PERSONS from the vicinity of the incident if there is a fire. First, move people out of line-of-sight of the scene and away from windows. Then, obtain more information and specific guidance from competent authorities listed on the shipping papers.

SPILL OR LEAK

Shut off ignition sources; no flares, smoking or flames in hazard area. Do not touch or walk through spilled material.

FIRST AID

Call emergency medical care.
Use first aid treatment according to the nature of the injury.

GUIDE 50 (ERG 93)

POTENTIAL HAZARDS

FIRE OR EXPLOSION:
May explode and throw fragments 1/3 mile or more if fire reaches cargo.

HEALTH HAZARDS:
Fire May produce irritating or poisonous gases.

EMERGENCY ACTION

If fire reaches cargo, do not fight fire.

Stop traffic and begin to evacuate all persons, including emergency responders, from the area for 1500 feet (1/3 mile) in all directions.

Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters= protective clothing will provide limited protection.

CALL Emergency Response Telephone Number on Shipping paper FIRST. If Shipping Paper NOT AVAILABLE or NO ANSWER, CALL CHEMTREC AT 1-800-424-9300.

FIRE

Cargo Fires: DO NOT FIGHT FIRE WHEN IT REACHES CARGO. Withdraw from area and let fire burn.

Truck and Equipment Fires: Try to prevent fire from reaching the explosive cargo compartment. Flood with water; if no water is available use dry chemical or earth.

Promptly isolate the scene by removing ALL PERSONS from the vicinity of the incident if there is a fire. First, move people out of line-of-sight of the scene and away from windows. Then, obtain more information and specific guidance from competent authorities listed on the shipping papers.

SPILL OR LEAK

Shut off ignition sources; no flares, smoking or flames in hazard area. Do not contact spilled material.

FIRST AID

Call emergency medical care.
Provide 1st aid according to the nature of the injury.

SUPPLEMENTAL INFORMATION

Packages bearing the 1.4S label contain explosive substances or articles that are designed or packaged in such a manner that when involved in a fire, may burn vigorously with localized detonations and projection of fragments; effects are usually confined to immediate vicinity of packages.

If fire threatens cargo area containing packages bearing the 1.4S label, consider initial isolation of at least 50 feet in all directions. Fight fire with normal precaution from a reasonable distance.

PIKA FORM ESHF-201 (back)

ESHF-202: AUTHORIZATION LIST FOR EXPLOSIVES PURCHASE, RECEIPT, & TRANSPORTATION

Address and County: (Home Office)

Address and County: (Field Office)

Federal License #: Expiration Date:

The following persons are agents, employees, or representatives of the undersigned, and are authorized to order or acquire explosive materials on behalf of PIKA International, Inc.

Name and Home Address	Driver's License No.	Soc. Sec. Number	Place of Birth

The undersigned certifies the foregoing information to be true and correct to the best of their knowledge and belief, and that they will communicate any additions or deletions to the foregoing list to PIKA International, Inc

Corporate Officer: _____ Date: _____

PIKA FORM ESHF-202

ESHF 203: DA 3020-R MAGAZINE DATA CARD

*(Original pdf file available separately)

1. DODIC	2. NSN	3. LOT NO.	4. LOCATION	B.	D.
5. DESCRIPTION			A.	C.	E.

6. DATE	7. DOCUMENT NO.	8. ACTION/PURPOSE	9. QUANTITY		10. BALANCE	11. PRINTED NAME
			A. GAIN	B. LOSS		

DA FORM 3020-R, AUG 89 — MAGAZINE DATA CARD

For use of this form, see DA PAM 710-2-1; the proponent agency is DCSLOG

Continued on Reverse

PREVIOUS EDITION IS OBSOLETE

USAPPC V1.01

1. DODIC	2. NSN	3. LOT NO.	4. LOCATION	B.	D.
5. DESCRIPTION			A.	C.	E.

6. DATE	7. DOCUMENT NO.	8. ACTION/PURPOSE	9. QUANTITY		10. BALANCE	11. PRINTED NAME
			A. GAIN	B. LOSS		

REVERSE, DA FORM 3020-R, AUG 89 — MAGAZINE DATA CARD

Use Other Side First

ESHF-204: MPPEH AND RRD INSPECTION, CERTIFICATION, AND CHAIN OF CUSTODY FORM

Project Location:		Contract No:		DO No:	Page __of __
Line	Description	Source (e.g., Grid or Range Identifier)	Container/Serial Number	Container Type	Unit Wt./Vol.
1					
2					
3					
4					
5					
6					
7					
8					

Inspector's certification: This certifies that the AEDA residue, Range Residue and/or Explosive Contaminated Property listed has been 100 percent properly inspected and, to the best of our knowledge and belief, are free of explosive hazards.

Printed/typed name:	Signature:	Date:

Verifier certification: This certifies that the AEDA residue, Range Residue and/or Explosive Contaminated Property listed has been 100 percent properly inspected and, to the best of our knowledge and belief, are free of explosive hazards.

Printed/typed name:	Signature:	Date:

Transporter(s)	Transporter 1 acknowledgment of receipt of materials properly sealed/secured.		
	Printed/typed name:	Signature:	Date:
	Transporter 2 acknowledgment of receipt of materials properly sealed/secured.		
	Printed/typed name:	Signature:	Date:
Final Disposition	Facility owner or operator: Certification of receipt of AEDA/Range Residue materials, except as noted above. Acknowledgment of receipt of materials properly sealed/secured.		
	Printed/typed name:	Signature:	Date:

ESHF 205: DEMOLITION SHOT RECORD

Site Name/Location:		Date:
Shot Location (OB/OD Range or Grid No.):	Demolition Supervisor:	State License # (if applicable):
Type of MEC Destroyed, Vented or Burned:	Firing Method:	Time of Shot:
Direction and Distance to Nearest Building, Road, Utility Line, etc.:	Temp: _____ Wind Dir./Speed: _____ Ceiling: _____ Clouds/% Sun: _____	
Type and Amount of Tamping or Sandbag Mitigation Used:	Mat or Other Protection Used (list):	
Seismographic / Sound Level Meter Used: Yes ☐ No ☐	Readings / Results:	

Demolition Materials Used

Description	Amount	Description	Amount
Perforator		Time Fuze	
Det Cord		Squibs	
Detonator ☐ Electric ☐ Non-electric		Booster Block	
Non-El Detonator		Other (list)	

Certification

I certify that the explosives listed were used for their intended purpose, and that the MEC listed were rendered inert/destroyed.

Signature of Demolition Supervisor: _____ Date: _____ Consecutive Record Number: _____

List of MEC Destroyed, Vented or Burned:

Description	Quantity	Description	Quantity

PIKA FORM ESHF-205

ESHF-206: FLASHING FURNACE PRE-OPERATIONAL CHECKLIST

Furnace Supervisor (complete prior to start-up)

- ☐ Security notification 1 HR prior, start COMM checks (every 2 HRs)
- ☐ Gates secured and/or access denied 1 HR prior and after shutdown
- ☐ Conduct Operational briefing of days treatment profile and review daily weather report
- ☐ Review appropriate Activity Hazard Analysis Forms
- ☐ Make assignments: Furnace Operator _____
  Safety Observer _____
  Equipment Operator _____
  QC Specialist _____
- ☐ Emergency Assignments: Generator Shut-down
  Fuel Shut-down _____
  Fire Fighter _____
  Facility Shut-down _____
  Driver/Vehicle Keys _____
  Telephone Notifications _____
- ☐ Conduct communication check with PIKA Office
- ☐ Material handling equipment checks

Furnace Operator (perform these checks prior to/during start-up)

- ☐ Complete Operational Checklist in-process
- ☐ Secure Facility or work area Gates and make sure access is restricted
- ☐ Conduct 360 degree Check of Furnace
- ☐ Make sure Electrical Lock-Out key and VHF Radio are in hand
- ☐ Check that Remote control Box is in proper position
- ☐ Disengage Electrical Emergency Panic Button
- ☐ Check Fuel System
- ☐ Check Electrical System (Generator)
- ☐ Remove Electrical Lock-Out
- ☐ Lift Door/Extend Car-Bottom
- ☐ Load Furnace and Insert Temperature Indicator as Necessary
- ☐ Retract Car-Bottom/Lower Door
- ☐ Mark Data-Recorder

Furnace Operator Signature: _____ Date: _____

Furnace Supervisor Signature: Date: _____ Date: _____

ESHF-207: FLASHING FURNACE POST START-UP CHECKLIST

Furnace Operator: _____ **Date:** _____

PERFORM AT START-UP

1. Generator (warm up for 5 minutes)
   - ☐ Oil Pressure_____(Bars)
   - ☐ Water Temp_____(Degrees)
   - ☐ Water Level_____
   - ☐ HZ _____
   - ☐ Oil Level
   - ☐ Hours_____
   - ☐ RPM_____
   - ☐ VAC_____
2. Turn on Power at Power distribution box

FURNACE START-UP

1. Check #1 Fire Extinguisher Full Pressure ☐ YES ☐ NO
   If "NO" Replace Prior to Startup
2. Main Fuel Tank (Disengage Emergency Stop)
   - ☐ Fuel Level_____(FT/IN)
   - ☐ PSI_____(50 PSI Optimum)
   - ☐ Pump Motor operation Good / Not Good
   - ☐ Leak Check ☐ YES (Leaks identified) ☐ NO (No leaks identified)

   If "YES" Report to Furnace Supervisor Immediately.
   Corrective action taken _____
3. Secondary Fuel Tank
   - ☐ Fuel Level_____(FT/IN)
   - ☐ Leak Check ☐ YES (Leaks identified) ☐ NO (No leaks identified)

   If "YES" Report to Furnace Supervisor Immediately.
   Corrective action taken _____
4. Propane Tank _____% (Call for re-supply when tank level reaches 20%)
5. Furnace
   - ☐ Time _____ (log on Data-Recorder)
   - ☐ Oil Pressure 1._____ (PSI) 2. _____ (PSI) 3. _____ (PSI)
   - ☐ Propane (at furnace) _____PSI
   - ☐ Combustion Air Blower gauge_____(IN of water)
   - ☐ Fire Extinguisher #2 FULL / If needs charging, correct immediately

PIKA FORM ESHF-207

ESHF-208: FLASHING FURNACE MAINTENANCE REQUIREMENT CHECKLIST

Daily

- ☐ Furnace Housing: Inspect Insulation
- ☐ Refractory: Inspect for large cracks, spalling, etc.
- ☐ Car Bottom: Check Roller Chain tension
- ☐ Cable Reel: Check for deterioration
- ☐ Door Seal: Check for proper sealing
- ☐ Door Assembly: Check Roller Chain tension
- ☐ Door Assembly: Inspect sprocket for broken teeth, alignment, etc.
- ☐ Fuel delivery system: Check for proper operation, check for leaks
- ☐ Pilot Fuel system: Check for proper operation, check for leaks
- ☐ System temperature monitors: Check for proper operation
- ☐ System Alarms: Check for proper operation

Weekly

- ☐ Furnace Housing: Check for broken welds, cracks, etc.
- ☐ Car Bottom: Lubricate Roller Chain with SAE 30 wt. Oil
- ☐ Car Bottom: Inspect sprockets for broken teeth, alignment, etc.
- ☐ Car Bottom: Check gear motor fluid level
- ☐ Door Assembly: Lubricate Roller Chains with SAE 30 wt. Oil
- ☐ Check gear motor fluid level
- ☐ Spark Ignition System: Spark Igniters: Inspect, clean, or replace
  Igniter Cables: Inspect for core breakage

Monthly

- ☐ Strongbox: Inspect welds for breakage, surface cracks, etc.
- ☐ Furnace Temperature Controller: See Manual

Every 2 Months

- ☐ Car Bottom: Lubricate Axle bearings

Bi-annual

- ☐ Furnace Housing: Touch up coating as required to minimize rust
- ☐ Combustion Air Blower: Lubricate bearings
  - Inspect housing for cracks
  - Check mounting bolts for tightness
- ☐ Cooling Air Blower: Lubricate bearings if possible
  - Inspect housing for cracks
  - Check mounting bolts for tightness

Maintenance Performer:_____ Date:_____

PIKA FORM ESHF-208

ESHF-209: WEEKLY EXPLOSIVE ACCOUNTABILITY REPORT

Weekly Explosive Accountability Report

Project:	Location:	Contract Number or Job Code:	Report Date:

Materials Description	Received This Week	Received To Date	Used This Week	Used To Date	Quantity On Hand

Comments:

Weekly Inventories completed this month:

SUXOS SIGNATURE BLOCK

PIKA FORM ESHF-209

ESHF 210: DD 626 MOTOR VEHICLE INSPECTION (TRANSPORTING HAZARDOUS MATERIALS)

MOTOR VEHICLE INSPECTION (TRANSPORTING HAZARDOUS MATERIALS)

(Read instructions before completing this form.)

This form applies to all vehicles which must be marked or placarded in accordance with Title 49 CFR.

1. BILL OF LADING/TRANSPORTATION CONTROL NUMBER

SECTION 1 - DOCUMENTATION	ORIGIN a.	DESTINATION b.
2. CARRIER/GOVERNMENT ORGANIZATION		
3. DATE/TIME OF INSPECTION		
4. LOCATION OF INSPECTION		
5. OPERATOR(S) NAME(S)		
6. OPERATOR(S) LICENSE NUMBER(S)		
7. MEDICAL EXAMINER'S CERTIFICATE*		

8. *(X if satisfactory at origin)*

a. MILITARY HAZMAT ENDORSEMENT		d. ERG OR EQUIVALENT COMMERCIAL:		YES		NO		9. CVSA DECAL DISPLAYED ON COMMERCIAL EQUIPMENT*	YES / NO
b. VALID LEASE*		e. DRIVER'S VEHICLE INSPECTION REPORT*						a. TRUCK/TRACTOR	
c. ROUTE PLAN		f. COPY OF 49 CFR PART 397						b. TRAILER	

SECTION II - MECHANICAL INSPECTION

All items shall be checked on empty equipment prior to loading. Items with an asterisk shall be checked on all incoming loaded equipment.

10. TYPE OF VEHICLE(S)

11. VEHICLE NUMBER(S)

12. PART INSPECTED *(X as applicable)*	ORIGIN (1) SAT	ORIGIN (1) UNSAT	DESTINATION (2) SAT	DESTINATION (2) UNSAT		ORIGIN (1) SAT	ORIGIN (1) UNSAT	DESTINATION (2) SAT	DESTINATION (2) UNSAT	COMMENTS (3)
a. SPARE ELECTRICAL FUSES					k. EXHAUST SYSTEM					
b. HORN OPERATIVE					l. BRAKE SYSTEM*					
c. STEERING SYSTEM					m. SUSPENSION					
d. WINDSHIELD/WIPERS					n. COUPLING DEVICES					
e. MIRRORS					o. CARGO SPACE					
f. WARNING EQUIPMENT					p. LANDING GEAR*					
g. FIRE EXTINGUISHER*					q. TIRES, WHEELS, RIMS					
h. ELECTRICAL WIRING					r. TAILGATE/DOORS*					
i. LIGHTS AND REFLECTORS					s. TARPAULIN*					
j. FUEL SYSTEM*					t. OTHER *(Specify)*					

13. INSPECTION RESULTS *(X one)* ACCEPTED ☐ REJECTED ☐

(If rejected give reason under "Remarks". Equipment will be approved if deficiencies are corrected prior to loading.)

14. SATELLITE MOTOR SURVEILLANCE SYSTEM: *(X one)* ACCEPTED ☐ REJECTED ☐

15. REMARKS

16. INSPECTOR SIGNATURE *(Origin)*

17. INSPECTOR SIGNATURE *(Destination)*

SECTION III - POST LOADING INSPECTION

This section applies to Commercial and Government/Military vehicles. All items will be checked prior to release of loaded equipment and shall be checked on all incoming loaded equipment.

	ORIGIN (1) SAT	ORIGIN (1) UNSAT	DESTINATION (2) SAT	DESTINATION (2) UNSAT	COMMENTS (3)
18. LOADED IAW APPLICABLE SEGREGATION/COMPATIBILITY TABLE OF 49 CFR					
19. LOAD PROPERLY SECURED TO PREVENT MOVEMENT					
20. SEALS APPLIED TO CLOSED VEHICLE; TARPAULIN APPLIED ON OPEN EQUIPMENT					
21. PROPER PLACARDS APPLIED					
22. SHIPPING PAPERS/DD FORM 836 FOR GOVERNMENT VEHICLE SHIPMENTS					
23. COPY OF DD FORM 626 FOR DRIVER					
24. SHIPPED UNDER DOT SPECIAL PERMIT 868					

25. INSPECTOR SIGNATURE *(Origin)*

26. DRIVER(S) SIGNATURE *(Origin)*

27. INSPECTOR SIGNATURE *(Destination)*

28. DRIVER(S) SIGNATURE *(Destination)*

DD FORM 626, MAR 2007 PREVIOUS EDITION IS OBSOLETE. Page 1 of 3 Pages

Adobe Professional 7.0

INSTRUCTIONS

SECTION I - DOCUMENTATION

General Instructions.

All items (2 through 9) will be checked at origin prior to loading. Items with an asterisk (*) apply to commercial operators or equipment only. Only Items 2 through 7 are required to be checked at destination.

Items 1 through 5. Self explanatory.

Item 6. Enter operator's Commercial Driver's License (CDL) number or Military OF-346 License Number. CDL and OF-346 must have the HAZMAT and other appropriate endorsements IAW 49 CFR 383.

Item 7. *Enter the expiration date listed on the Medical Examiner's Certificate.

Item 8.a. APPLIES TO MILITARY OPERATORS ONLY. Military Hazardous Materials Certification. In accordance with applicable service regulations, ensure operator has been certified to transport hazardous materials.

b. *Valid Lease. Shipper will ensure a copy of the appropriate contract or lease is carried in all leased vehicles and is available for inspection. (49 CFR 376.12 and 376.11(c)(2))

c. Route Plan. Prior to loading any Hazard Class/Division 1.1, 1.2, or 1.3 (Explosives) for shipment, ensure that the operator possesses a written route plan in accordance with 49 CFR Part 397. Route Plan requirements for Hazard Class 7 (Radioactive) materials are found in 49 CFR 397.101.

d. Emergency Response Guidebook (ERG) or Equivalent. Commercial operators must be in possession of an ERG or equivalent document. Shipper will provide applicable ERG page(s) to military operators.

e. *Driver's Vehicle Inspection Report. Review the operator's Vehicle Inspection Report. Ensure that there are no defects listed on the report that would affect the safe operation of the vehicle.

f. Copy of 49 CFR Part 397. Operators are required by regulation to have in their possession a copy of 49 CFR Part 397 (Transportation of Hazardous Materials Driving and Parking Rules). If military operators do not possess this document, shipper will provide a copy to operator.

Item 9. *Commercial Vehicle Safety Alliance (CVSA) Decal. Check to see if equipment has a current CVSA decal and mark applicable box. Vehicles without CVSA, check documentation of the last vehicle periodic inspection and perform DD Form 626 inspection.

SECTION II - MECHANICAL INSPECTION

General Instructions.

All items (12.a. through 12.t.) will be checked on all incoming empty equipment prior to loading. All UNSATISFACTORY conditions must be corrected prior to loading. Items with an asterisk (*) shall be checked on all incoming loaded equipment. Unsatisfactory conditions that would affect the safe off-loading of the equipment must be corrected prior to unloading.

SECTION II *(Continued)*

Item 12.a. Spare Electrical Fuses. Check to ensure that at least one spare fuse for each type of installed fuse is carried on the vehicle as a spare or vehicle is equipped with an overload protection device (circuit breaker). (49 CFR 393.95)

b. Horn Operative. Ensure that horn is securely mounted and of sufficient volume to serve purpose. (49 CFR 393.81)

c. Steering System. The steering wheel shall be secure and must not have any spokes cracked through or missing. The steering column must be securely fastened. Universal joints shall not be worn, faulty or repaired by welding. The steering gear box shall not have loose or missing mounting bolts or cracks in the gear box mounting brackets. The pitman arm on the steering gear output shaft shall not be loose. Steering wheel shall turn freely through the limit of travel in both directions. All components of a power steering system must be in operating condition. No parts shall be loose or broken. Belts shall not be frayed, cracked or slipping. The power steering system shall not be leaking. (49 CFR 396 Appendix G)

d. Windshield/Wipers. Inspect to ensure that windshield is free from breaks, cracks or defects that would make operation of the vehicle unsafe; that the view of the driver is not obscured and that the windshield wipers are operational and wiper blades are in serviceable condition. Defroster must be operative when conditions require. (49 CFR 393.60, 393.78 and 393.79)

e. Mirrors. Every vehicle must be equipped with two rear vision mirrors located so as to reflect to the driver a view of the highway to the rear along both sides of the vehicle. Mirrors shall not be cracked or dirty. (49 CFR 393.80)

f. Warning Equipment. Equipment must include three bidirectional emergency reflective triangles that conform to the requirements of FMVSS No. 125. FLAME PRODUCING DEVICES ARE PROHIBITED. (49 CFR 393.95)

g. Fire Extinguisher. Military vehicles must be equipped with two serviceable fire extinguishers with an Underwriters Laboratories rating of 10 BC or more. (Commercial motor vehicles must be equipped with one serviceable 10 BC Fire Extinguisher). Fire extinguisher(s) must be located so that it is readily accessible for use and securely mounted on the vehicle. The fire extinguisher must be designed, constructed and maintained to permit visual determination of whether it is fully charged. (49 CFR 393.95)

h. Electrical Wiring: Electrical wiring must be clean and properly secured. Insulation must not be frayed, cracked or otherwise in poor condition. There shall be no uninsulated wires, improper splices or connections. Wires and electrical fixtures inside the cargo area must be protected from the lading. (49 CFR 393.28, 393.32, 393.33)

DD FORM 626, MAR 2007

Page 2 of 3 Pages

INSTRUCTIONS

SECTION II *(Continued)*

i. Lights/Reflectors. (Head, tail, turn signal, brake, clearance, marker and identification lights, Emergency Flashers). Inspect to see that all lighting devices and reflectors required are operable, of proper color and properly mounted. Ensure that lights and reflectors are not obscured by dirt or grease or have broken lenses. High/Low beam switch must be operative. Emergency Flashers must be operative on both the front and rear of vehicle. (49 CFR 393.24, 25, and 26)

j. Fuel System. Inspect fuel tank and lines to ensure that they are in serviceable condition, free from leaks, or evidence of leakage and securely mounted. Ensure that fuel tank filler cap is not missing. Examine cap for defective gasket or plugged vent. Inspect filler necks to see that they are in completely serviceable condition and not leaking at joints. (49 CFR 393.83)

k. Exhaust System. Exhaust system shall discharge to the atmosphere at a location to the rear of the cab or if the exhaust projects above the cab, at a location near the rear of the cab. Exhaust system shall not be leaking at a point forward of or directly below the driver compartment. No part of the exhaust system shall be located where it will burn, char or damage electrical wiring, fuel system or any other part of the vehicle. No part of the exhaust system shall be temporarily repaired with wrap or patches. (49 CFR 393.83)

l. Brake System. (Io include hand brakes, parking brakes and Low Air Warning devices). Check to ensure that brakes are operational and properly adjusted. Check for audible air leaks around air brake components and air lines. Check for fluid leaks, cracked or damaged lines in hydraulic brake systems. Ensure that parking brake is operational and properly adjusted. Low Air Warning devices must be operative. (49 CFR 393.40, 41, 42, 43, 44, 45, 47, 48, 49, 50, 51, 52, 53, and 55)

m. Suspension. Inspect for indications of misaligned, shifted or cracked springs, loosened shackles, missing bolts, spring hangers unsecured at frame and cracked or loose U-bolts. Inspect for any unsecured axle positioning parts, and sign of axle misalignment, broken torsion bar springs (if so equipped). (49 CFR 393.207)

n. Coupling Devices (Inspect without uncoupling). Fifth Wheels: Inspect for unsecured mounting to frame or any missing or damaged parts. Inspect for any visible space between upper and lower fifth wheel plates. Ensure that the locking jaws are around the shank and not the head of the kingpin. Ensure that the release lever is seated properly and safety latch is engaged. Pintle Hook, Drawbar, Towbar Eye and Tongue and Safety Devices: Inspect for unsecured mounting, cracks, missing or ineffective fasteners. (welded repairs to pintle hook is prohibited). Ensure safety devices (chains, hooks, cables) are in serviceable condition and properly attached. (49 CFR 393.70 and 71)

o. Cargo Space. Inspect to ensure that cargo space is clean and free from exposed bolts, nuts, screws, nails or inwardly projecting parts that could damage the lading. Check floor to ensure it is tight and free from holes. Floor shall not be permeated with oil or other substances. (49 CFR 393.84)

p. Landing Gear. Inspect to ensure that landing gear and assembly are in serviceable condition, correctly assembled, adequately lubricated and properly mounted.

SECTION II *(Continued)*

q. Tires, Wheels and Rims. Inspect to ensure that tires are properly inflated. Flat or leaking tires are unacceptable. Inspect tires for cuts, bruises, breaks and blisters. Tires with cuts that extend into the cord body are unacceptable. Thread depth shall not be less than: 4/32 inches for tires on a steering axle of a power unit, and 2/32 inches for all other tires. Mixing bias and radial on the steering axle is prohibited. Inspect wheels and rims for cracks, unseated locking rings, broken, loose, damaged or missing lug nuts or elongated stud holes. (49 CFR 393.75)

r. Tailgate/Doors. Inspect to see that all hinges are tight in body. Check for broken latches and safety chains. Doors must close securely. (49 CFR 177.835(h))

s. Tarpaulin. If shipment is made on open equipment, ensure that lading is properly covered with fire and water resistant tarpaulin. (49 CFR 177.835(h))

t. Other Unsatisfactory Condition. Note any other condition which would prohibit the vehicle from being loaded with hazardous materials.

Item 14. For AA&E and other shipments requiring satellite surveillance, ensure that the Satellite Motor Surveillance System is operable. The DTTS Message Display Unit, when operative, will display the signal "DTTS ON". The munitions carrier driver, when practical, will position the DTTS message display unit in a manner that allows the shipping inspector or other designated shipping personnel to observe the "DTTS ON" message without climbing aboard the cab of the motor vehicle.

SECTION III - POST LOADING INSPECTION

General Instructions.

All items will be checked prior to the release of loaded equipment. Shipment will not be released until deficiencies are corrected. All items will be checked on incoming loaded equipment. Deficiencies will be reported in accordance with applicable service regulations.

Item 18. Check to ensure shipment is loaded in accordance with 49 CFR Part 177.848 and the applicable Segregation or Compatibility Table of 49 CFR 177.848.

Item 19. Check to ensure the load is secured from movement in accordance with applicable service outload drawings.

Item 20. Check to ensure seal(s) have been applied to closed equipment, fire and water resistant tarpaulin applied on open equipment.

Item 21. Check to ensure each transport vehicle has been properly placarded in accordance with 49 CFR 172.504.

Item 22. Check to ensure operator has been provided shipping papers that comply with 49 CFR 172.201 and 202. For shipments transported by Government vehicle, shipping paper will be DD Form 836.

Item 23. Ensure operator(s) sign DD Form 626, are given a copy and understand the hazards associated with the shipment.

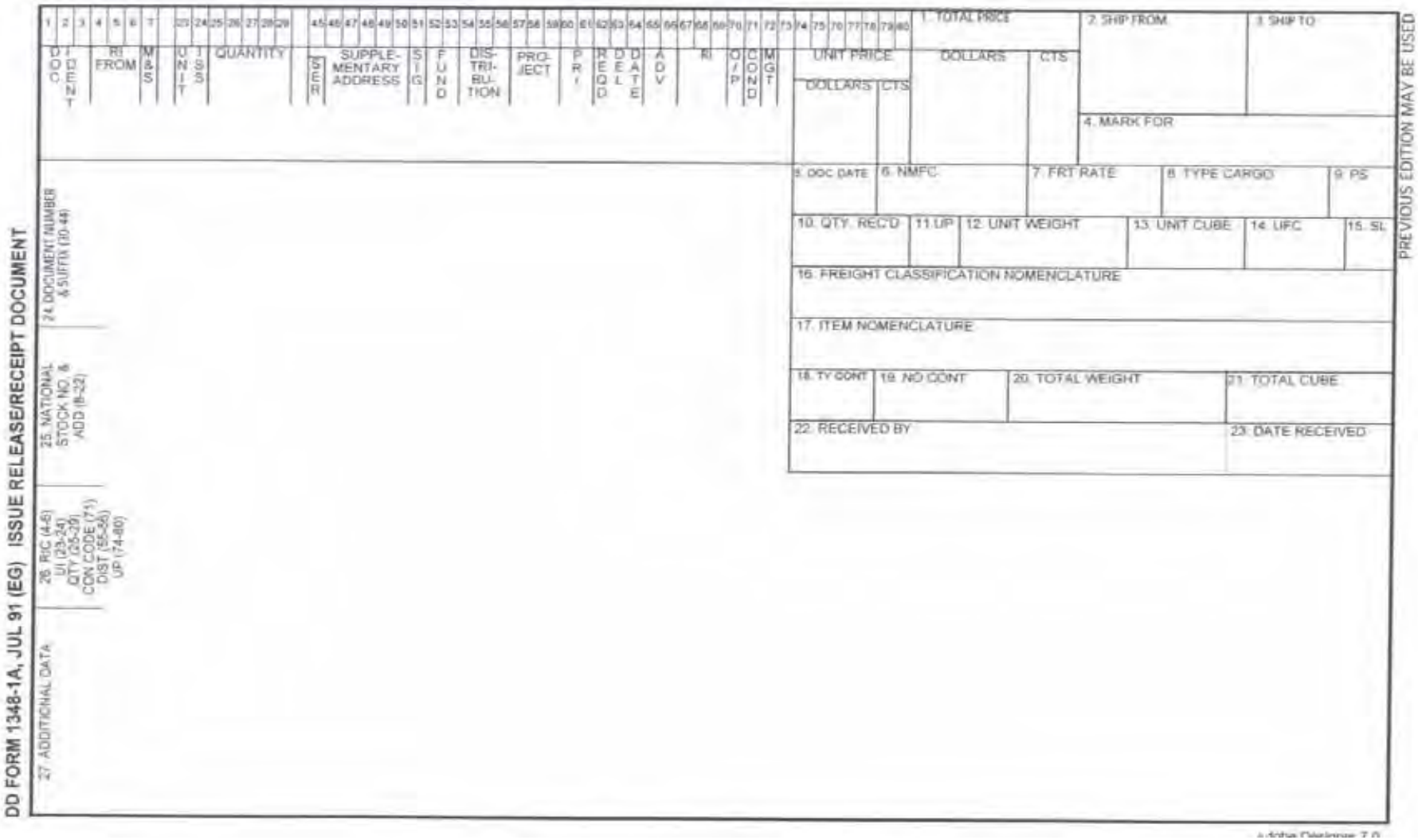
Item 24. Applies to Commercial Shipments Only. If shipment is made under DOT Special Permit 868, ensure that shipping papers are properly annotated and copy of Special Permit 868 is with shipping papers.

DD FORM 626, MAR 2007

Page 3 of 3 Pages

ESHF 211: DD 1348-1A ISSUE/RELEASE RECEIPT DOCUMENT

(Original pdf versions of this form are available)



1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the excavation of soil to gain access to anomalies that could potentially be munitions and explosives of concern (MEC). This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP).

2.0 SCOPE

This ESHP applies to PIKA personnel, including subcontractor personnel, and operations involving the excavation of possible MEC anomalies. This ESHP is not intended to contain requirements needed to complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REGULATORY REFERENCES

This ESHP is to be implemented in conjunction with PIKA ESHP-519, Excavation and Trenching, and ESHP-518, Heavy Equipment Operations if earth-moving machinery (EMM) is used. This ESHP has been designed to addresses the safety and health concerns associated with excavation operations conducted in MEC contaminated areas. Along with the specifications of ESHPs 518 and 519, the OSHA standards and USACE requirements listed below directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed.

- Department of Defense (DoD) 6055.9-STD, DoD Ammunition and Explosive Safety Standard, February 29, 2008.
- DoD 4145.26-M, DoD Contractor's Safety Manual for Ammunition and Explosives, March 13, 2008.
- Department of Defense Explosive Safety Board (DDESB) Technical Paper (TP) 16, Methodologies for Calculating Primary Fragment Characteristics, 1 December 2003.
- DDESB TP 18, Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel, 20 December 2004.
- DA-Pam 385-64, Ammunition and Explosives Safety Standards, 15 December 1999.
- OSHA Construction Industry Standard 29 CFR Part 1926, Subparts O and P, Excavations (most current version).
- USACE Engineering Regulation (ER) 385-1-92, Safety and Occupational Health Requirements for Hazardous, Toxic and Radioactive Waste (HTRW) Activities, July 2003.

- USACE Engineering Pamphlet (EP) 385-1-95a, Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Removal Action Operations, 27 August 2004.
- USACE EP 1110-1-18, Military Munitions Response Process, 3 April 2006.
- USACE EM 1110-1-4009, Military Munitions Response Actions, 15 June 2007.
- USACE EM 385-1-1, Safety and Health Requirements Manual, 3 November 2003.
- USACE EM 385-1-95, Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations, 30 March 2007.
- The PIKA CESHP (this document will be on site and available to site personnel during the project).

4.0 DEFINITIONS

As related to this ESHP the definitions presented below shall apply:

1. **Discarded Military Munitions (DMM):** Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations.
2. **Materials Potentially Presenting and Explosive Hazard (MPPEH):** Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within DoD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.
3. **MEC Procedures or Operations**: Work conducted which includes, but is not limited to, the following actions performed by unexploded ordnance (UXO) personnel (see definition below):
   a. Manually gaining access to and identifying subsurface anomalies and assessing the condition of buried MEC.
   b. Identifying and assessing the condition of surface MEC.
   c. Recovering and making final disposal of MEC.
   d. Handling and inspection of Munitions Debris (MD), DMM, Range-related Debris (RRD) or MPPEH before it has been inspected by UXO personnel and determined to be free of explosive hazards.

4. **MEC-Related Procedures/Operations**: Work conducted which includes, but is not limited to: actions which may be performed by a non-UXO-qualified individual. Non-UXO-qualified personnel who have been determined to be essential for the operations being performed may be utilized to perform MEC-related procedures when supervised by a UXO Technician III or a UXO-qualified individual of higher rank than a UXO Technician III:
   a. Conduct visual and/or detector aided UXO and DMM field search activities.
   b. Locate subsurface UXO and DMM by operating geophysical detection instruments and related equipment.
   c. Perform field maintenance and calibration checks on geophysical detection instruments and related equipment.
   d. Remove non-hazardous MD and RRD after such items have been inspected by a UXO technician.
   e. Utilizing EMM to excavate overburden from suspected MEC.
5. **Munitions and Explosives of Concern**: This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) MEC: (B) DMM: or (C) munitions constituents (e.g., TNT, RDX) present in high enough concentrations to pose an explosive hazard.
6. **Unexploded Ordnance**: Military munitions that have been primed, fuzed, armed, or otherwise prepared for action and have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material and remain unexploded either by malfunction, design, or any other cause.
7. **UXO-Qualified Personnel**: For qualification requirements, refer to DDESB TP 18.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

The Project Manager shall be responsible for making sure of the availability of the resources needed to implement this ESHP, and shall also see that this ESHP is incorporated into site specific plans, procedures and training for sites where this ESHP is to be implemented.

5.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

- Conducting an annual review of this ESHP and making modifications as necessary.

- Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP for proper protection of personnel.
- Providing the UXOSO with consultation related to MEC protective measures.
- Periodically auditing PIKA work sites for compliance with this ESHP.

5.3 SENIOR UXO SUPERVISOR

The SUXOS will see that this ESHP is implemented for operations that involve personnel exposure to the hazards associated with the excavation of anomalies. The SUXOS will also see that relevant sections of this ESHP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

5.4 UXO SAFETY OFFICER

The UXOSO will be responsible for making sure that the safety and health hazards and control techniques associated with or referenced in this ESHP 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 for their initial and continued compliance with this ESHP and other regulatory guidelines.

5.5 UXO TECHNICIAN III

The UXO Technician III (UXOTIII) responsible for supervising the excavation operations shall be responsible for the field implementation of this ESHP and for implementing the safety and health requirements outlined in section 5.0 of this ESHP. In the absence of a SUXOS, the UXOTIII shall be responsible for implementing the SUXOS responsibilities outlined in paragraph 4.3.

6.0 PROCEDURE

Personnel, including contractor and subcontractor personnel, involved in excavation of anomalies on a MEC site will be familiar with the potential safety and health hazards associated with the conduct of this operation, work practices and the control techniques to be used to reduce or eliminate these hazards.

6.1 SAFETY HAZARDS AND OPERATIONAL CONTROL TECHNIQUES

6.1.1 General Excavation Control Measures

The excavation and trenching ESHP (ESHP-519) and the heavy equipment ESHP (ESHP-518) will be consulted and implemented to determine the general procedures that must used during excavation and trenching operations. In addition, the safety and health control techniques listed below will be used during the conduct of anomaly excavation on MEC sites.

1. Daily tailgate safety meetings will be conducted and recorded in the project UXOSO Daily Safety Log, as to the safety concerns pertaining to that day's use of EMM.
2. Excavation operations shall be restricted to daylight hours only unless adequate lighting is established.
3. To protect the site personnel and the public from the operational hazards, the UXOTIII in coordination with the SUXOS shall establish an exclusion zone (EZ) around the excavation site. The UXOTIII or SUXOS will specify the manner in which the area is delineated and may place barricades, construction fencing, barrier tape, etc., to restrict personnel entry into the EZ minimizing the number of personnel exposed to the hazards.

6.1.2 Excavation of Anomalies at Known MEC Sites

Excavation and identification of anomalies at a known MEC contaminated site will be performed using the criteria and procedures outlined below.

1. Only UXO-qualified personnel will perform investigation of anomalies.
2. The size of the EZ established to restrict unauthorized personnel will be equal the minimum separation distance (MSD) for the munition with the greatest fragmentation distance (MGFD) associated with the site. This EZ will be established before any excavation is conducted.
3. An additional Work Zone (WZ) will be established around the site of the excavation to restrict personnel from entering the work zone where the excavation is being conducted. This work zone will be the Team Separation Distance and will be equal to distance specified in the Work Plan, but never less then the K40 for the Munition With the Greatest Fragmentation Distance (MGFD).
4. To gain access to a subsurface anomaly, UXO-qualified personnel will use either hand tools or earth moving machinery (EMM) to remove soil in an anomaly free location to the side of the anomaly. Excavation operations, whether by hand or EMM, will employ a step down or offset access method. Under no circumstances will any excavation be made directly over suspected OE items.
5. Soil removal will be conducted in one-foot lifts and after each lift, the excavated area will be magnetically surveyed to assess the approximate distance to the item (based upon signal strength). Additionally, the soil removed in the lift will be magnetically surveyed to make sure no small MEC items were present in the soil but masked by the signal of the anomaly. In the event that an anomaly is located in the excavated soil, the anomaly will be exposed using hand tools and identified according to the steps outlined below.
   a. If the anomaly is identified as MEC-related, its identity and condition will be determined by two UXO personnel.
   b. Prior to any action being performed on an ordnance item, fuzing will be

definitively identified. Under no circumstances will any fuzed MEC be moved in an attempt to make a definitive identification.

c. A fuzed MEC item or a MEC item that is deemed unacceptable to move will be blown in place (BIP). Requisite safety precautions for demolition operations will be taken in accordance with applicable references.
d. Non-MEC items will simply be removed once inspected and deemed safe to move by the UXOTIII.

6. Once the vertical depth of the anomaly is know by digging along beside the anomaly, EMM may be used to remove the overburden. However, once the excavation is believed to be within one foot of the anomaly source, additional excavation will be conducted with care using hand tools only.
7. A detailed accounting of MEC located at each site will be made and maintained at the site. A log entry will be made for each MEC item indicating the item's identity, its explosive hazards, location (x, y, and z grid axis measurements) and final disposition.
8. If the MEC item is determined to be chemical warfare materiel (CWM), work will immediately cease. Personnel will withdraw along cleared paths upwind from the point of discovery to a minimum of 500 meters from the item. Two UXO qualified personnel will be positioned as far upwind as possible, at a safe location from the item to observe and secure the CWM item. The SUXOS will be notified, as will the client representative. For the discovery of CWM, military EOD support will be requested and PIKA or client authorized personnel will secure the area until military EOD arrives and takes control of the site.

6.2 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

The following safety measures and personal protective equipment shall be used in preventing or reducing exposures associated with excavation operations. These requirements will be implemented unless superseded by site-specific requirements stated in the Site Safety and Health Plan.

1. Hardhats, safety glasses and safety-toe safety boots shall be worn by work area personnel when excavation equipment is in operation. The UXOSO will determine the minimum PPE required usage areas.
2. The the hardhat and safety glasses will either be removed or secured when anomalies or MEC are being inspected.
3. Hearing protection shall be worn when excavation equipment is in operation unless the UXOSO has measured and determined the noise levels to be less than 85 dBA TWA.

6.0 AUDIT CRITERIA

The following items related to excavations will be audited for compliance with this ESHP:

1. The Daily Operational and Safety Logs.
2. The Daily Task and Safety Briefing Log (ESHF-502).
3. The Safety Training Attendance Log (ESHF-503).
4. The Daily Inspection and Weekly Audit Report Form (ESHF-506).

7.0 ATTACHMENTS

None.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of mechanical screening equipment to remove OE items from soil. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA personnel, including subcontractor personnel, and operations involving the use of mechanical screening equipment to remove OE items from soil. This ESHP is not intended to contain requirements needed for regulatory compliance and is generic in nature. Prior to being added to a Site Safety and Health Plan, the site-specific requirements for blast shields, Plexiglas and safety arcs will need to be added to the figures attached to this ESHP. Additionally, consult the documents listed in section 3.0 of this ESHP for additional compliance issues.

3.0 REGULATORY REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA Construction Industry Standard 29 CFR Part 1926, Subpart O;
- OSHA General Industry Standard 29 CFR Part 1910, Subparts N and O; and
- USACE EM 385-1-1, Sections 16 A and B and Section 17 A.
- The PIKA CESHP (this document will be on site and available to site personnel during the project).
- Department of Defense (DoD) 6055.9-STD, DoD Ammunition and Explosive Safety Standard, Feburary 29, 2008.
- DoD 4145.26-M, DoD Contractor's Safety Manual for Ammunition and Explosives, March 13, 2008
- Department of Defense Explosive Safety Board (DDESB) Technical Paper (TP) 16, Methodologies for Calculating Primary Fragment Characteristics, 1 December 2003.
- DDESB TP 18, Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel, 20 December 2004.

- DA-Pam 385-64, Ammunition and Explosives Safety Standards, 15 December 1999.
- USACE Engineering Regulation (ER) 385-1-92, Safety and Occupational Health Requirements for Hazardous, Toxic and Radioactive Waste (HTRW) Activities, July 2003.
- USACE Engineering Pamphlet (EP) 385-1-95a, Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Removal Action Operations, 27 August 2004.
- USACE EP 1110-1-18, Military Munitions Response Process, 3 April 2006.
- USACE EM 1110-1-4009, Military Munitions Response Actions, 15 June 2007.
- USACE EM 385-1-1, Safety and Health Requirements Manual, 3 November 2003.
- USACE EM 385-1-95, Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations, 30 March 2007.

4.0 RESPONSIBILITIES

It is the belief of PIKA senior management that the creation of an effective safety culture, to include the appropriate implementation of safety protocols, begins with project management personnel. As such PIKA management personnel are tasked the effective application of PIKA's core safety values to site operations to safeguard site personnel, the environment and the public from project-related hazards. The ES&H responsibilities of PIKA's project and site management personnel as they relate to this ESHP are outlined below.

4.1 PROJECT MANAGER

The Project Manager shall be responsible for the effective application of the requirements outlined in this ESHP. Additionally, the PM will make available the PIKA personnel and equipment resources needed to implement this ESHP. For sites where mechanical screening will be used in a MEC environment, the PM will see that this ESHP is incorporated in the plans, procedures and training developed for the project.

4.2 SENIOR UXO SUPERVISOR

As the primary site manager who is responsible for the personnel working on the site, the Senior UXO Supervisor (SUXOS) will make sure that this ESHP is implemented for screening operations, and that the hazard controls required by this ESHP are effectively implemented during site operations. The SUXOS will make sure that relevant sections of this ESHP are discussed in the tailgate safety briefings. Information related to the daily implementation of the ESHP is to be is documented in the Daily Task and Safety Briefing Log (ESHF-502) maintained by the SUXOS.

4.3 UXO SUPERVISOR

The UXO Supervisor (UXOTIII) is typically assigned a team of site personnel who work under the direction of the UXOTIII. As such, the UXOTIII shall be responsible for making sure of the field implementation of this ESHP and for implementing the safety and health requirements outlined in section 5.0 of this ESHP. In the absence of a SUXOS, the UXOTIII shall be responsible for implementing the SUXOS responsibilities outlined in paragraph 4.2.

4.4 UXO SAFETY OFFICER

The UXO Safety Officer (SSHO) will be responsible for providing both MEC and occupational safety and health consultation and oversight to the SUXOS, the UXOTIII, and the site personnel. The SSHO will make sure that the safety and health hazards associated with the site operations and addressed by this ESHP are discussed during the initial site hazard training and the daily tailgate safety briefings. The SSHO will also make sure that site personnel are aware of the hazard control techniques and procedures to be implemented to safeguard themselves, the environment and the public from the recognized hazards. The SSHO will also be responsible for daily inspection of site operations and conditions to make sure their initial and continued compliance with this ESHP, the project plans, and other regulatory guidelines.

4.5 ON-SITE PROJECT PERSONNEL

PIKA, contractor, and subcontractor personnel involved in mechanical screening operations shall be familiar with the potential safety and health hazards associated with this operation and the control techniques that will used to reduce or eliminate these hazards. On-site project personnel will also be responsible for working in a safe and healthful manner in compliance with associated regulatory requirements. At no time will on-site project personnel act in a manner that is non-compliant with this ESHP and they will take the steps necessary to safeguard themselves, their co-workers, the environment and the public.

5.0 PROCEDURE

5.1 SAFETY HAZARDS

The safety and health hazards potentially associated with mechanical screening operations on a MEC site are listed below. For each of the hazards listed, at least one hazard control measure is listed in paragraph 5.2 for the reduction of the operational hazard. At no time will mechanical screening operations be conducted on site without the use and implementation of the appropriate controls measures listed here or in the approved site plans.

1. MEC possibly resulting in heat, fire, fragmentation, and over pressurization hazards;
2. Vehicle traffic and movement;
3. Trips and falls (excavations and man lift);
4. Noise;
5. Heavy equipment operations;
6. Dust, with potential for exposure to toxic metals;
7. Stored energy and pinch points; and
8. Engine exhaust.

5.2 OPERATIONAL CONTROL MEASURES

For the safety hazards listed in paragraph 5.1, the operational control measures presented below shall be used to the greatest extent feasible, to protect site personnel from the hazards associated and identified with mechanical screening operations. The degree and type of hazard, as outlined in the site Work Plan (WP) and Site Safety and Health Plan (SSHP) will dictate the extent of control to be used and those controls will be specified in the WP and SSHP.

1. Daily tailgate safety meetings will be conducted, and noted in the Safety Log, as to the safety and health concerns pertaining to overall operations and the use of screening equipment.
2. Screening equipment and support vehicles shall be equipped with appropriate fire extinguishers.
3. The excavation operations will not require barricading, however, both the excavator and the UXO Specialist (UXOTII) will be protected behind a Plexiglas window of the thickness specified in Figure 202-1. For the loader/excavator operator, the Plexiglas will be mounted over the existing windshield and windows. For the UXOTII observing the excavation, the Plexiglas window will be mounted on a blast shield similar to that portrayed in Figure 202-1. At a minimum, the blast shield shall provide front, side, and overhead protection, and be constructed to the material thickness specifications in Figure 202-1. General design characteristics and dimensions of the Plexiglas and steel sides required will have been specified by the Structures Branch, Engineering Directorate, US Army Engineering and Support Center, Huntsville (CEHNC), or the DDESB Fragmentation Database. The thickness of the protective materials will be based upon the accidental detonation of the Munition with the Greatest Fragmentation Distance (MGFD) for the specific site.
4. The mechanical screening assembly will not require barricading; however, the UXO personnel controlling and monitoring the screening, along with the UXOTII monitoring the screen reject material, will be protected behind Plexiglas windows

mounted on separate blast shields. The blast shields used shall be constructed similar to the blast shield depicted in Figure 202-1 of this ESHP. The UXO personnel controlling the screen will do so by means of a remotely wired "kill switch." This kill switch will be capable of shutting down the screening operations should the UXOTII monitoring the operation detect an OE item within the screen or screen reject. The location of the UXOTII monitoring the screening process will be such that the UXOTII will be able to see the screening area. This may require the use of a man lift to allow for visual observation of the operation. If needed, the blast shield will be mounted on the man lift platform.

5. All operational observers and operators described above will be located outside the K24 distance arc for the MGFD specified for the site
6. The UXOTII controlling the screening operation will watch for any materials that may be UXO items and any items that may become lodged/jammed in the screens. If any potential UXO is seen in the hopper, on the conveyors, in the screens, or in the reject material, the screening process will be shut down immediately. Additionally, if a potential UXO is observed in the screen reject, the UXOTII observing the item will use radio or visual communication to order the immediate shut-sown of the screening operations. Once the process has been halted and secured, the potential UXO item will be inspected by the UXOTIIs. If the item is confirmed as being a UXO, the item will be identified and a determination made as to whether the item can be moved. Those items that are unfuzed or safe to move will be removed from the screening equipment and stored for later disposal according to the approved WP. Those items determined to be unsafe to move will be left in place, the CEHNC on-site Safety Specialist will be notified, and the screening operations halted until a resolution can be obtained using the procedures in the approved WP. Those items identified as being OE-related but not UXO will be removed and stored accordingly.
7. Segregation of the oversize materials will be performed according to the following:
   a. Debris identified as rocks, roots, shale, etc., will be collected and combined with the screened soil from which they came.
   b. The debris is identified as non-OE scrap that will be disposed of as scrap.
   c. The debris is identified as OE-related scrap or inert OE and must be verified as being free of OE hazards prior to scrap disposal.
   d. The debris is identified as UXO that is unfuzed and safe to move, in which case the item will be removed from the area and destroyed at the existing Open Detonation (OD) area.

e. Hazardous UXO identified that cannot be moved, will be brought to the attention of the SUXOS who will immediately notify the client representative. The client representative will direct PIKA as to the next course of action to be taken.

8. When maintenance/servicing is performed on the sifter or conveyor system, sources of immediate power or stored energy shall be controlled (refer to lockout/tagout ESHP).
9. Screening operations shall be restricted to daylight hours, and once operations begin, only UXO-qualified personnel may enter the safety zone around the sifter operation.
10. All personnel involved in the screening operations shall be informed of the "Kill Switch" location, as well as the procedures for summoning emergency support.

5.2 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

The following safety measures and personal protective equipment (PPE) shall be used in preventing or reducing exposures associated with screening operations. These requirements will be implemented unless superseded by site-specific requirements stated in the SSHP.

1. Hard hats, steel-toe safety boots and protective gloves shall be worn whenever maintenance, adjustment, or clearing of the sifter is being performed.
2. Safety glasses shall be worn around screening equipment unless full face respirators are required.
3. Any of the PPE that will be worn when investigating OE items in the sifter will be secured to the wearer to make sure that it does not fall off and strike suspect UXO items.
4. Hearing protection shall be worn when screening equipment is in operation unless the SSHO has measured and determined the noise levels to be less than 85 decibels on the “A” scale over an 8-hour time-weighted average.

6.0 AUDIT CRITERIA

The following items related to screening operations will be audited for compliance with this ESHP:

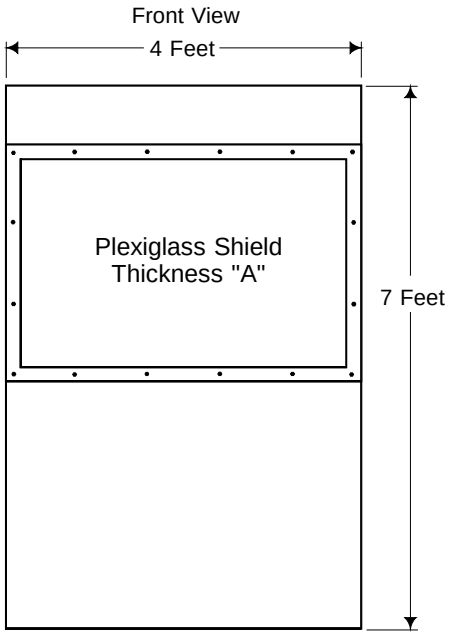
1. The Daily Task and Safety Briefing Logs (ESHF-502);
2. The Documentation of Hazard Communication Training Form (ESHF-505);
3. The Safety Training Attendance Log (ESHF-503); and
4. The Daily Inspection and Weekly Audit Report Form (ESHF-506).

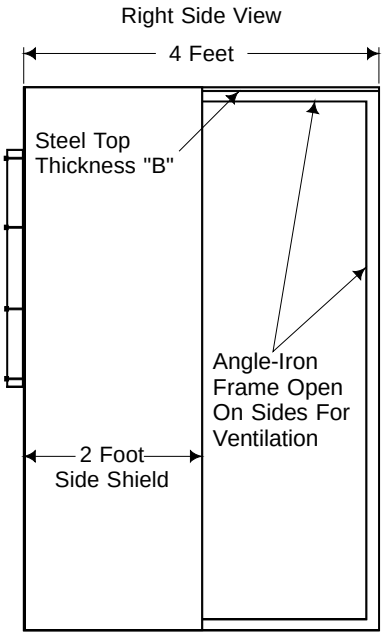
7.0 ATTACHMENTS

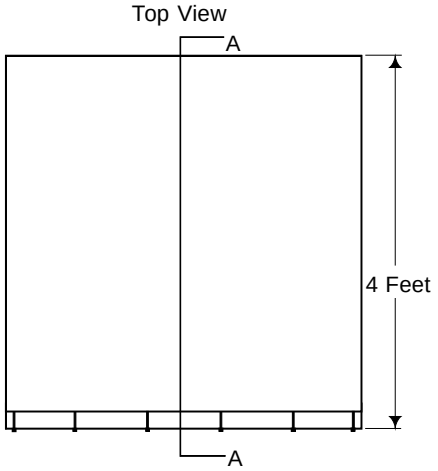
None.

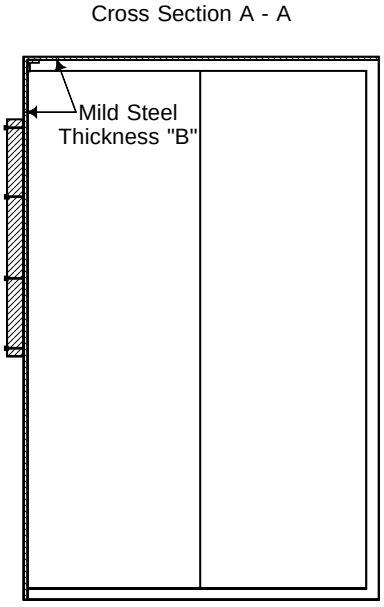
FIGURE 202-01 – BARRIER SPECIFICATIONS

Site Name:	**Site Location:**
MGFD:	**Team Separation Distance:**
Thickness "A" for the Plexiglas:	**Thickness "B" for the Steel:**
K24 Distance:	**MSD:**



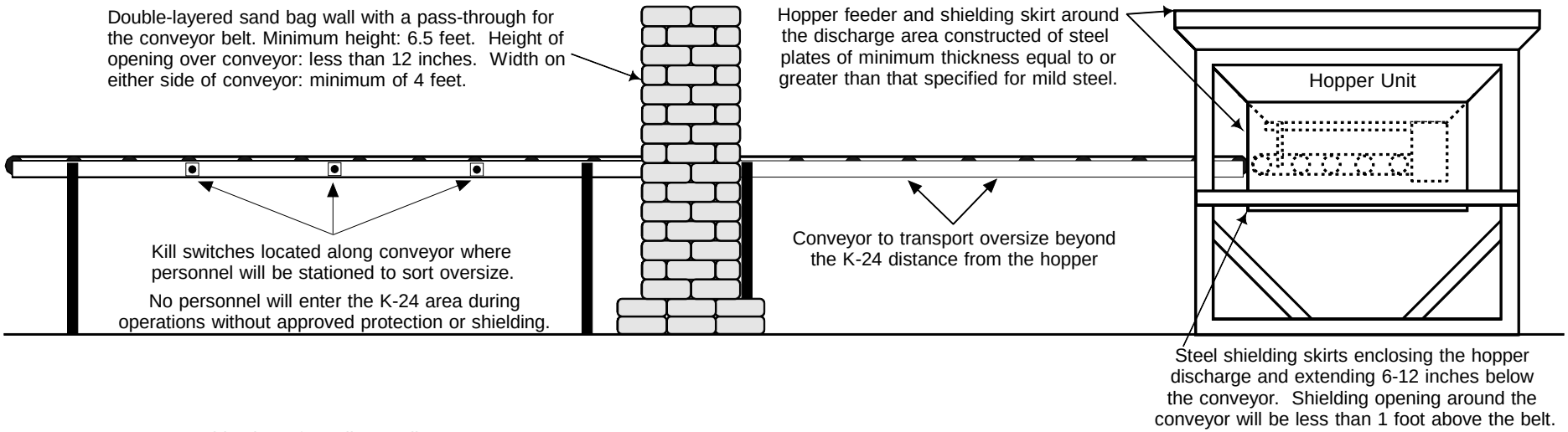




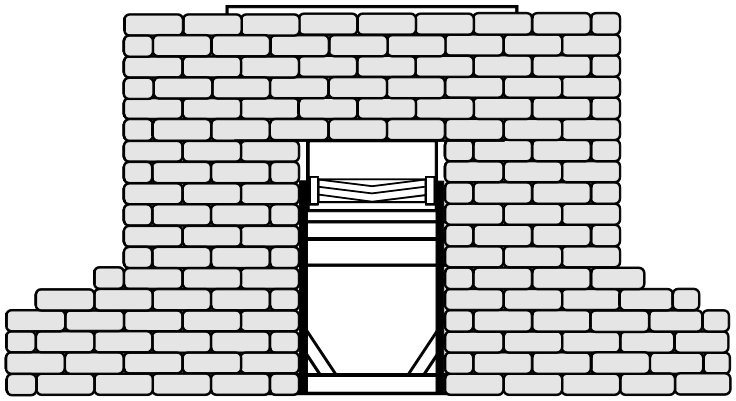


Note:
Sizes are approximate, and different configurations using approved materials may be used upon approval of CEHNC. Additionally, plexiglass window may cover entire front of blast shield.

FIGURE 202-02 – POTENTIAL HOPPER AND CONVEYOR CONFIGURATION

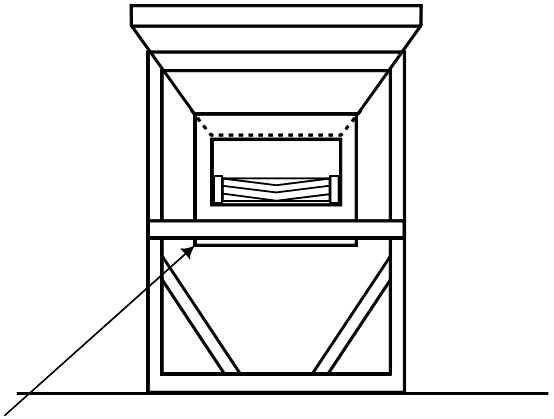


Side view of sandbag wall



Distance from the top of the belt to the bottom of the wall opening will be approx. 12-inches. (View depicts possible wall configuration. Actual on-site configuration may vary, with OSS approval.)

Side view of hopper system



View depicts the orientation of the steel shield at hopper discharge. Distance from the top of the belt to the bottom of the shield opening approximately 12-inches.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the procedures applicable to the transport of explosives to include demolition material and munitions and explosives of concern (MEC). This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP).

2.0 SCOPE

This ESHP applies to PIKA site personnel involved in the transport of explosives. This ESHP is generic in nature and is not intended to cover requirements necessary for compliance at each site. It may be necessary to obtain state or local permits/licenses and even a Commercial Drivers License (CDL) in some instances. In most cases, the data contained in this ESHP and PIKA Forms ESHF-201 and ESHF-202 will be sufficient.

3.0 REGULATORY REFERENCES

Procedures and information contained in this document were obtained from the below listed references:

- Department of Transportation, 49 CFR Parts 172, 173, and 383, and applicable sections.
- OSHA 29 CFR 1910 General Industry Standards.
- OSHA 29 CFR 1926 Construction Standards.
- Department of Defense (DoD) 6055.9-STD, DoD Ammunition and Explosive Safety Standard, February 29, 2008.
- DoD 4145.26-M, DoD Contractor's Safety Manual for Ammunition and Explosives, March 13, 2008.
- USACE Engineering Pamphlet (EP) 1110-1-18, *Ordnance and Explosives Response*, 3 April 2006.
- USACE Engineering Manual (EM) 385-1-1, Safety and Health Requirements Manual, 3 November 2003.
- USACE Engineering Regulation (ER) 385-1-95, *Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations*, 30 March 2007.
- USACE EP 385-1-95a, *Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations*, 27 August 2004.
- USACE, EM 385-1-4009, *Military Munitions Response Actions*, 15 June 2007.
- The PIKA CESHP (this document will be on site and available to site personnel during the project).

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM), in conjunction with the Senior UXO Supervisor (SUXOS) will determine the specific-site requirements for explosive licensing, permitting, and placarding. The PM will then make sure that the appropriate requirements are communicated to the Corporate Safety and Health Manager (CSHM) and that they are incorporated into the site plans or added as an attachment to this ESHP should they differ. The PM will also be responsible for making sure that the project-related manpower and personnel resources are available for the safe and effective implementation of this ESHP. Any site-specific attachments added to this ESHP will be reviewed and approved by the CSHM and the SUXOS.

4.2 SENIOR UXO SUPERVISOR

The SUXOS will be responsibility for making sure that the requirements of this ESHP, and any site-specific attachments are enforced and that the pertinent PIKA forms, ESHF-201 and ESHF-202, are property completed and in the vehicle(s) used for explosive transportation.

4.3 EXPLOSIVE VEHICLE DRIVER

Individuals assigned to transport explosives will meet the site driver requirements, be thoroughly familiar with this ESHP, and know and understand emergency procedures in the event of an accident/incident.

5.0 EXPLOSIVES AND MEC TRANSPORTATION REQUIREMENTS

5.1 GENERAL REQUIREMENTS

Contractors transporting MEC or explosives will comply with Federal, state, and local regulations. Permits for the transportation of explosives or MEC are not required for on-site or inter-facility transportation within Federal installations. Off-site shipment of MEC and explosives will be accomplished by approved commercial carriers. For off-site shipment:

- MEC will be packaged IAW 49 Code of Federal Register (CFR) part 172 and 173;
- Drivers will have PIKA Form ESHF-201 (Special Instructions for Vehicle Drivers);
- Vehicles will be inspected using the PIKA Motor Vehicle Inspection Form, and if applicable, be properly placarded;
- Compatibility requirements will be observed;
- The load shall be well braced and, except when in closed vans, covered with a fire-resistant tarpaulin.

5.2 TRANSPORTATION ON-SITE AND ON FEDERAL INSTALLATIONS

Transportation of explosives and MEC on-site and on Federal installations will comply with the following:

- Vehicles will be inspected prior to use each day using the PIKA Weekly Vehicle Inspection Checklists and will be properly placarded;
- Vehicle engine will not be running, wheels chocked and brakes will be set when loading/unloading explosives;
- Explosives will be transported in closed vehicles whenever possible. When using an open vehicle, explosives will be covered with a flame resistant tarpaulin (except when loading/unloading);
- The area of the vehicle where the explosives are placed for transportation will have either a plastic bed liner, dunnage, or sand bags placed in the area to protect the explosives from contact with the metal bed and fittings;
- Explosive vehicles will have a first aid kit, **a minimum of** two fire extinguishers with a rating of at least 10-BC units, and communications capabilities;
- Initiating explosives, such as detonators, will remain separated;
- Compatibility requirements will be observed;
- Operators transporting explosives will have a valid drivers license;
- Operators will drive at a safe speed based on road conditions, but never over the speed limit. Vehicles transporting explosives off-road will not exceed 25 mph
- PIKA will also comply with any installation-specific explosives transportation procedures, to include those procedures related to drivers, equipment requirements and vehicle inspections.

5.3 GENERAL PLACARDING REQUIREMENTS

According to 49 CFR 172.504, the placarding requirements listed below will apply to PIKA explosives transportation:

(a) "Except as otherwise provided, each bulk packaging, freight container, unit load device, transport vehicle or rail car containing any quantity of a hazardous material must be placarded on each side and each end with the type of placards specified in Tables 1 and 2, in accordance with other requirements and exceptions." (Tables 1 and 2 are presented on the following page in Table 203-1 and 203-2.)

(c) Exceptions for less than 454 kg (1,001 pounds). "Except for bulk packaging and hazardous materials subject to 49 CFR 172.505, when hazardous materials covered by Table 2 of this section are transported by highway or rail, placards are not required on:

(1) A transport vehicle or freight container which contains less than 454 kg (1,001 lbs.) aggregate gross weight of hazardous materials covered by Table 2 of paragraph (e) of this section; or

(2) A rail car loaded with transport vehicles or freight containers, none of which is required to be placarded."

The exceptions provided in paragraph (c) provided above, do not prohibit the display of placards in the manner prescribed in this subpart, if not otherwise prohibited, on transport vehicles for freight containers that are not otherwise required to be placarded.

5.4 OFF-SITE TRANSPORTATION OF EXPLOSIVES OVER PUBLIC HIGHWAY

5.4.1 DOT Certificate of Registration

DOT certificates of registration for PIKA persons involved in the transportation of demolition materials are not required as long as only 1.4 explosives or less than 55 lbs net explosive weight (NEW) of 1.1, 1.2, or 1.3 explosives are transported by PIKA personnel.

TABLE 203 – 1: PLACARDING REQUIREMENTS

Category of material (Hazard class or division number and additional description, as appropriate)	Placard name	Placard Design Reference
1.1	Explosives 1.1	172.523
1.2	Explosives 1.2	172.524
1.3	Explosives 1.3	172.525
2.3	Poison Gas	172.532
4.3	Dangerous When Wet	172.528
6.1 (PG I, inhalation hazard only)	Poison	172.542
7 (Radioactive Yellow III label only)	Radioactive	172.544

TABLE 203 – 2

Category of material (Hazard class or division number and additional description, as appropriate)	Placard name	Placard Design Section Ref.()
1.4	Explosives 1.4	172.523
1.5	Explosives 1.5	172.524
1.6	Explosives 1.6	172.525
2.1	Flammable Gas	172.532
2.2	Non-Flammable Gas	172.528
3	Flammable	172.542
Combustible liquid	Combustible	172.544
4.1	Flammable Solid	172.546
4.2	Spontaneously Combustible	172.547
5.1	Oxidizer	172.550
5.2 (Other than organic peroxide, Type B, liquid or solid, temperature controlled).	Organic peroxide	172.552
6.1 (PG I or II, other than Zone A or B inhalation hazard).	Poison	172.554
6.1 (PG III)	Keep Away from Food	172.553
6.2	(None)	
8	Corrosive	172.558
9	Class 9	172.560
ORM-D	(None)	

5.4.2 Definition of Commercial Motor Vehicles

The term "commercial motor vehicle" (CMV) means a motor vehicle, or combination thereof, used in commerce to transport passengers or property if the motor vehicle meets any of the following:

- It has a gross combination weight rating of 11,794 or more kilograms (kg) (26,001 pounds or more) inclusive with a towed unit with a gross vehicle weight rating of more than 4,536 kilograms (10,000 pounds); or
- It has a gross vehicle weight rating of 11,794 or more KG (26,001 pounds or more); or
- It is designed to transport 16 or more passengers, including the driver; or
- It is of any size and is used in the transportation of materials found to be hazardous for the purposes of the Hazardous Materials Transportation Act and which require the motor vehicle to be placarded under the Hazardous Materials Regulations (49 CFR part 172, subpart E).

5.4.3 CDL Requirements

If the vehicle being used does not weigh more than 26,000 pounds and the materials being transported do not require placards under the DOT Hazardous Materials Regulations (i.e., 1.4 explosives) then the vehicle being used need not be classified as a CMV and the operator of the vehicle need not have a Commercial Driver's License (CDL). This situation is typical on PIKA project sites where only demolition materials classified as 1.4 are transported. However, if a CDL is required, the SUXOS will make sure that the requisite license/permits are obtained.

5.4.4 Mixed Packaging Requirements

Explosives of compatibility Group S may be packed with explosives of other explosive compatibility groups except A and L. To determine the compatibility of the materials typically transported by PIKA, check the Material Data Sheets presented in Attachment 1 to this ESHP.

6.0 DOCUMENTATION

6.1 PIKA FORMS

Any time explosives are being transported this entire ESHP to include the completed copies of supporting forms ESHF-201 and ESHF-202, will be in the vehicle. A brief description of the relevant forms is included below and shall be used for proper completion of the forms.

1. **PIKA FORM ESHF-201**

   Only those items that are being transported will be entered in the form with the applicable qty/units and weight columns completed. It is imperative that the NEW limitations of 55 lbs. not be exceeded. Required data will be entered on the front and the Guide 50 block should be checked on the back of the form.

2. PIKA FORM ESHF-202

The form will be completed making sure the pertinent data for those transporting explosives is included on the form. As with the other required form, this one will also be part of the transport paperwork. Only the route shown will be used unless there is an emergency or the route is blocked. Any deviation from the planned route will be reported to and coordinated with the SUXOS.

6.2 BATF PERMIT/LICENSE

A copy of the current BATF license will accompany the vehicle and will be readily available for inspection. A copy of the BATF license will also remain at the project site whenever explosives transportation is being conducted as a requirement of the clients Statement of Work.

7.0 ATTACHMENTS

The following attachment is included with this ESHP:

- Attachment 1 – Material Data Sheets

ATTACHMENT 1

MATERIAL DATA SHEETS

CORD, DETONATING - 1.4D - UN0289

NET EXPLOSIVE WEIGHT (NEW):

0.00229 OZ = 1 Grain

80 gr. X .00229 = .1832 oz.

0.1832 oz. Per ft. x 100' = 18.32 oz. Total Net Explosive Weight per 100 feet

HAZARDOUS CLASS OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name:

CORD DETONATING, FLEXIBLE UN0289 1.4D

49 CFR 172.101 - TABLE OF HAZMAT MATERIAL

CORD DETONATING, FLEXIBLE UN0289 1.4D

49 CFR 173.63 (a)

Packaging Exceptions

(a) Cord, Detonating (UN0065), having an explosive content not exceeding 6.5g (0.23 ounces) per 30 centimeter length (one linear foot) may be offered for transportation domestically and transported as Cord, detonating (UN0289), Division 1.4 Compatibility Group D (1.4D) explosives, if the gross weight of all packages containing Cord, detonating (UN0065), does not exceed 45 kg (99 pounds) per:

(1) Transport vehicle, freight container, or cargo-only aircraft;

UN0065 and UN0289 Use Packaging Instruction #139

Packing Instruction	Inner Packaging	Intermediate Packaging	Outer Packaging
139..... PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: 1. For UN 0065, 0102, 0104, 0289 and 0290, the ends of the detonating cord must be sealed, for example, by a plug firmly fixed so that the explosive cannot escape. The ends of CORD DETONATING flexible must be fastened securely. 2. For UN 0065 and UN 0289, inner Packaging are not required when they are fastened securely in coils.	Bags ..... Plastics Receptacles..... Fiberboard Metal Plastics Wood Reels ..... Sheets ..... Paper Plastics	Not necessary	Boxes. Steel (4A). Aluminum (4B). Wood, natural, ordinary (4C1). Wood, natural, sift proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fiberboard (4G). Plastics, solid (4H2). Drums. Steel, removable head (1A2). Aluminum, removable head (1B2). Plywood (1D). Fiber (1G). Plastics, removable head (1H2).

SHAPE CHARGE (1.4S) (UN0441)

HAZARDOUS CLASS OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name:

CHARGES, SHAPED, COMMERCIAL W/O DETONATOR UN04411.4S

49 CFR 172.101 TABLE OF HAZMAT MATERIAL

CHARGERS, SHAPED, COMMERCIAL WITHOUT DETONATOR UN04411.4S

49 CFR 173.62

Packaging & Instructions #137

49 CFR ch. 1 (10-97 Edition) . 173.62

Packing Instruction	Inner Packaging	Intermediate Packaging	Outer Packaging
137..... PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN 0059, 0439, 0440, and 0441, when the shaped charges are packed singly, the conical cavity must face downwards and the package marked “This Side Up≅. When the shaped charges are packed in pairs, the conical cavities must face inwards to minimize the jetting effect in the event of accidental initiation. 2. For UN 0065 and UN 0289, inner Packaging are not required when they are fastened securely in coils.	Bags..... Plastics Boxes..... Fiberboard Tubes..... Fiberboard Metal Plastics Dividing partitions in the outer Packaging.	Not necessary....	Boxes. Steel (4A). Aluminum (4B). Wood, natural, ordinary (4C1). Wood, natural, sift proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fiberboard (4G).

DETONATOR, NON-ELECTRIC (1.4B) (UN0267)

HAZARD CLASSIFICATION OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name

DETONATOR, NON-ELECTRIC UN0267 1.4B

CFR 49 172.101 TABLE OF HAZARDOUS MATERIALS

DETONATOR, NON-ELECTRIC UN0267 1.4B

Special Provisions (column #7)

#103 Detonators which will not mass detonate and undergo only limited propagation in the shipping package may be assigned to 1.4B classification code. Mass detonate means that more than 90 percent of the devices tested in a package explode practically simultaneously.

49 CFR 173.63 (g)

Packaging Exceptions

(g) Detonators that are classed as 1.4B or 1.4S and contain no more than 1 g of explosive (excluding ignition and delay charges) may be packed as follows in which case they are excepted from the packaging requirements of 173.62:

(1) No more than 50 detonators in one inner packaging;

(2) IME Standard 22 container is used as the outer packaging;

(3) No more than 1000 detonators in one outer packaging; and

(4) Each inner packaging is marked 1.4B Detonators or 1.4S Detonators, as appropriate.

DETONATOR, ELECTRIC (1.4B) (UN0244)

HAZARDOUS CLASSIFICATION OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name

DETONATOR, ELECTRIC UNO244 1.4B

49 CFR 172.101 TABLE OF HAZARDOUS MATERIALS

DETONATOR, ELECTRIC UN0255 1.4B

Special Provisions (column #7)

#103 Detonators which will not mass detonate and undergo only limited propagation in the shipping package may be assigned to 1.4B classification code. Mass detonate means that more than 90 percent of the devices tested in a package explode practically simultaneously. Limited propagation means that if one detonator near the center of a shipping package is exploded, the aggregate weight of explosives, excluding ignition and delay charges, in this and additional detonators in the outside packaging that explode may not exceed 25 grams.

49 CFR 173.63 (f) & (g)

Packaging exceptions:

(f) Detonators containing no more than 1g explosive (excluding ignition and deadly charges) that are electric blasting caps with leg wires four feet long or longer, delay connectors in plastic sheaths, or blasting caps with empty plastic tubing twelve feet long or longer, may be packed as follows, in which case they are excepted from the packaging requirements of 173.62:

(1) No more than 50 detonators in one inner packaging;
(2) IME Standard 22 container or compartment is used as the outer packaging;
(3) No more than 1,000 detonators in one outer packaging; and
(4) No material may be loaded on top of the IME Standard 22 container and no material may be loaded against the outside door of the IME standard 22 compartment.

(g) Detonators that are classed as 1.4B or 1.4S and contain no more than 1g of explosive (excluding) ignition and delay charges) may be packed as follows in which case they are excepted from the packaging requirements of 173.62:

(1) No more than 50 detonators in one inner packaging;
(2) IME Standard 22 container is used as the outer packaging;
(3) No more than 1,000 detonators in one outer packaging; and
(4) Each inner packaging is marked ☐1.4B Detonators☐ or ☐1.4S Detonators☐, as appropriate.

49 CFR 173.62 SPECIAL PACKING REQUIREMENTS FOR EXPLOSIVES

(Explosives Table) UN0267 PI# 131

Research and Special Programs Administration, DOT . 173.62

Table of Packing Methods - Continued

Packing Instruction	Inner Packaging	Intermediate Packaging	Outer Packaging
131..... PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: 1. For UN 0029, 0267, and 0455, bags and reels may not be used as inner packagings. 2. For UN 0030, 0255, and 0455, inner packagings are not required when detonators are packed in pasteboard tubes, or when their leg wires are wound on spools with the caps either placed inside the spool or securely taped to the wire on the spool, so as to restrict freedom of movement of the caps and to protect them from impact forces. 3. For UN 0360, 0361, and 0500, detonators are not required to be attached to the safety fuse, metal-clad mild detonating cord, detonating cord, or shock tube, inner packagings are not required if the packing configuration restricts freedom of movement of the caps and protects them from impact forces.	Bags..... Paper Plastics Receptacles ..... Fiberboard Metal Plastics Wood Reels.....	Not necessary....	Boxes. Steel (4A). Aluminum (4B). Wood, natural, ordinary (4C1). Wood, natural, sift proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fiberboard (4G). Drums. Steel, removable head (1A2). Aluminum, removable head (1B2). Fiber (1G). Plastics, removable head (1H2).

49 CFR 173.63 PA PACKAGING EXCEPTIONS (Enclosure 1)

(g) (2) IME Standard 22 container

Publication: Institute of Makers of Explosives SLP #22 May 1993

Publication: Guide for the Use of the IME 22 Container Oct. 1, 1993

IGNITER, M2/M60 F/TIME BLASTING FUSE (1.4S) (UN0131)

HAZARD CLASSIFICATION OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name:

LIGHTERS, FUSE 1.4S UN0131

49 CFR 172.101 TABLE OF HAZARDOUS MATERIALS

LIGHTER, FUSE 1.4S UN0131

49 CFR 173.62

Packaging Instruction #142

49 CFR ch. 1 (10-97 Edition) . 173.62

Table of Packing Methods - Continued

Packing Instruction	Inner Packagings	Intermediate Packagings	Outer Packagings
142.....	Bags..... Paper Plastics Receptacles ..... Fiberboard Metal Plastics Wood Sheets..... Paper Trays, fitted with dividing partitions plastics	Not necessary....	Boxes. Steel (4A). Aluminum (4B). Wood, natural, ordinary (4C1). Wood, natural, sift proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fiberboard (4G). Plastics, solid (4H2). Drums. Steel, removable head (1A2). Aluminum, removable head (1B2). Fiber (1G). Plastics, removable head (1H2).

FUSE, BLASTING TIME M700 (1.4S) (UN0105)

HAZARD CLASSIFICATION OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name:

FUSE, SAFETY UN0105 1.4S

49 CFR 49 172.101 TABLE OF HAZARDOUS MATERIALS

FUSE, SAFETY UN0105 1.4S

49 CFR 173.62

Packing Instructions #140

Research and Special Programs Administration, DOT . 173.62

Table of Packing Methods – Continued

Packing Instruction	Inner Packagings	Intermediate Packagings	Outer Packagings
140..... PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: 1. If the ends of UN 0104 are sealed, no inner packagings are required. 2. For UN 0101, the packaging must be sift-proof except when the fuse is covered by a paper tube and both ends of the tube are covered with removable caps. 3. For UN 0101, steel or aluminum boxes or drums must not be used.	Bags..... Plastics Reels..... Sheets..... Paper, Kraft Plastics	Not necessary....	Boxes. Steel (4A). Aluminum (4B). Wood, natural, ordinary (4C1). Wood, natural, sift proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fiberboard (4G). Plastics, solid (4H2). Drums. Steel, removable head (1A2). Aluminum, removable head (1B2). Fiber (1G).

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the on site Quality Control Specialist (QCS) the minimum instruction necessary to professionally and competently perform the job of making sure a quality product conforms with agreed upon results. This ESHP is also intended to provide the user the understanding of the theories used in the development of specific procedures within this ESHP.

2.0 SCOPE

This ESHP applies to any person affecting the quality of PIKA's products, but is specifically developed for use by the Quality Control Specialist in the performance of their duties.

3.0 REFERENCES

The following standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has also been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- ISO 9001:2000
- MIL-STD-1916
- DID MR-005-11

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) shall be responsible for making sure of the availability of the resources needed to implement this ESHP, and shall also make sure that this ESHP is incorporated in plans, procedures and training for sites where this ESHP is to be implemented.

4.2 OCCUPATIONAL SAFETY AND HEALTH MANAGER

The Corporate Safety and Health Manager (CSHM) is responsible for the continued development, improvement, and implementation of the PIKA Corporate Environmental Safety & Health Program, to include this ESHP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary;

2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP for proper protection of personnel.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to visitor entry and protective measures.
4. Periodically auditing PIKA work sites for compliance with this ESHP.

4.3 SENIOR UXO SUPERVISOR

The Senior UXO Supervisor (SUXOS) will make sure that the UXO Quality Control Specialist (UXOQCS) is supplied with any administrative needs in order to implement this ESHP. The SUXOS has overall responsibility for the QC department for inspection and acceptance. The SUXOS is responsible to effect any corrective actions necessary in the event a site non-conformance or non-compliance is identified. The SUXOS is responsible to lead in the development of lessons learned and make sure any lessons learned are implemented where needed.

4.4 UXO SUPERVISOR

The UXO Supervisor (UXOTIII) shall be responsible for understanding aspects of this ESHP that relates to their daily activities and the level of workmanship required under each individual task. The UXOTIII has the responsibility to perform any actions necessary to make sure work and products performed or created by their team/function meet previously agreed upon results that may be specified in the SOW, WP or other regulatory documents and that these responsibilities have been met prior to presenting any work or product to the SUXOS as completed.

4.5 PROJECT OR SITE GEOPHYSICIST

The geophysicist has the responsibility for developing the site-specific geophysical plans and procedures and for working with the Quality Control Manager (QCM) in the development for geophysical QC procedures. The geophysicist may be responsible for processing digital geophysical data collected by the QCS for QC purposes. The geophysicist is responsible for assisting the project team in any corrective actions and/or lessons learned that may need to be implemented or captured/analyzed.

4.6 UXO QUALITY CONTROL MANAGER

The PIKA QCM is responsible for the implementation and maintenance of this ESHP. The PIKA QCM is responsible for making sure that the UXOQCS understands this ESHP and conducts QC activities in accordance with this ESHP. The QCM may be responsible for processing digital geophysical data collected by the QCS for QC purposes.

The QCM is responsible for compiling data that relates to quality aspects of a specific project, analyzing that data in order to assist project management in the development of efficient production methods. The QCM is responsible for maintaining the training level of quality personnel working on specific projects. This training will meet or exceed customer requirements. The QCM has the responsibility to interact, when necessary, with the customer in order to communicate data, progress or other information desired by the customer. The QCM is responsible for reporting directly to the President of PIKA on any aspects of the quality program as well as project specific quality aspects.

4.7 UXO QUALITY CONTROL SPECIALIST

The UXOQCS is responsible for the field implementation of this ESHP. In addition, it is the responsibility of the UXOQCS to make it understood throughout the entire project site the level of workmanship that must be demonstrated in order to meet the goals and expectations, previously agreed upon by PIKA and its customer as well as the various stakeholders as detailed in the approved work plan and/or SOW. The UXOQCS will also make sure that relevant sections of this ESHP are discussed in the tailgate safety briefings and that information related to its daily implementation is documented in the Site Operational Log. The QCS is responsible for making sure data and deliverables are accurate prior to submission to intended receivers.

5.0 PROCEDURES

Quality Control procedures are broken down in this ESHP into eight (8) sections. These sections are Surveillance Activities, Inspections, Data Quality, Non-Conformance/Non-Compliance, Corrective Actions, Root-Cause Analysis, Lessons Learned and Documentation. The UXOQCS and the PIKA Quality Control Manager (QCM) shall work together at the start of a specific project to develop any project-specific QC procedures and develop an activity/frequency index to make sure the more complex activities are surveilled more often than some of the more simple activities. The overall goal of the PIKA quality process is to move away from the costly procedure of controlling conformance through inspection. Instead, PIKA will inspect work until such time as QC personnel are convinced that the level of quality is satisfactory then reduce the quantity of inspections while controlling quality through process surveillances. The amount of inspections will increase if product is found to be non-conforming or work is found to be in non-compliance with requirements and corrective actions initiated. Once corrective actions have been verified, inspections may be reduced.

5.1 SURVEILLANCE ACTIVITIES (PROCESS VERIFICATION)

Surveillance activities conducted at the project site will make sure actual work processes match those instructions set forth in the approved work plan as well as other work instructions and industry standards. It is the responsibility of the UXOTIII and SUXOS to make sure the written procedures are followed by personnel given such

responsibility. It is then the responsibility of the UXOQCS to verify that these processes are being followed. The UXOQCS will review the written processes for the activity being surveilled prior to conducting the surveillance. The UXOQCS will then travel (if necessary) to the location of the process being performed and examine the methods being conducted utilizing the written process (WP or SOW) as a reference. These actions shall be consistent with the procedures detailed in the WP and SOW. Operational functions to be surveilled include, but are not limited to: Tailgate safety briefing, equipment maintenance, equipment calibration, safety operations, grid tracking and control, safe separation distances, information gathering and reporting, clearance operations, geophysical operations, explosive storage and accountability, demolition procedures and safety, scrap inspection and processing and scrap disposal. If the actual work practices differ from the procedures detailed in the SOW or WP, a non-compliance exists and shall be documented IAW section 5.8 of this ESHP. Surveillances shall be documented IAW section 5.8 of this ESHP.

5.2 INSPECTIONS

5.2.1 MIL-STD-1916 BASED INSPECTIONS (Process Validation)

MIL-STD-1916 was selected by PIKA as its quality acceptance model for two reasons. First, MIL-STD-1916 is approved for use by Departments and Agencies of the Department of Defense for making sure of the quality of products and services. Secondly, it is a tool to be used in order to move away from the Acceptable Quality Level (AQL) methodology toward a Process Control system for quality. Once an acceptable level of quality has been established by operational functions and verified by the UXOQCS through the use of sampling inspection, a system of Process Control takes over and less sampling is required. This is accomplished with structured and documented process surveillances and a sampling inspection that is documented, repeatable and defensible.

To validate the work procedures being used to perform various tasks for a given project, the UXOQCS will conduct a sampling inspection of each area or item requiring customer acceptance. These inspections will vary from task order to task order depending on technology used, customer requirements, expected results as well as various other factors. The most common types of inspections are listed below. PIKA will control quality and the risk of nonconformance by employing efficient processes and process control so that inspections can be reduced, thus reducing costs. This allows a constant feedback to the operational teams as to the level of effort vs. their level of quality. In addition, it allows other stakeholders to monitor the level of quality from a repeatable standpoint. In order to determine the type of sampling plan to implement, four items must be considered (See MIL-STD-1916 Section 4.2.3).

- Verification Level: Either the customer or PIKA will assign a verification level to the project. This verification level (VL) varies depending on the size or quantity

of items being inspected and the amount of effort needed for conformance. For most grid clearance type projects where grids are 100 feet square to 400 feet square, a VL of II is sufficient. For munitions debris (MD)/Range Residue (RR) processing, the VL may need to be raised to accommodate a large amount of scrap being inspected.

- Type of Sampling: The type of sampling best suited to most UXO projects is attribute sampling.
- Lot or Interval Size Code Letter: This code letter (CL) is found by consulting MIL-STD-1916 Chapter 5 Table II and cross-referencing the lot size (For example: Grid lane quantity or pieces of OE scrap) with the VL.
- Sampling/Switching Procedure: After determining a sampling procedure (Reduced, Normal or Tightened) and consulting MIL-STD-1916 Chapter 5.2.1.3, the QCS and/or QCM will determine the sampling size in this manner: Assuming a starting procedure of Normal (Most projects can be started at Normal sampling), inspections occur at a rate dictated by consulting MIL-STD-1916 Chapter 5 Table II and cross referencing the CL determined earlier in Table I with the VL determined at the start of the project and determining the number directly under the VL (For example: A CL "A", a VL of II and a sampling of Normal would dictate a sampling size of 12.) The sample size can increase or decrease depending on the lot acceptance or rejection. Starting at Normal, if two lots in the past five inspected are rejected, the switching procedure dictates a switch to Tightened sampling. The size of the sample is found by consulting MIL-STD-1916 Chapter 5 Table II, and reading the number to the left of the Normal sample. In the case of the above example, the sample size would increase from 12 to 32. Tightened sampling will remain in effect until five consecutive lots have been accepted at which point Normal sampling will be resumed. Once 10 consecutive lots have been accepted, reduced sampling can be instituted. The number is again found by consulting MIL-STD-1916 Chapter 5 Table II, and reading the number to the right of the Normal sample. In the case of the above example the sample will be reduced to five. Reduced sampling will remain in effect until one lot is rejected at which point Normal sampling will be instituted.

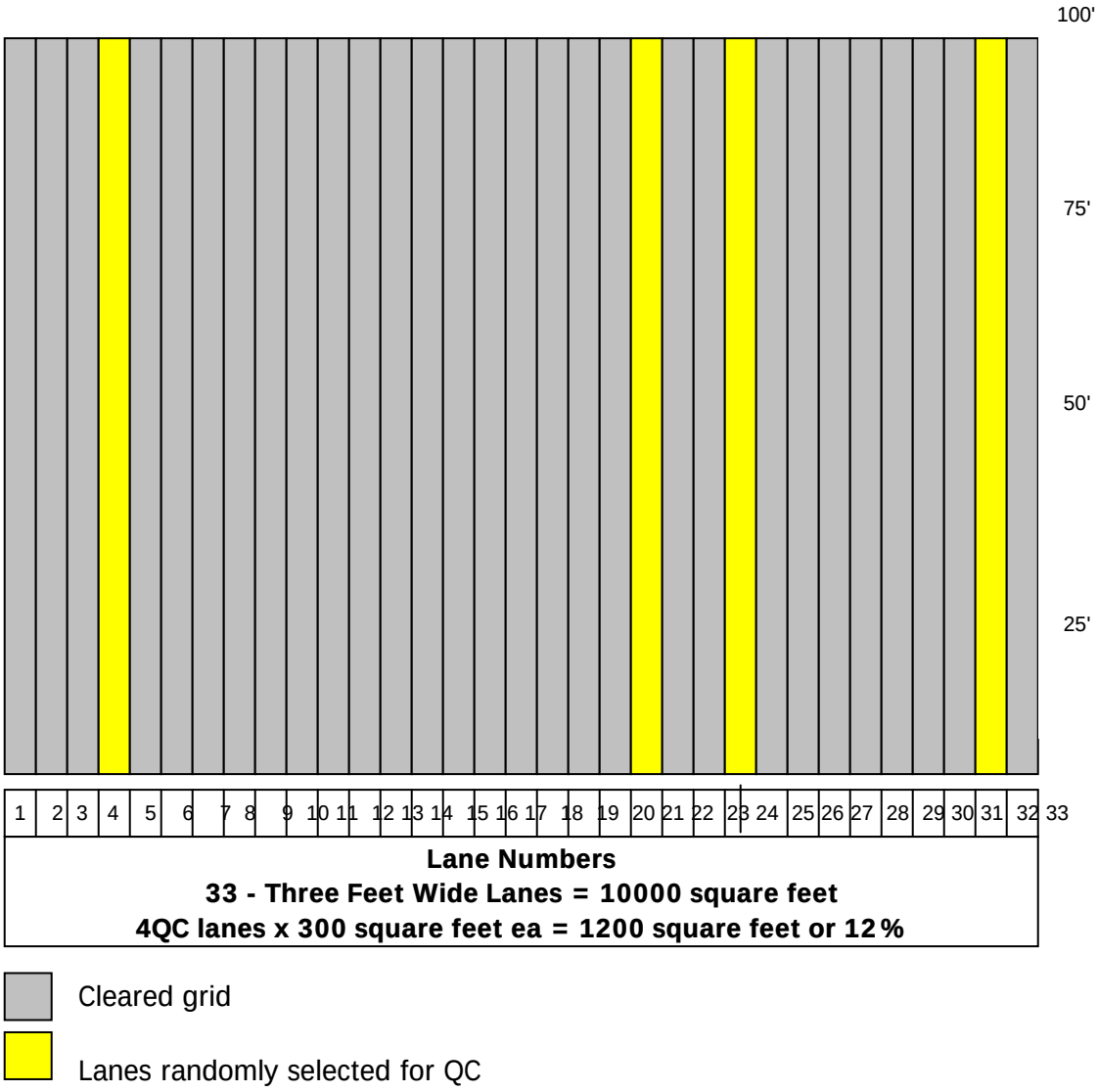
As most removal actions are conducted in areas that have been delineated into quadrilateral grids, this ESHP will assume this unless otherwise stated. These grids vary in size but are usually 100' x 100' or 200' x 200'. For QC purposes, grids are further delineated into lanes of varying widths. Generally, Mag and Dig grids are delineated into five-feet-wide lanes while grids cleared utilizing Digital Geophysics are delineated into two, two and a half or three feet lanes. Depending on the size of the grid, the number of lanes will vary. Inspection activities will be documented IAW section 5.8 of this ESHP.

5.2.1.1 Inspection Of Geophysical Cleared Grids

After operational clearance activities are completed and the grid has been offered to QC personnel for inspection and acceptance, the UXOQCS will determine the number of lanes available for that grid (i.e. A 100 feet wide grid will have 20 five feet wide lanes). Starting at the southwest corner, the UXOQCS will number the lanes from zero to twenty. Using a computer based (Microsoft Excel) random number generator (See attachment 2), the UXOQCS will generate a number of lanes equaling the percentage of area needing inspection. In other words, to inspect 20 percent of a 100 feet by 100 feet grid (10,000 sq. ft) the random number generator will be used to select 4 lanes for inspection (2000 sq. ft) (See Figure 204-1 for an example). The UXOQCS will then proceed to the grid to be inspected and collect digital geophysical data over those selected lanes. If a precision locating system was used during the operational clearance, it will also be used for QC purposes.

The instrument to be used during this inspection is dependent on the procedures specified in the work plan and SOW but will usually be the same instrument used in the operational clearance. If a digital geophysical data collection instrument is used for QC inspection, the collected data will be processed in the same manner as the operational data except that the QCM will nominate anomalies for investigation. After anomaly nomination, the anomaly list (dig sheet) will be sent to the QCS so that the anomalies may be investigated. The QCS will assign a surveyor to acquire the anomalies with either precision locating equipment or with tape measures, and mark the anomaly locations for later investigation. The QC excavation team will then re-acquire, excavate and identify each anomaly. The results of the investigation will be annotated on the QC Inspection Report with the following information: QC personnel, grid/area identification, random lanes selected, identification of items found with coordinates in the appropriate coordinate system as specified in the WP and SOW or x and y locations, disposition of items found. If failure criteria items are found, non-conformance/corrective action procedures will be initiated IAW section 5.4 of this ESHP.

Figure 204-1
Example of 100' x 100' grid divided into
33 three-feet lanes.



5.2.1.2 Inspection of Mag/Dig Cleared Grids

After operational clearance activities are completed and the grid has been offered to QC personnel for inspection and acceptance, the UXOQCS will determine the number of lanes available for that grid (i.e. A 100 feet wide grid will have 20 five feet wide lanes). Starting at the southwest corner, the UXOQCS will number the lanes from zero to twenty. Using a computer based (Microsoft Excel) random number generator (See Figure 204-4 and paragraph 5.2.3), the UXOQCS will generate a number of lanes equaling the percentage of area needing inspection. In other words, to inspect 15

percent of a 100 feet by 100 feet grid (10,000 sq. ft) the random number generator will be used to select 3 lanes for inspection (1500 sq. ft) (see Figure 204-2) from the total number of lanes available. The UXOQCS will then proceed to the grid to be inspected and either mag and dig those selected lanes or collect digital geophysical data over those selected lanes. If a precision locating system was used during the operational clearance, it will also be used for QC purposes.

The instrument to be used during this inspection is dependent on the procedures specified in the work plan and SOW. It is possible to use digital geophysical data collection, processing, reacquisition and investigation for QC inspection instead of mag and dig. If this is the case, a like technology instrument will be used as long as the SOW and WP are satisfied (i.e. if a Schonstedt Magnetometer is used during the clearance action, a Cesium Vapor Magnetometer would be a good candidate to be used to collect digital geophysical data and if a White's All Metals Detector is used during the clearance action, an EM-61 would be a good candidate to be used to collect digital geophysical data). If a digital geophysical data collection instrument is used for QC inspection, the collected data will be processed in the same manner as the operational data except that the QCM will nominate anomalies for investigation. If a like instrument (i.e. Schonstedt or White's) is to be used for QC, the results will be annotated on the QC Inspection Report with the following information: QC personnel, grid/area identification, random lanes selected, items found with x and y locations in the appropriate coordinate system as specified in the WP and SOW, disposition of items found. If failure criteria items are found, non-conformance/corrective action procedures will be initiated IAW section 5.4 of this ESHP.

5.2.1.3 Inspection Of MD/RR

Refer to PIKA ESHP-205 Inspection and Disposal of Munitions Debris and Scrap for applicable procedures.

5.2.2 NON MIL-STD-1916 QC INSPECTION

When MIL-STD 1916 based inspections are undesirable, conventional inspections will be carried out IAW this ESHP, the SOW and WP. These inspections will validate PIKA's work procedures by sampling worked product to determine its level of compliance to predetermined criteria. The UXOQCS will inspect a minimum of 10 percent random sample of a grid OE scrap. These inspections will consist of QC personnel performing a random sampling inspection. For cleared grids, the UXOQCS will travel to the grid being inspected and using the same type of instrument (for sub-surface clearances), randomly inspect at least 10 percent of the grid making sure to cover the grid from bottom to top and side to side. Starting at the southwest corner and traveling a zigzag pattern from south to north and west to east can usually accomplish a sufficient coverage (See Figure 204-3 for an example search pattern). If the quality of clearance

is in question, the UXOQCS can increase the coverage area in order to assure compliance. For OE scrap inspections, the UXOQCS will inspect a minimum of 10 percent of items IAW ESHP-205 Inspection and Disposal of Munitions Debris and Scrap.

Figure 204-2
Example of 100' x 100' grid divided into 20 five-feet lanes.

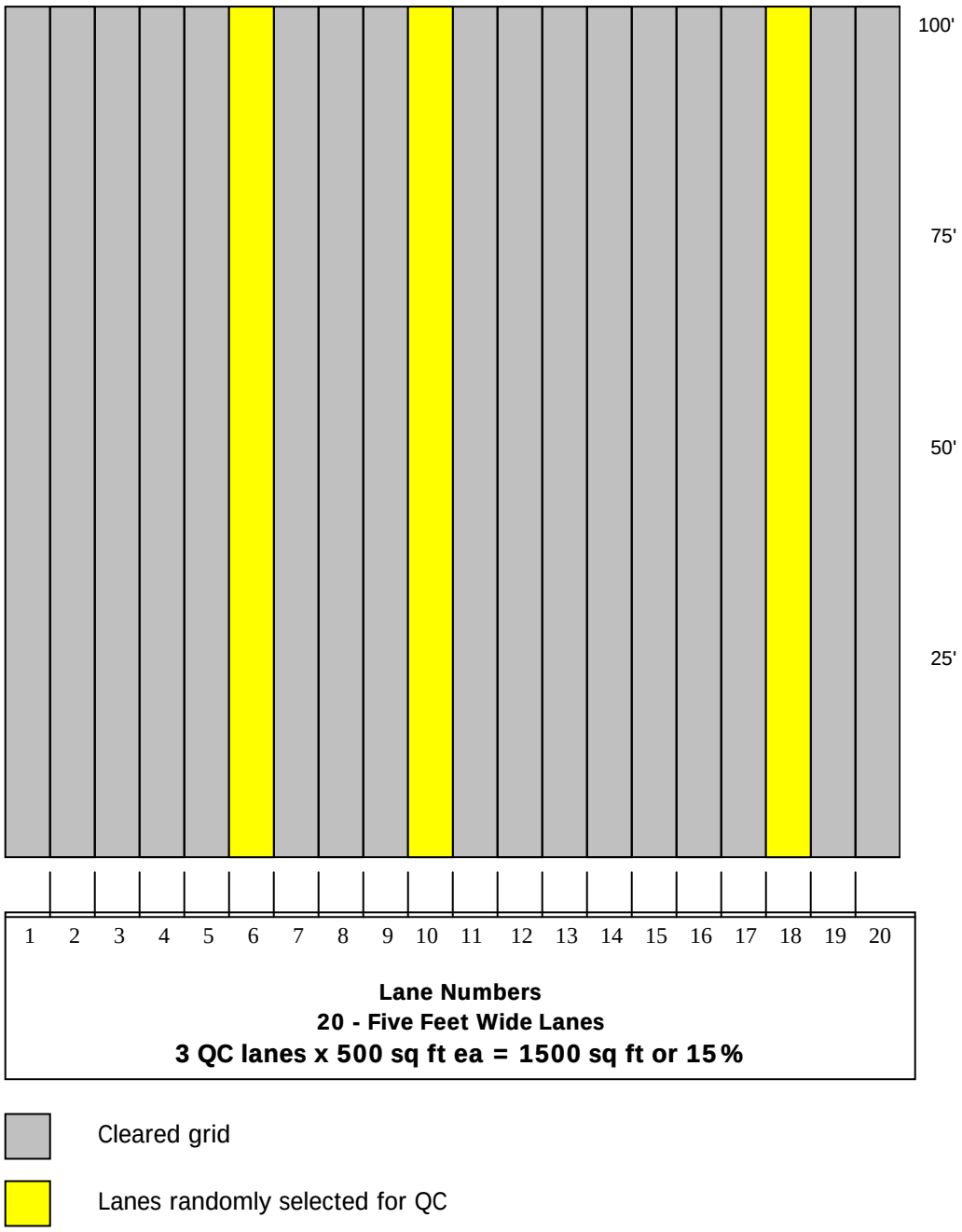
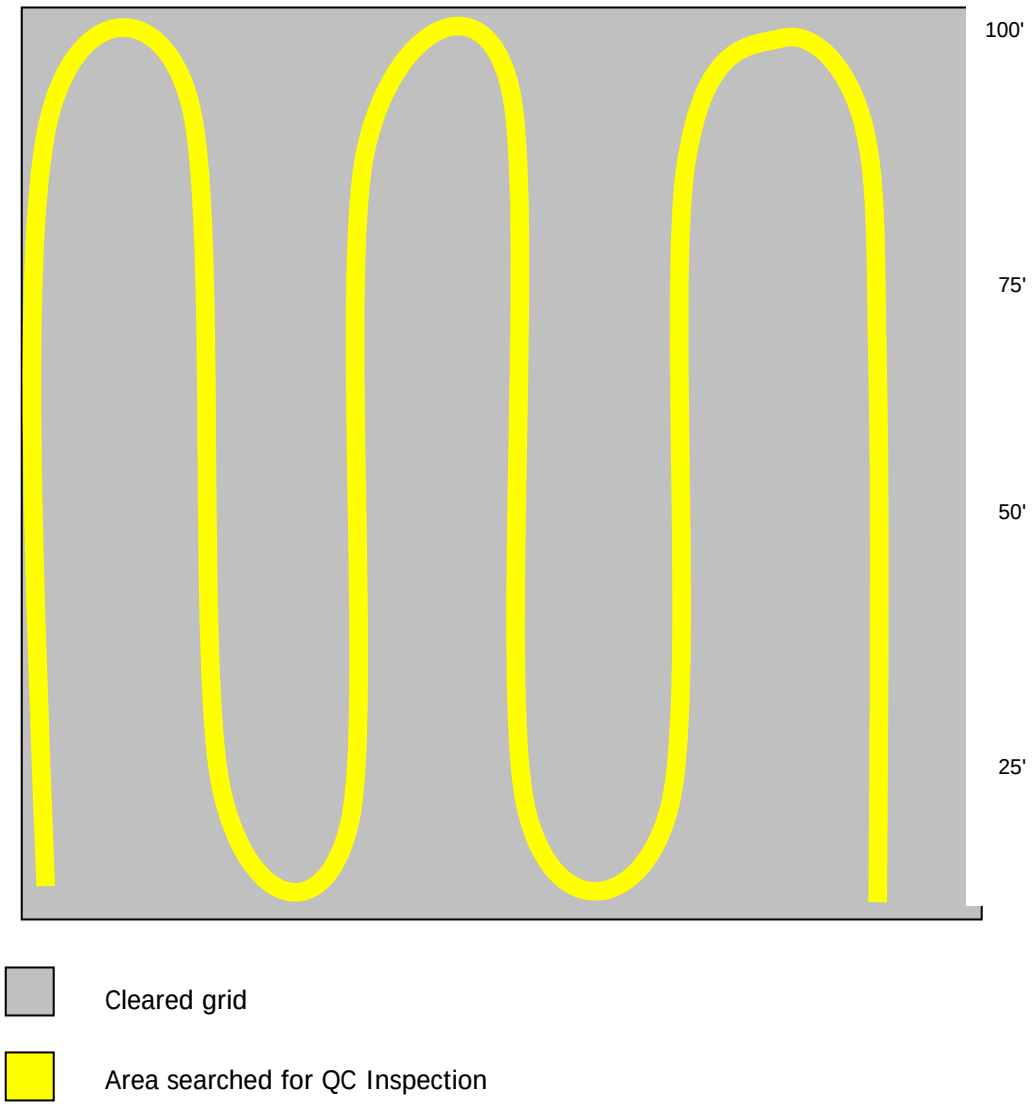


Figure 204-3
Example of 100' x 100' grid randomly sampled using zigzag pattern.



5.3 DATA QUALITY OF GEOPHYSICAL DATA

The UXOQCS will make sure data collected by site geophysical teams is posted correctly soon after the data is collected. The QCM will then work with the geophysicist to make sure the data is complete and appropriate. During data processing, the QCM and geophysicist will make sure that the procedures are complete, appropriate and IAW the data processing ESHP. Once the data is processed and anomalies selected for investigation, the QCM will review the data and make sure anomaly selection is appropriate. If it is determined that appropriate anomalies were not selected, the QCM will select those anomalies and include them on the dig sheet. These anomalies will be identified as chosen by the QCM for later analysis. The anomaly target I.D., date of review and applicable details will be entered under the appropriate grid on the PIKA

Geo Database. Once the geophysicist creates the dig sheet, it will be reviewed by the QCM for completeness. During anomaly investigation activities, the excavation team will make sure data blocks are completed. The QCS will review the completed dig sheet for completeness prior to it being returned to the geophysicist.

5.3.1 DELIVERABLES

Deliverable items will be reviewed for completeness and applicability by the QCM prior to submission to the customer. The date and details of this review will be documented on an PIKA QC Surveillance Report.

5.4 NONCONFORMANCE/NONCOMPLIANCE

In the event that any worked product is found by Quality Control or Quality Assurance sampling inspection not to be in conformance with acceptance standards, the product will be withheld from acceptance and distribution. In addition, that portion of the lot that has already been completed and additional production occurring prior to initiation and validation of corrective action shall be withheld. Prior to re-inspection, the lot of non-conforming product shall be kept separate from conforming product. Once corrective actions have been validated, the nonconforming product shall be re-worked and/or re-inspected for its conformance to acceptance criteria. These non-conformances shall be documented IAW section 5.8 of this ESHP. Any procedures or processes identified during QC surveillance activities shall be halted immediately and corrective actions initiated. Any production occurring with the nonconforming procedures shall be withheld from acceptance. Once corrective actions have been validated, the nonconforming product shall be re-worked and/or re-inspected for its conformance to acceptance criteria.

5.5 CORRECTIVE ACTIONS

Once the non-conforming product has been identified, a Non-Conformance/Corrective Action procedure shall be initiated. This procedure will make sure immediate corrective actions take place to return any non-conforming product to a conforming status. Corrective actions may include reworking of product for its conformance to acceptance standards. Non-conformance/corrective actions shall be documented IAW section 5.8 of this ESHP.

5.6 ROOT CAUSE ANALYSIS

In the event a nonconforming product or noncompliant procedure is discovered and corrective actions are taken to make sure of conformity, a root cause analysis will be initiated. This analysis will be performed by a team of involved personnel such as the QCS, QCM, SUXOS, PM, Geophysicist, etc. The analysis will focus on the breakdown in approved procedures or the inadequacy of approved procedures in order to prevent like nonconforming occurrences. A key component of the analysis is capturing and

successfully disseminating the information in order to be available to personnel for preventative use. The data gathered by the analysis will be gathered by the QCM and disseminated to appropriate personnel.

5.7 LESSONS LEARNED

Lessons learned, as a component of PIKA's corrective action and root cause analysis procedures, will be captured, analyzed and disseminated in an appropriate manner as to prevent similar types of nonconformance/noncompliance. These lessons learned will be communicated to the customer with details surrounding the lesson learned.

5.8 DOCUMENTATION

All quality control function will be documented IAW the WP, SOW or this ESHP. Surveillance activities will be documented on an PIKA QC Surveillance Report. Any noncompliance identified during the conduct of surveillance activities will require an PIKA Nonconformance/Corrective Action Report be initiated. Inspections will be documented on an PIKA QC Inspection Report. If a nonconformance is identified, an PIKA Nonconformance/Corrective Action form will be initiated. Data Quality inspections/checks will be documented on the PIKA Geo/QC site specific database. Nonconformance/noncompliance and associated corrective actions will be recorded on a PIKA Nonconformance/Corrective Action Report. Root Cause Analysis' will be recorded, depending on specific circumstances, by either a surveillance report or a memorandum. Lessons learned will be documented either on PIKA Inspection, Surveillance or Nonconformance/Corrective Action Report. Site documentation will be kept at the project site and copies forwarded to the QCM for analysis, and forms and reports referenced in this ESHP are available in the PIKA Quality Assurance Program.

6.0 AUDIT CRITERIA

The following items related to inspection, certification, and chain of custody of MD/RR items will be audited to for compliance with this ESHP:

- PIKA Weekly Report;
- PIKA Grid/Ordnance Tracking Log;
- PIKA QC Surveillance Report;
- PIKA QC Inspection Report; and
- PIKA Nonconformance/Corrective Action Report.

7.0 ATTACHMENTS

None.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to outline the accountability requirements and procedures associated with managing and processing material potentially presenting an explosive hazard (MPPEH). This criteria is intended to protect personnel and property from potential explosive hazards associated with munitions debris (MD) or range-related debris (RRD) being transferred within or released from project sites where munitions and explosives of concern (MEC) investigation or removal actions are conducted.

2.0 SCOPE

This ESHP applies to site personnel, to include PIKA, contractor, and subcontractor personnel, who conduct operations involving the collecting, inspecting, certifying, demilitarizing, segregating, and transporting MD/RRD recovered from MEC project sites. This ESHP is not intended to contain requirements needed for compliance with Department of Defense (DoD), Department of Transportation (DOT), or Environmental Protection Agency (EPA) requirements. Consult the documents listed in Section 3.0 of this ESHP for additional regulations governing these matters.

3.0 REGULATORY REFERENCES

The following regulations outline requirements associated with managing MD/RRD collected from MEC project sites:

- US Army Engineering and Support Center, Huntsville (CEHNC) Interim Guidance Document 06-08, Corps Of Engineers Contractors MPPEH Inspection, Certification, And Final Disposition Procedures, 30 August 2006.
- DoD 6055.9-STD, DoD Ammunition and Explosive Safety Standard, Rev 5, dated 5 October 2004, with revised chapter 16 dated 14 December 2004.
- DoD Policy to Implement the EPA's Military Munitions Rule, 1 July 1998.
- 40 Code of Federal Regulations Part 261.
- DoD Directive (DOD) 4160.21-M-1 "Defense Demilitarization Manual," 14 February 1995.
- Technical Manual 11A-1-60, "Inspection of Reusable Munitions Containers and Scrap Material Generated from Items Exposed to, or Containing Explosives," 21 November 1995.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager is responsible for the availability of PIKA resources needed to implement this ESHP, and will make sure that the requirements of this ESHP are incorporated into plans, procedures, and training at sites where MD/RRD is managed.

4.2 SENIOR UXO SUPERVISOR

The Senior Unexploded Ordnance (UXO) Supervisor (SUXOS) has overall responsibility for implementing this ESHP at sites where range clearance operations include the removal of MD/RRD. The SUXOS will maintain information related to the daily implementation of this ESHP in the Site Operational Log.

4.3 UXO SUPERVISOR

The UXO Supervisor (UXOTIII) is responsible for implementing this ESHP in the field at the team level. In the absence of the SUXOS, the UXOTIII will be responsible for implementing SUXOS responsibilities outlined in Section 4.2 of this ESHP.

4.4 QUALITY CONTROL SPECIALIST

The UXO Quality Control Specialist (UXOQCS) is responsible for randomly sampling MD/RRD that has been inspected and certified by PIKA personnel as described in Section 5.1 of this ESHP. The UXOQCS makes sure each item that requires demilitarization in accordance with DoD 4160.21-M-1 is appropriately demilitarized as described in Section 5.4 of this ESHP except in the case that final disposition will satisfy the demilitarization requirements. Additionally, the UXOQCS is also responsible for checking documents that track the MD/RRD from the point it is certified until it reaches its final disposition point and is released from PIKA custody as described in Section 5.5 of this ESHP.

4.5 UXO SAFETY OFFICER

The UXO Safety Officer (UXOSO) is responsible for making sure of the removal of MD/RRD with due care and attention to the hazards involved in the operation. The hazards associated with MD/RRD operations will be detailed within each project specific Site Safety and Health Plan (SSHP).

The UXOSO will make sure that the following safety measures and personal protective equipment (PPE) outlined in each SSHP are used in order to prevent or reduce accidents or injuries during the removal of MD/RRD from project sites. The requirements presented below will be implemented unless superseded by site-specific requirements imposed by the SSHP.

- Steel-toed safety boots and protective gloves will be worn whenever working with heavy MD/RRD scrap;
- Hard hats will be worn when working under overhead hoists, loaders, etc.;
- Work Gloves (leather, Kevlar or other cut/puncture resistant material) will be worn when handling MD/RRD; and
- Any PPE worn when inspecting MD will be secured to the wearer to make sure it does not fall from the worker and strike any suspect MEC items.
- A Worn, torn, or discolored safety vest will be replaced with a new vest.

- Approved safety glasses will be worn as applicable and in accordance with the SSHP and or the Accident Prevention Plan (APP).

5.0 PROCEDURES

Personnel, including PIKA, contractor, and subcontractor personnel involved in processing MD/RRD removed from project sites, will familiarize themselves with the procedures outlined below.

5.1 INSPECTION OF MD/RRD

MD/RRD to be disposed of will first be 100 percent visually inspected to make sure the removal of live rounds, primers, or explosive material occurs. Items that cannot be visually inspected will be either 100 percent physically inspected (i.e., using depth gauges, mirrors, or other inspection devices), vented, or thermally treated to make sure no explosive hazards exist. Munitions fragments, such as those found dispersed within the proximity of demolition or impact ranges will be inspected for the presence of energetic contaminants.

5.1.1 Inspection Process

The inspection process for MD/RRD will involve the steps outlined below. This multi-step process will make sure that the MD/RRD that is released for disposal is free of explosive hazards.

A. UXO Specialist (UXOTII) will:
   1. Inspect each item as it is recovered and determine the following:
      - Is the item a MEC or component of a military munition?
      - Does the item contain explosives or other dangerous materials?
      - Does the item require detonation?
      - Does the item require demilitarization (demil) or venting to expose internal fillers and/or cavities?
   2. Segregate items requiring demil or venting procedures from those items ready for certification.
   3. Items found to contain dangerous fillers will be set aside for additional processing such as demolition.

      ***Note**: A UXO Assistant (UXOT1) can only tentatively identify if a located item is scrap or MD. A UXOTII or higher will be required to inspect any located MD and make a determination if it presents an explosive hazard or not.*

B. UXO Supervisor (UXOTIII) will:
   1. Inspect 100% of items recovered by the team for proper segregation of scrap from MD/RRD and to confirm the condition of those items classified as free of dangerous fillers, residues or components.
   2. Supervise detonation of items found to contain dangerous or unexposed fillers and venting/demil procedures.

3. Supervise the consolidation of recovered scrap within assigned areas.

C. MEC scrap recovery team will:
   1. Respond to scrap consolidation areas as directed by the SUXOS.
   2. Inspect items before placing them into transport vehicle.
   3. Determine separation requirements of material recovered. (i.e., scrap that resembles ordnance, sort by metal types, MD requiring processing, etc.).
   4. Deliver scrap to appropriate area and secure to prevent commingling with inspected and certified scrap.

D. UXOQCS will:
   1. Conduct surveillances of the procedures used by MEC teams and individuals for processing MD or Range Residue.
   2. Perform and document, a minimum of 10% (100% in some cases), random sampling of MD/RRD collected from the various teams to make sure no items of a dangerous or explosives nature are identified as free from hazardous material. The UXOQCS performs these random checks to satisfy the UXOQCS that the MD/RRD is free from any explosive hazards, necessary for completion of the required documentation. UXOQCS should, during generation of small amounts, accomplish a 100% inspection of all materials.
   3. Inspection should be accomplished daily or not to exceed the end of the work week within which the material was recovered. Inspection will be performed prior to consolidation within a container (barrel, conex, trailer, rolloff etc.).
   4. Inspect the prepared documentation. At a minimum, the Requisition and Turn-in DOD document form, DD 1348-1A and PIKA's MD/RRD INSPECTION, CERTIFICATION, AND CHAIN OF CUSTODY FORM.

E. UXOSO will:
   1. Make sure the specific procedures and responsibilities for processing MD/RRD for certification are being followed and performed safely.
   2. Confirm that operations are compliant with the SSHP and consistent with applicable regulations and guidance and in accordance with the USACE approved project work plan.
   3. Will perform and document in a timely manner and prior to containerization, random checks of processed MD/RRD to make sure items being identified as scrap are safe and free from any explosive hazards.

F. SUXOS will:
   1. Be responsible for making sure Work and Quality Control (QC) Plans specify the procedures and responsibilities for processing MD/RRD for the final disposition as scrap metal.
   2. Make sure a Requisition and Turn-in Form, DD Form 1348-1A is completed for MD/RRD to be transferred.

3. Perform in a timely manner and prior to containerization, random checks to make sure that the MD or range residue is free from explosive hazards, necessary to complete the DD 1348-1A.
4. Certify scrap metal generated from MD or Range Residue as free of explosive hazards or other dangerous material.
5. Be responsible for making sure that inspected materials are secured in a closed, labeled and sealed container and documented as follows:
   a. The container shall be closed and clearly labeled on the outside with the following information: The first container will be labeled with a unique identification that shall start with USACE (if appropriate)/Installation Name/PIKA International, Inc./0001/Seal's unique identification and continue sequentially.
   b. The container shall be sealed, in such a manner, that the seal must be broken in order to open the container. The seal shall bear the same unique identification as the container or the container (if feasible) shall be clearly marked with the seal's identification, if different than the container.
   c. A MD/RANGE RESIDUE INSPECTION, CERTIFICATION, AND CHAIN OF CUSTODY FORM will be provided to the customer and scrap disposal company. The following information for each container will be provided; weight of container; location where MD/RRD was obtained; name of contractor, names of certifying and verifying individuals; unique container identification; and seal identification, if required. This documentation will be included in the final report.

5.2 MARKING AND PACKAGING

Cartridge and flare cases, fuzes, primers, boosters, practice ordnance, and small pieces/fragments from types of high explosive ordnance and other similar items DO NOT require individual marking. These items will be inspected, placed in containers, then secured with steel band(s) or tagged with an appropriate seal or similar device having a serial number. When large amounts of residue are generated, large containers such as hoppers, securable roll-offs, conex's or other appropriate containers may be used, provided the container has a lid/cover/door that can be secured and sealed after inspection. **Any evidence of tampering after sealing will require re-inspection and re-certification**. Containers will be marked as in paragraph 5.1.1.f. (5) above. Where quantities permit, the contents will be separated by base metal type (i.e., copper, aluminum, steel, etc.) and tagged or marked to identify contents. Large MD/RRD that cannot be containerized or palletized will be individually inspected and marked similarly. Each will be tagged with a "railroad seal" or similar device having a serial number. When large items are further demilitarized, by smelting, disassembly, breaking, crushing, shredding, or cutting, additional stamping or marking of individual pieces is not required.

5.3 MD/RRD SCRAP CERTIFICATION AND VERIFICATION

PIKA will make sure that MD/RRD generated from MEC project sites is properly inspected in accordance with the procedures in 5.1 above. Only personnel who are qualified UXO personnel per the U.S. Army Corps of Engineers Data Item Description (DID) OT-025 will perform these inspections. The SUXOS will certify, and the client representative will verify, that the MD/RRD is free of explosive hazards.

DD form 1348-1A will be used as documentation. DD 1348-1A forms must clearly show the typed or printed names of the SUXOS and the client representative, organization, signature, and contractor's home office and field office phone number(s) of the persons certifying and verifying the MD/RRD.

a. Local directives and agreements may supplement these procedures. Coordination with the local concerns will identify any desired or requested supplement to these procedures.
b. In addition to the data elements required and any local agreed to directives, the DD 1348-1A must clearly indicate the following for scrap metal:
   (1) Basic material content. (Type of metal; steel, aluminum, brass, or mixed)
   (2) Estimated weight.
   (3) Unique identification of each of the containers and seals stated as being turned over.
   (4) Location where MD scrap was obtained. (Site or Range Number)
   (5) Seal identification, if different from the unique identification of the sealed container.
c. The following certification will be entered on each DD 1348-1A for turn over of scrap generated from MD or Range Clearance operations and will be signed by the SUXOS and the client representative. If there is no client representative on the project, the SUXOS will be the verifier and the UXOQCS will be the certifier.

   "This certifies that the MD residue, Range Residue and/or Explosive Contaminated Property listed has been 100 percent properly inspected and, to the best of our knowledge and belief, are free of explosive hazards."

***Note**: This statement may be replaced by specific requirements of the client and the DD1348-1A shall reflect the appropriate statement applicable to the WP/SOW.*

5.4 DEMILITARIZATION

When required by DoD 4160.21-M-1, or the Scope of Work where this directive is not applicable, MD/RRD will be demilitarized before being released from PIKA custody. The purpose of demilitarization is to render any item unusable and/or unrecognizable as a military article. Explosives or mechanical means can be used to demilitarize an item.

5.5 CHAIN OF CUSTODY

The containers/hoppers and individual pieces of MD/RRD must be under the control and custody of PIKA from the time each is inspected and certified until each is turned over to the smelter or recycler for final disposition. PIKA Form ESHF-204 will be used to document this chain of custody. ESHF-204 identifies the quantity, composition, origin, routing, and destination of each container/hopper or item during its handling and transportation life cycle. It also provides evidence that containers/lots were properly segregated and secured until final disposition. At random intervals during the scrap process, photographs of a representative sample of containers/lots will be taken by PIKA personnel, to verify that this ESHP is being followed.

5.6 FINAL DISPOSITION

The certified and verified MEC scrap will only be released to an organization that will:

a. Upon receiving the unopened labeled containers each with its unique identified and unbroken seal making sure there is a continued chained of custody, and after reviewing and concurring with the provided supporting documentation, sign for having received and agree with the provided documentation that the sealed containers contained no explosive hazards when received. This shall be signed on company letterhead stating that the contents of these sealed containers will not be sold, traded or otherwise given to another party until the contents have been smelted and are only identifiable by their basic content.
b. Send notification and supporting documentation to PIKA that the contents of the sealed containers have been smelted and are now only identifiable by their basic content.
c. This document will be incorporated into the final report as documentation for supporting the final disposition of this scrap metal.

6.0 AUDIT CRITERIA

The following items related to inspection, certification, and chain of custody of MD/RRD items will be audited for compliance with this ESHP:

- Requisition and Turn-in Form, DD Form 1348-1A completed for scrap metal to be transferred;
- Copies of PIKA Form ESHF-204 for each container or item;
- Daily Task and Safety Briefing Logs (ESHF-502);
- Documentation of Hazard Communication Training Form (ESHF-505);
- Safety Training Attendance Log (ESHF-503); and
- Daily Inspection and Weekly Audit Report Form (ESHF-506).

7.0 ATTACHMENTS

None.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum procedures and safety and health requirements applicable to the acquisition, storage, and accountability of explosives and munitions and explosives of concern (MEC). This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP).

2.0 SCOPE

This ESHP applies to site personnel, including contractor and subcontractor personnel, involved in the conduct of operations on a site where explosives are utilized or MEC contamination is encountered. This ESHP is not intended to contain requirements needed for compliance. Consult the documents listed in section 3.0 of this ESHP for additional compliance issues.

3.0 REGULATORY REFERENCES

This ESHP has been designed to addresses the safety and health concerns associated with the acquisition, storage and accountability of explosives and MEC. This ESHP will be used in conjunction with PIKA ESHP-203, Transportation of Explosives, and the applicable specifications of the Occupational Safety and Health Administration (OSHA) standards and US Army Corps of Engineers (USACE) requirements listed below. Additional Federal regulations are also presented below, and in the event other hazards are associated with the conduct of this ESHP, consultation of other PIKA ESHPs may be needed.

- OSHA 29 CFR 1910 General Industry Standards
- OSHA 29 CFR 1926 Construction Standards
- Department of Defense (DoD) 6055.9-STD, DoD Ammunition and Explosive Safety Standard, February 29, 2008.
- DoD 4145.26-M, DoD Contractor's Safety Manual for Ammunition and Explosives, March 13, 2008.
- USACE Engineering Pamphlet (EP) 1110-1-18, *Ordnance and Explosives Response*, 3 April 2006.
- USACE Engineering Manual (EM) 385-1-1, Safety and Health Requirements Manual, 3 November 2003.
- USACE Engineering Regulation (ER) 385-1-95, *Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations*, 30 March 2007.
- USACE EP 385-1-95a, *Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations*, 27 August 2004.

- USACE EP-75-1-2 *Munitions and Explosives of Concern (MEC) Support during Hazardous, Toxic, or Radiological Waste (HTRW) and Construction Activities*, 1 August 2004.
- USACE, EM 385-1-4009, *Military Munitions Response Actions*, 15 June 2007.
- American conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs®) and Biological Exposure Indices (BEIs®), 2007.
- NIOSH/OSHA/USCG/EPA, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, October 1985. (DHHS (NIOSH) Publication No. 85-115).
- Department of Defense Explosive Safety Board (DDESB) Technical Paper (TP) 16, *Methodologies for Calculating Primary Fragment Characteristics*, 1 December 2003.
- DDESB TP 18, *Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel*, 20 December 2004.
- USACE, ER 385-1-92, *Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities* 1 May 2007.
- Procedures for *Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites*, U.S. Army Engineering and Support Center, Huntsville, August 1998.
- Alcohol Tobacco and Firearms (ATF) P 5400.7, ATF-*Explosives Law and Regulations* (most current version).
- The PIKA CESHP (this document will be on site and available to site personnel during the project).

4.0 RESPONSIBILITIES

4.1 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP and this ESHP. To accomplish this end, the CESHM will be responsible for:

- Conducting an annual review of this ESHP and making modifications as necessary;
- Developing or reviewing site plans that require the acquisition, storage and accountability of explosives and making sure the requirements of this ESHP are incorporated in the site plans;
- Providing the UXO Safety Officer (UXOSO) with consultation related to MEC storage and protective measures; and
- Periodically auditing PIKA work sites for compliance with this ESHP.

4.2 PROJECT MANAGER

The Project Manager (PM), in conjunction with the Senior UXO Supervisor (SUXOS), will be responsible for evaluating the initial quantity and type of demolition materials to be

ordered for MEC Response Action operations. When possible, the initial requisition should be of sufficient quantity to support the project for a 90-day period. The PM will be responsible for making sure the acquisition of demolition supplies and explosives from recognized and licensed sources. Additionally, the PM will make sure of the availability and management of the PIKA resources needed to acquire, store and account for the explosives.

4.3 SENIOR UXO SUPERVISOR

The SUXOS will be responsible assisting the PM with the initial explosives acquisition and for the ordering of subsequent demolition materials. The SUXOS will generate a purchase order (PO) request through the PM, who will approve the PO and submit it to accounting for placement of the order. The SUXOS will then be responsible for the proper receipt, storage, and accountability of the explosives received on site, and for tracking usage of explosives. The SUXOS will also be responsible for the proper storage and accountability of MEC items that may be stored at the site.

4.4 UXO SAFETY OFFICER

For sites where MEC hazards exist or explosives are utilized, PIKA will field a UXO Safety Officer (UXOSO) who meets the training and experience requirements of DDESB TP 18. The UXOSO will be responsible for making sure that the explosive safety requirements outlined in this ESHP and the references in paragraph 3.0 of this ESHP. The UXOSO will make sure that the hazards and control techniques associated explosive acquisition and storage 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 for their initial and continued compliance with this ESHP and other regulatory guidelines.

4.5 QUALITY CONTROL SPECIALIST

The UXO Quality Control Specialist (UXOQCS) is responsible for making sure of the completeness of weekly inspecting the Explosives Accountability Record/Magazine Data Card (ESHF-203), the PIKA Demolition Shot Record (ESHF-205), and the inventory of MEC and demolition material. Verifying the weekly Explosive Consumption Report, shipping documents and shot records match for accountability.

5.0 REQUISITION PROCEDURES

The requisition of explosives will be in accordance with PIKA's purchasing policy to make sure of the best possible price for the task. Of paramount importance in this process is the determination of the location of the supplier(s). Generally, response time to requisitions is better for those suppliers closest to the site. Additionally, there is the possibility of leasing explosives magazines from the supplier however, it will remain the responsibility of the PM and UXOSO to make sure regulatory requirements are met to the greatest extent practicable. Magazines must meet the requirements of 27 CFR 55

and each magazine must have a Net Explosive Weight (NEW) and hazard classification established for the explosives to be stored. The NEW is calculated in accordance with the procedures identified in DA Pam 385-64.

6.0 LICENSE/PERMIT

6.1 FEDERAL LICENSE

In order to requisition explosives, PIKA will have a valid Bureau of Alcohol Tobacco and Firearms (BATF) license/permit on hand, to include an Explosives Purchase/Receipt/ Transportation Authorization List (ESHF-202) for the receipt of explosives. These two documents must be on file at the PIKA corporate office, the project site, and each explosives supplier must also have a copy of each in order to sell to PIKA.

6.2 STATE BLASTERS LICENSE

If required by the state in which a project is being conducted, PIKA personnel will obtain a state blaster's license. This will usually be accomplished by contacting the State Fire Marshall or Safety Office to determine the requirements and schedule for the test. Only those individuals licensed by the State may actually initiate the demolition shot. The PIKA PM and SUXOS will be responsible for identifying the need to obtain a blaster's license for a given project and for scheduling the personnel resources needed to obtain the requisite license.

6.3 STATE/COUNTY PERMITS

In some instances, it is necessary to obtain a state or county permit to conduct open burn/open detonation. This is accomplished by contacting the State Fire Marshall or County Fire Department for instructions.

7.0 EXPLOSIVES RECEIPT

Only those individuals named on the Authorization list may sign for explosives from the shipper. In order to make sure that the quantity shipped is the same as the quantity listed on the shipping documents, two PIKA personnel will inventory the shipment prior to signing for its receipt.

7.1 SHIPPING DOCUMENTS

The explosive suppliers Bill of Lading (B/L) and the freight companies shipping document generally accompany explosive shipments (see PIKA Form ESHF-201). The initial inventory will include reconciling the two documents with the actual shipment and creating an on-site record that includes these documents and the inventory records. Regardless of the outcome of the initial inventory, one copy of the B/L and the freight company's shipping document will be attached to a copy of the PO request and the PO. One copy of each of the four documents will be kept on file on site and one complete copy forwarded to the corporate office.

7.2 RECEIPT DISCREPANCIES

In the event there is a discrepancy between the amount shipped and the amount received, the SUXOS will immediately contact the explosive supplier and inform the supplier of the discrepancy. It is then the responsibility of the supplier and shipper to rectify the situation and inform PIKA of the results. The supplier and/or shipper must then correct their documents and forward the corrected documents to the site. Only the amount received will be entered on the Explosives Accountability Record/Magazine Data Card (ESHF-203).

8.0 EXPLOSIVES STORAGE

Demolition operations require the availability and storage of explosive demolition materials. To the maximum extent possible, local government or existing facilities will be used. Existing facilities are desirable due to their low cost and pre-approval, negating transport and set up. PIKA will comply with local storage procedures when using Government facilities. When required to provide explosive storage facilities, PIKA will:

- Use approved BATF Type 2 outside storage structures or government furnished magazines;
- Locate, install, and maintain the magazines to comply with the magazine criteria and quantity distance requirements established in DoD 6055.9-STD, DoD Ammunition and Explosives Safety Standards, 27 CFR 55, 29 CFR 1910.1201 and local, and state requirements to the greatest extent;
- Install a lightning protection system (LPS) and grounding, and have it checked by an electrician for specification conformance. Inspection and testing criteria are contained in DA Pam 385-64;
- A physical security survey will be conducted in accordance with AR 190-11 to determine if fencing or guards are required. Establish security, such as fencing and lighting as needed, to prevent unauthorized access and theft.

8.1 MAGAZINES

Generally, Type 2 outdoor magazines conforming to the standards set forth in Section 55.206 of ATFP 5400.7. Alcohol, Tobacco, and Firearms (ATF) Explosives Law and Regulations will be used, which will consist of a box, trailer, semi-trailer, or other mobile facility. Type 2 magazines are bullet, fire, weather, and theft-resistant and must be well ventilated. The ground around outdoor magazines must slope away for drainage or other adequate drainage provided. When unattended, vehicular magazines must have wheels removed or otherwise be effectively immobilized by using pin-locking devices.

8.1.1 Exterior Construction

The exterior and doors are to be constructed of not less than 1/4-inch steel and lined with at least two inches of hardwood. Magazines with top openings will have lids with water-resistant seals or which overlap the sides by at least one inch when in a closed position.

8.1.2 Hinges and Hasps

Hinges and hasps will be attached to doors by welding, riveting or bolting (nuts on inside of door). Hinges and hasps will be installed so they cannot be removed when the doors are closed and locked.

8.1.3 Locks

Each door will be equipped with two padlocks fastened in separate hasps and staples. Padlocks must have at least five tumblers or five blades and a casehardened shackle of at least 3/8-inch diameter. Padlocks will be protected with not less than 1/4-inch steel hoods constructed to prevent sawing or lever action on the locks, hasps, and staples.

8.1.4 Signs/Placards

The BATF and the Department of Defense (DoD) require that magazines be appropriately posted to indicate the hazard class of the contents, the fire fighting hazards and the emergency notification list. Magazines will be placarded in accordance with DOD 6055.9-STD and DA Pam 385-64. This will require that the magazine area be posted for the most hazardous items stored in the magazine area. If there are two fire division or hazard class items in the same magazine, use the higher hazard division/class placard.

8.1.5 Lightning Protection

For Base Realignment and Closure (BRAC) and active military facilities, appropriate lightning protection will be installed in accordance with Chapter 7 of DOD 6055.9-STD. Army installations will also meet the provisions of DA Pamphlet 385-64. For Formerly Used Defense Sites (FUDS) where existing storage facilities are typically not available, lightning protection is not required if the following criteria are met

- The magazine is constructed of metal that is 3/16-inch steel or larger (reference Appendix L of NFPA 780), and
- The magazine is grounded IAW NFPA requirements, and
- The parts of the magazine are located at least 6.5 feet from the nearest fence.

8.1.6 Emergency Notification List

An emergency notification list containing the name, telephone number and local address of the individuals to be notified in the event of an emergency, will be posted on the outside and inside of the magazine door. These individuals should be the same individuals authorized to sign for explosives.

8.1.7 Compatibility

Explosive compatibility will be maintained. Table No. 206-1 lists the various storage compatibility groups and Table No. 206-2 is the compatibility chart. These tables are extracts from Section 4 of DA PAM 385-64. In certain instances, it may be necessary to store incompatible items in the same magazine. If this should occur, then a barricade, such as sandbags, within the magazine, will physically separate the incompatible items. This situation should be an interim occurrence to be avoided if possible, and for DoD projects will be approved by the DDESB prior to implementation.

8.1.8 Key Control

Magazines will remain locked except when explosive receipt, issue or accountability operations are being conducted. The two locks on the magazines will require two different keys to unlock. The SUXOS will maintain one copy of the key, and will designate control of the second key to the UXOSO, the UXO Quality Control Specialist UXOQCS, or a UXO Technician III assigned as the demolition supervisor (DS). This procedure makes sure that access to the magazines cannot be made without obtaining the two keys and no one individual can gain access to the magazines. In instances where provided storage areas such as earthen covered bunkers, inspection of the facilities and coordination with the installation or client may be necessary to meet these requirements by addition or modification of facilities or procedures. Written documentation will be generated with the defined procedures as applicable to the situation and all feasible coordination's will be made to accomplish these requirements as closely as possible. Key sign-out rosters will be utilized at all times and keys will be issued and received for accountability and control.

TABLE 206-1: STORAGE COMPATIBILITY GROUPS FOR EXPLOSIVES AND AMMUNITION

Group A
Bulk initiating explosives that have the necessary sensitivity to heat, friction, or percussion to make them suitable for use as initiating elements in an explosives train. Examples are wet lead azide, wet lead styphnate, wet mercury fulminate, wet tetracene, dry cyclonite (RDX), and dry pentaerythritol tetranitrate (PETN).
Group B
Detonators and similar initiating devices not containing two or more independent safety features. Items containing initiating explosives that are designed to initiate or continue the functioning of an explosives train. Examples are detonators, blasting caps, small arms primers, and fuzes.
Group C
Bulk propellants, propelling charges, and devices containing propellant with or without their own means of ignition. Items that, upon initiation, will deflagrate, explode, or detonate. Examples are single-, double-, triple-base and composite propellants, rocket motors (solid propellant), and ammunition with inert projectiles.
Group D
Black powder, high explosives (HE), and ammunition containing HE without its own means of initiation and without propelling charge, or a device containing initiating explosives and containing two or more

TABLE 206-1: STORAGE COMPATIBILITY GROUPS FOR EXPLOSIVES AND AMMUNITION

independent safety features. Ammunition and explosives that can be expected to explode or detonate when any given item or component thereof is initiated except for devices containing initiating explosives with independent safety features. Examples are bulk trinitrotoluene (TNT), Composition B, black powder, wet RDX or PETN, bombs, projectiles, cluster bomb units (CBUs), depth charges, and torpedo warheads.
Group E
Ammunition containing HE without its own means of initiation and with propelling charge (other than one containing a flammable or hypergolic liquid). Ammunition or devices containing HE and containing propelling charges. Examples are artillery ammunition, rockets, or guided missiles.
Group F
Ammunition containing HE with its own means of initiation and with propelling charge (other than one containing a flammable or hypergolic liquid) or without a propelling charge. Examples are grenades, sounding devices, and similar items having an in-line explosives train in the initiator.
Group G
Fireworks, illuminating, incendiary, and smoke, including hexachloroethane (HC) or tear-producing munitions other than those munitions that are water activated or which contain white phosphorous (WP) or flammable liquid or gel. Ammunition that, upon functioning, results in an incendiary, illumination, lachrymatory, smoke, or sound effect. Examples are flares, signals, incendiary or illuminating ammunition, and other smoke or tear-producing devices.
Group H
Ammunition containing both explosives and WP or other pyrophoric material. Ammunition in this group contains fillers which are spontaneously flammable when exposed to the atmosphere. Examples are WP, plasticized white phosphorous (PWP), or other ammunition containing pyrophoric material.
Group J
Ammunition containing both explosives and flammable liquids or gels. Ammunition in this group contains flammable liquids or gels other than those which are spontaneously flammable when exposed to water or the atmosphere. Examples are liquid- or gel-filled incendiary ammunition, fuel-air explosives (FAE) devices, flammable liquid-fueled missiles, and torpedoes.
Group K
Ammunition containing both explosives and toxic chemical agents. Ammunition in this group contains chemicals specifically designed for incapacitating effects more severe than lachrymation. Examples are artillery or mortar ammunition (fuzed or unfuzed), grenades, and rockets or bombs filled with a lethal or incapacitating chemical agent.
Group L
Ammunition not included in other compatibility groups. Ammunition having characteristics that do not permit storage with dissimilar ammunition belong in this group. Examples are water-activated devices, prepackaged hypergolic liquid-fueled rocket engines, certain FAE devices, triethylaluminum (TEA), and damaged or suspect ammunition of any group. Types presenting similar hazards may be stored together but not mixed with other groups.
Group N
Ammunition containing only extremely insensitive detonating substance (EIDS). Examples are bombs and warheads.
Group S
Ammunition presenting no significant hazard. Ammunition so packaged or designed that any hazardous effects arising from accidental functioning are confined within the package unless the package has been degraded by fire, in which case blast or projection effects are limited to the extent that they do not hinder firefighting significantly. Examples are thermal batteries, explosives switches or valves, and other ammunition items packaged to meet the criteria of this group.

TABLE 206-2: STORAGE COMPATIBILITY CHART

GROUPS	A	B	C	D	E	F	G	H	J	K	L	S
A	X	Z										Z
B	Z	X										X
C			X	Z	Z		Z					X
D			Z	X	X							X
E			Z	X	X							X
F						X						X
G			Z				X					X
H								X				X
J									X			X
K										X	U	
L										U		
S	Z	X	X	X	X	X	X	X	X			X

Notes:

1. The marking “X” at an intersection of the above chart indicates that these groups may be combined in storage. Otherwise, mixing is either prohibited or restricted per Note 2 below.
2. The marking “Z” at an intersection of the above chart indicates that, when warranted by operational considerations or magazine non-availability, and when safety is not sacrificed, these groups may be combined in storage.
3. Equal numbers of separately packaged components of complete rounds of any single type of ammunition may be stored together. When so stored, compatibility is that of the assembled rounds; i.e., WP Filler in Group H, HE Filler in Groups D, E, or F, as appropriate.
4. Group K required not only separate storage from other groups, but also requires that munitions having different toxic chemical agent fillers be stored separately from each other.
5. The marking “U” on above chart indicates that leaking toxic chemical munitions of one agent type, i.e., G-B, with or without explosive components, may be stored together in one magazine specifically designated for storage of leakers of that agent type.
6. Ammunition designated “PRACTICE” by NSN and nomenclature may be stored with the fully loaded ammunition it simulates.

9.0 EXPLOSIVES ACCOUNTABILITY

Upon receipt and verification of explosive demolition material, the Explosives Accountability Record/Magazine Data Card (ESHF-203) is completed and kept in the magazine on top of the listed item. A duplicate copy is maintained by either the UXOSO or the UXOQCS.

9.1 USAGE INVENTORY

During each occurrence of a receipt or issue of explosive material, the Demolition Supervisor (DS) drawing out or returning the explosives will fully inventory those items issued/returned. The second person will perform an additional count of materials issued/returned. These quantities will be compared and upon concurrence, the DS will appropriately annotate the two sets of magazine data cards.

9.2 WEEKLY INVENTORY

The last day of each work week, the SUXOS, UXOSO or the UXOQCS, and a second individual (who will be changed each week) will conduct a complete inventory and record results on the two sets of magazine data cards. Data cards will be reviewed for completeness, accuracy and legibility. The weekly receipt and usage report will be completed and forwarded to the corporate office.

9.3 LONG TERM STORAGE

In the event long term storage in excess of 30 calendar days is anticipated or through unforeseen events short term storage surpasses 30 calendar days when no PIKA personnel are present on site for inventory, inspection and control purposes, additional guidance must be obtained through the corporate office for disposition of explosive materials such as disposal of materials, return to the supplier or off site shipment to an active project. Alternative measures may also include retaining a licensed security firm for external facility inspection and surety.

9.4 DISCREPANCIES

In the event there is a discrepancy during any inventory, the item will be recounted a minimum of two additional times. If a discrepancy still exists, the PIKA PM, and the BATF will be notified. All actions from this point will be dictated by the BATF.

10.0 AUDIT CRITERIA

The following items related to explosives acquisition, storage, accountability and transport shall be audited for compliance with this ESHP:

- The PIKA Demolition Shot Record (ESHF-205);
- The Daily Task and Safety Briefing Logs (ESHF-502);
- The Daily Inspection and Weekly Audit Report Form (ESHF-506); and
- The Explosives Accountability Record/Magazine Data Card (ESHF-203).

11.0 ATTACHMENTS

None.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum procedures and safety and health requirements applicable to the conduct of demolition/disposal operations on sites contaminated with munitions and explosives of concern (MEC). This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP).

2.0 SCOPE

This ESHP applies to site personnel, including contractor and subcontractor personnel, involved in the conduct of MEC demolition/disposal operations on a MEC contaminated site. This ESHP is not intended to contain all of the requirements needed for complete compliance, and should be used in conjunction with project plans and applicable Federal, state and local regulations. Consult the documents listed in section 3.0 of this ESHP for additional compliance issues.

3.0 REGULATORY REFERENCES

Applicable sections and paragraphs in the documents listed below will be used as references for the conduct of MEC demolition/disposal operations:

- OSHA 29 CFR 1926 Construction Standards (notably 29 CFR 1926 Subpart U, Blasting and the Use of Explosives). Department of Defense (DoD) 6055.9-STD, DoD Ammunition and Explosive Safety Standard, February 29, 2008.
- DoD 4145.26-M, DoD Contractor's Safety Manual for Ammunition and Explosives, March 13, 2008.
- USACE Engineering Pamphlet (EP) 1110-1-18, *Ordnance and Explosives Response*, 3 April 2006.
- USACE Engineering Manual (EM) 385-1-1, Safety and Health Requirements Manual, 3 November 2003.
- USACE Engineering Regulation (ER) 385-1-95, *Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations*, 30 March 2007.
- USACE EP 385-1-95a, *Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations*, 27 August 2004.
- USACE EP-75-1-2 *Munitions and Explosives of Concern (MEC) Support during Hazardous, Toxic, or Radiological Waste (HTRW) and Construction Activities*, 1 August 2004.
- USACE, EM 1110-1-4009, *Military Munitions Response Actions*, 15 June 2007.
- American conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs®) and Biological Exposure Indices (BEIs®), 2008.

- NIOSH/OSHA/USCG/EPA, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, October 1985. (DHHS (NIOSH) Publication No. 85-115).
- Department of Defense Explosive Safety Board (DDESB) Technical Paper (TP) 16, *Methodologies for Calculating Primary Fragment Characteristics*, 1 December 2003.
- USACE, ER 385-1-92, *Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities* 1 May 2007.
- Procedures for *Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites*, U.S. Army Engineering and Support Center, Huntsville, August 1998.
- Applicable sections of DOT, 49 CFR Parts 100 to 199.
- Bureau of Alcohol Tobacco Firearms and Explosives (BATFE) 5400.7, Alcohol Tobacco and Firearms Explosives Laws and Regulations.
- The PIKA CESHP (this document will be on site and available to site personnel during the project).

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The PIKA Project Manager (PM) shall be responsible for making sure of the availability of the personnel and equipment resources needed to implement this ESHP, and shall also make sure that this ESHP is incorporated in plans, procedures and training for sites where this ESHP is to be implemented.

4.2 SENIOR UXO SUPERVISOR

The Senior Unexploded Ordnance (UXO) Supervisor (SUXOS) will be responsible for making sure that adequate safety measures and housekeeping are taken during each phase of site operation, to include demolition activities, and shall visit site demolition locations as deemed necessary to make sure that demolition operations are carried out in a safe, clean, efficient and economical manner.

4.3 DEMOLITION SUPERVISOR

Prior to initiation of demolition operations, the SUXOS shall designate an experienced and trained UXO Supervisor to act as the Demolition Supervisor (DS). The DS shall be present during demolition operations or designate a competent, qualified person to be in charge during any absences. The demolition activities shall then be conducted under the direct control of the DS, who will have the responsibility of supervising demolition operations within the area. The DS shall be responsible for providing a pre-demolition briefing as outlined in paragraph 8.1 of this ESHP. The DS will also make sure that applicable forms, documentation, and records required by this ESHP are completed and signed by appropriate project personnel. The DS will make sure that the logs and

records accurately reflect the demolition events conducted and the demolition materials used during that day's operations.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO for the site is responsible for making sure that demolition operations are being conducted in a safe and healthful manner. As such, a PIKA employee designated as the demolition SSHO will be present on-site during MEC demolition operations and the SSHO will meet the requirements for a UXO Safety Officer as expressed in DDESB TP 18 listed above in paragraph 3.0 or this ESHP. However, in the event that a given project has multiple sites where varying types of MEC investigation and remediation operations are being conducted concurrently, it may be necessary to assign an additional, temporary SSHO to monitor the demolition operations. The temporary demolition SSHO will make sure of the compliance of the demolition team while the primary SSHO attends to the remaining project teams. If there is no temporary SSHO assigned strictly to demolition operations, the primary site SSHO will be the one responsible for monitoring demolition operations.

4.5 QUALITY CONTROL SPECIALIST

The UXO Quality Control Specialist (UXOQCS) is responsible for making sure of the completeness of demolition operations and for weekly inspecting the Explosives Accountability Record/Magazine Data Card (ESHF-203), the PIKA Demolition Shot Record (ESHF-205), and the inventory of MEC and demolition material. The UXOQCS, assisted by demolition team personnel, will inspect each demolition pit and an area of up to 250 feet in radius after each demolition shot to make sure there are no kick outs, hazardous MEC components or other hazardous items remaining after the demolition shot. The pit will be checked with a magnetometer and large metal fragments, and any hazardous debris will be removed on a per use basis IAW the SOW. Any MEC discovered during the QC check will be properly disposed of using the demolition procedures in the WP. MEC items that have been exposed to the forces of demolition detonations will not be moved and will be disposed of in place using the approved procedures in the project WP.

MEC items that have been exposed to the forces of demolition detonations but not destroyed/vented to the appropriate standard for completeness will be inspected by competent UXO Personnel prior to handling or movement. If the item is found to be unacceptable to move, the item will be disposed of in place using the approved procedures in the project WP.

5.0 GENERAL OPERATIONAL AND SAFETY PROCEDURES

Personnel, including contractor and subcontractor personnel, involved in operations on MEC contaminated sites shall be familiar with the potential safety and health hazards associated with the conduct of demolition/disposal operations, and with the work practices and control techniques used to reduce or eliminate these hazards. During demolition operations, the general safety provisions listed below shall be followed by demolition personnel. Non-compliance with the general safety provisions listed may result in positive discipline, to include termination of employment. The safety provisions for demolition operations include:

- Demolition operations shall be conducted IAW this ESHP and any approved changes outlined in the approved WP.
- Complying with safety regulations applicable to demolition range activities, demolition materials, and MEC materials.
- Demolition of any kind is prohibited without the express permission from the client.
- The quantity of MEC to be destroyed during any single shot will be determined by the range limit net explosive weight (NEW) and other considerations outlined in the project WP.
- For projects where MEC items may be consolidated for demolition, the US Army Engineering and Support Center, Huntsville (CEHNC), document entitled "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites" dated August 1998 (updated March 2000) will be located on-site and followed when destroying multiple munitions by detonation on site.
- In the event of an electrical storm, or heavy snow or dust storms, immediate action will be taken to cease demolition range operations and evacuate the area.
- In the event of a fire or unplanned explosion, if possible, put out the fire, if unable to do so, notify fire department and evacuate the area. If injuries are involved, remove victims from danger, administer first aid and seek medical attention.
- The DS is responsible for reporting to the SSHO injuries, accidents or near misses that occur during demolition operations.
- Employees will not tamper with any safety devices or protective equipment.
- Any defect or unusual condition noted that is not covered by this ESHP will be reported immediately to the DS or SSHO, and operations will be halted until the condition is addressed and resolved.
- Adequate fire protection and first aid equipment shall be provided.
- Personnel engaged in the destruction of MEC shall wear under and outer garments made of natural fiber, close-weave clothes, such as cotton. Synthetic material such as nylon is not authorized unless treated with anti-static material.

- Consistent with PIKA's operational policies, exposures to demolition hazards shall be maintained to the fewest number of personnel, for the shortest time, and to the least amount of hazard.
- Work locations will be maintained in a neat and orderly condition.
- Hand tools shall be inspected prior to use, and maintained in a good state of repair.
- Heavy equipment use in support of the demolition operations and heavy operators will meet the requirements of PIKA ESHP-518.
- Equipment and other lifting devices designed and used for lifting will have the load rating and date of next inspection marked on them. The load rating will not be exceeded and the equipment will not be used without a current inspection date.
- Leather or leather-palmed gloves will be worn when handling wooden boxes, munitions or MEC.
- Lifting and carrying require care. Improper methods cause unnecessary strains. Observe the following preliminaries before attempting to lift or carry:
  - When lifting, keep your arms and back as straight as possible, bend your knees and lift with your leg muscles, and
  - Be sure you have good footing and hold, and lift with a smooth, even motion.
- Telephone and/or radio communications with off-site resources shall be available and maintained through out demolition operations.
- Motor vehicles and material handling equipment (MHE) used for transporting MEC or demolition materials must meet the following requirements:
  - Exhaust systems shall be kept in good mechanical repair.
  - Lighting systems shall be an integral part of the vehicle.
  - One Class ABC rated, portable fire extinguisher shall, if possible, be mounted on the vehicle outside of the cab, on the driver's side, and one Class ABC fire extinguisher shall be mounted inside the cab.
  - Wheels of carriers must be chocked and brakes set during loading and unloading.
  - No demolition material or MEC shall be loaded into or unloaded from, motor vehicles while their motors are running.
- Motor vehicles and MHE used to transport demolition material and MEC shall be inspected prior to use to determine that:
  - Fire extinguishers are filled and in good working order.
  - Electrical wiring is in good condition and properly attached.
  - Fuel tank and piping are secure and not leaking.
  - Brakes, steering and safety equipment are in good condition.

  - The exhaust system is not exposed to accumulations of grease, oil, gasoline, or other fuels, and has ample clearance from fuel lines and other combustible materials.

- Employees are required to wear leather or rubber gloves when handling demolition materials. The type of glove worn is dependent on the type of demolition material.
- If a designated demolition range is established and used, a red warning flag, such as a "Bravo Flag" or a windsock, will be displayed at the entrance to the demolition range during demolition operations. If a gate is available, the entrance gate shall be either guarded or locked when demolition work is in process.
- Demolition shots will be performed IAW with any engineering controls (i.e., soil tamping or sandbags) outlined in the project WP.
- An observer will be stationed at a location where there is a good view of the air and surface approaches to the demolition range before material is detonated. It shall be the responsibility of the observer to order the DS to suspend firing if any aircraft, vehicles or personnel are sighted approaching the general demolition area.
- Two-way radios shall not be operated on the demolition range while the pit is primed or during the priming process. The charts shown in Tables 207-2 and 207-3 (located at the end of this document) shall be used to calculate minimum safe distances as they relate to mobile RF, television and FM broadcasting transmitters when electric detonators are in use.
- No demolition operation will be left unattended during the active portion of the operation (i.e., during the burn or once any explosives or MEC are brought to the range).
- For established demolition ranges, a minimum area of 200 feet in diameter around the demolition pit shall be cleared of dry grass, leaves, and other combustible materials.
- No demolition activities will be conducted if there is less than a 2,000-foot ceiling or if wind velocity is in excess of 20 mph.
- Demolition shots must be fired during daylight hours (i.e., between 30 minutes after sunrise and 30 minutes before sunset).
- No more than two persons shall ride in a truck transporting demolition material or MEC, and no person shall be allowed to ride in the trailer/bed.
- Vehicles shall not be refueled when carrying demolition material or MEC, and if they must be refueled near such materials, the vehicle will be a minimum of 100 feet from magazines or trailers containing such items before refueling can occur.
- Explosive vehicles will be cleaned of visible explosive and other contamination before releasing the vehicles for other tasks.
- Prior to conducting any other task, personnel shall wash their face and hands after handling demolition material or MEC.

- For established demolition ranges, demolition pits shall be spaced at least 50 feet apart, with no more than 10 pits prepared for a series of shots at any one time.

6.0 SPECIAL REQUIREMENTS FOR DEMOLITION ACTIVITIES

The following safety and operational requirements shall be followed during demolition range operations. Any deviations from this procedure shall be allowed only after receipt of written approval from the PIKA PM and the client. Failure to adhere to the requirements and procedures listed in the paragraphs below could result in serious injury or death; therefore, complete compliance with these requirements and procedures will be strictly enforced.

6.1 GENERAL REQUIREMENTS

The general demolition range requirements listed below shall be followed:

- Demolition operations will comply with Attachment 1 of this ESHP, Explosive Hazards Tables.
- Material awaiting destruction shall be stored at not less than intra-line distance, based on the largest quantity involved, from adjacent explosive materials and from explosives being destroyed. The material shall be protected against accidental ignition or explosion from fragments, grass fires, burning embers or detonating impulses originating in materials being destroyed.
- MEC items or bulk explosives to be destroyed by detonation shall, whenever feasible or required by the project WP, be detonated in a pit not less than three feet deep and covered with earth which protrudes not less than two feet above existing ground level. The components should be placed on their sides or in a position to expose the largest area to the influence of the demolition material. The demolition material should be placed in intimate contact with the item to be detonated and held in place by tape or earth packed over the demolition materials. The total quantity to be destroyed below ground at one time shall not exceed the range limit.
- Detonations will be counted to make sure of detonation of pits. After each series of detonations, a search shall be made of the surrounding area for unexploded MEC and MEC. Items such as lumps of explosives or unfuzed ammunition may be picked up and prepared for the next shot. Fuzed ammunition or items, which may have internally damaged components, will be detonated in place, if possible.
- Prevailing weather condition information will be obtained from the U.S. Weather Service and the data logged in the Demolition Shot Log (ESHF-205) before explosive operations begin.
- Shots shall be dual primed.
- A minimum of 30 seconds will be maintained between each detonation.

- After each detonation and at the end of each day's operations, surface exposed scrap metal, casings, fragments, and related items shall be recovered from the demolition range and disposed of IAW contractual procedures, as well as applicable environmental regulations. Collected scrap metal will be 100% inspected for absence of explosive materials by demolition range personnel and the DS.
- When operated in accordance with the conditions of this procedure the demolition range should not present a noise problem to the surrounding community. However, if a noise complaint is received, the name, address and phone number of the complainant should be recorded and reported to the SUXOS, who in turn, will report it to the client.
- Whenever possible, during excavation of the demolition pits, contour the ground so that runoff water is channeled away from the pits. If demolition operations are discontinued for more than two weeks, the pits should be back filled until operations resume.
- Upon completion of the project, disturbed demolition areas will be thoroughly inspected for MEC. Depending upon contract requirements, the site may have to be leveled, seeded and mulched to establish a permanent vegetative cover to inhibit erosion. If necessary, this will be coordinated with the contractor representative. At a minimum, the holes/pits will be filled in and contoured.
- Prior to and after each shot, the PIKA Demolition Shot Record (ESHF-205) is to be filled out by the DS with applicable information. This record will be kept with the Explosives Accountability Record/Magazine Data Card (ESHF-203) and reflect the data for each shot.

6.2 ELECTRIC DETONATOR USE

The following requirements are necessary when using electric detonators and blasting circuits:

- Electric detonators and electric blasting circuits may be energized to dangerous levels from outside sources such as static electricity, induced electric currents and radio communication equipment. Safety precautions will be taken to reduce the possibility of a premature detonation of the electric detonator and explosive charges of which they form a part. Radios will not be operated while the pit is primed or during the priming process.
- The shunt shall not be removed from the leg wires of the detonator until the continuity check of the detonator.
- When uncoiling or straightening the detonator leg wires, keep the explosive end of the detonator pointing away from the body and away from other personnel. When straightening the leg wires, do not hold the detonator itself, rather hold the detonator leg wires approximately one inch from the detonator body. Straighten

the leg wires by hand, do not throw or wave the wires through the air to loosen them.

- Prior to use, the detonators shall be tested for continuity. To conduct the test, place the detonators in a pre-bored hole in the ground or place them in or under a sand bag and walk facing away from the detonators and stretch the wires to their full length, being sure to not pull the detonators from the hole or sand bag. With the leg wires stretched to their full length, test the continuity of the detonators one at a time by un-shunting the leg wires and attaching them to the galvanometer and checking for continuity. After the test, re-shunt the wires by twisting the two ends together. Repeat this process for each detonator until detonators have been tested. This process shall be accomplished at least 50 feet and down wind from any MEC or demolition materials and out of the demolition range, personnel and vehicle traffic flow pattern.
  NOTE: *When testing the detonator, prior to connecting the detonator to the firing circuit, the leg wires of the detonator must be shunted by twisting the bare ends of the wires together immediately after testing. The wires shall remain short circuited until time to connect them to the firing line.*
- At the power source end of the blasting circuit, the ends of the wires shall be shorted or twisted together (shunted), except when actually testing the circuit or firing the charge. The connection between the detonator and the circuit firing wires must not be made unless the power end of the firing wires are shorted and grounded or the firing panel is off and locked.
- The firing line will be checked using pre-arranged hand signals or using two-way radios if the demolition pit is not visible from the firing point. If radios are used, communication shall be accomplished a minimum of 50 feet from the demolition pit and detonators. The firing line will be checked for electrical continuity in both the open and closed positions, and will be closed/shunted prior to connecting the detonator leg wires.
- MEC to be detonated/vented shall be placed in the demolition pit and the demolition material placed/attached in such a manner as to make sure of the total detonation/venting of the MEC. Once the MEC and demolition material are in place and the shot has been tamped, the detonators will be connected to the demolition material. Prior to handling any detonators that are connected to the firing line, personnel shall make sure that they are grounded. The detonators will then be carried to the demolition pit with the end of the detonators pointed away from the individual. The detonators are then connected to the detonation cord, Non-El, etc., making sure that the detonator is not covered with tamping material to allow for ease of recovery/investigation in the event of a miss-fire.
- Prior to making connections to the blasting machine, the entire firing circuit shall be tested with a galvanometer for electrical continuity and ohm resistance to make sure the blasting machine has the capacity to initiate the shot.

- The individual assigned to make the connections at the blasting machine or panel will not complete the circuit at the blasting machine or panel and will not give the signal for detonation until satisfied that personnel in the vicinity have been evacuated to a safe distance. When in use, the blasting machine or its actuating device shall be in the blaster's possession. When using the panel, the switch must be locked in the open position until ready to fire, and the single key must be in the blaster's possession.
- Prior to initiating a demolition shot(s), a warning will be given, the type and duration of such will be determined by the prevailing conditions at the demolition range. At a minimum, this should be an audible signal using a siren, air horn, or megaphone, which is sounded for a duration of one minute, five minutes prior to the shot and again one minute prior to the shot.

6.3 DETONATING CORD USE

The following procedures are required when using detonating cord (det cord):

- Det cord should be cut using approved crimpers and only the amount required should be removed from inventory.
- When cutting det cord, the task should be performed outside the magazine.
- For ease of inventory control, only remove det cord in one-foot increments eg. 10’ or 11’ not 10’ 6”.
- Det cord should not be placed in clothing pockets or around the neck, arm or waist, and should be transported to the demolition location in either an approved "day box" or a cloth satchel, depending upon the magazine location and proximity to the demolition area.
- Det cord should be placed at least 50 feet away from detonators and demolition materials until ready for use. For consistent safe handling, each classification of demolition material shall be separated by at least 50 feet until ready for use.
- When ready to "tie in" either the det cord to demolition materials, or det cord to detonator, the det cord will be connected to the demolition material and secured to the MEC. The cord is then strung out of the hole and secured in place with soil, being sure to leave a minimum tail of 1 foot exposed outside the hole.
- Once the hole is filled, make a loop in the det cord large enough to accommodate the detonator, place the detonator in the loop and secure it with tape. The detonators explosive end will face down the det cord toward the demolition material or parallel to the main line.
- Make sure there is sufficient det cord extending out of the hole to allow for ease of detonator attachment and detonator inspection/replacement should a misfire occur.
- If the det cord detonators are electric, they will be checked, tied in to the firing line and shunted prior to being taped to the loop. If the det cord detonators are non-electric, the time/safety fuse will be prepared with the igniter in place prior

to taping the detonators to the det cord loop. If the det cord detonators are Non-El, simply tape the detonators into the loop as described above.

- In the event that a time/safety fuse is used, and an igniter is not available and a field expedient initiation system is used (i.e., matches), do not split the safety fuse until the detonator is taped into the det cord loop.

6.4 TIME/SAFETY FUSE USE

The following procedures are required when using a time/safety fuse:

- Prior to each daily use, the burn rate for the time/safety fuse must be tested to make sure the accurate determination of the length of time/safety fuse needed to achieve the minimum burn time of five minutes needed to conduct demolition operations.
- To make sure both ends of the time/safety fuse are moisture free, use approved crimpers to cut six inches off the end of the time/safety fuse roll and place the six inch piece in the time/safety fuse container.
- If quantity allows, accurately measure and cut off a six foot long piece of the time/safety fuse from the roll.
- Take the six-foot section out of the magazine and attach a fuse igniter.
- In a safe location, removed from demolition materials and MEC, ignite the time/safety fuse, measure the burn time from the point of initiation to the "spit" at the end, and record the burn time in the DS's Log.
- To measure the burn time, use a watch with a second hand or chronograph.
- To calculate the burn rate in seconds per foot, divide the total burn time (in seconds) by the length (in feet) of the test fuse.
- Whenever using time/safety fuse, for demolition operations, the minimum amount of fuse to be used for each shot will be the amount needed to permit a safe return of all personnel to the firing and/or security points and a burn time of no less than five minutes.

6.5 PERFORATOR USE

The following procedures are required when using perforators:

- Only remove from inventory the number of perforators required to perform the task.
- Transport perforators in an approved “day box,” cloth satchel, or plastic container, depending upon magazine location and proximity to the demolition operations.
- Keep perforators stored at the demolition site at least 50 feet away from detonators and demolition materials until ready for use.
- When ready to use, affix the det cord to the perforator and knot the det cord after the last perforator in line, making sure the cord fits securely and has good continuity with the perforator.

- Once the det cord is secure, place the perforator in the desired location and secure it in place.
- Proceed from this point as described in paragraph 6.3.

6.6 USE OF TWO-COMPONENT EXPLOSIVES

The following procedures are required when using two-component demolition materials:

- Only remove from inventory the amount of two-component required to perform the task.
- When transporting the solid and liquid, they need only be placed apart in the bed of a truck and in appropriate containers.
- Do not mix the solid and liquid components until certain that it will be used, since the resulting mixture is classified as a Class 1.1 explosive by Department of Transportation.
- When mixing the solid and liquids components, follow the manufacturer's instructions, while being sure to wear rubber gloves and goggles. Mix components in an area 50' downwind from other demolition materials, the MEC, and if possible, sheltered from the wind.
- Once the components have been mixed, it is essential that the lid to the solid bottle is put on securely as soon as possible after mixing to prevent evaporation of the liquid.
- Attach the det cord as recommended by the manufacturer, place the assembled unit in the desired location in the hole and secure the unit.
- Proceed from this point as described in paragraph 6.3.

6.7 DEMOLITION RANGE INSPECTION SCHEDULE

The demolition range inspection schedule outlined in Table 207-1 will be followed at sites where demolition operations are being conducted. This inspection shall be conducted by the SSHO and will be documented in the Site Safety Log. If any deficiencies are noted, demolition operations shall be suspended and the deficiency reported to the SUXOS and DS. Once the deficiencies are corrected, demolition operations may be resumed.

TABLE 207-1: DEMOLITION RANGE INSPECTION SCHEDULE

Check List Item	Inspection Schedule
Site Vehicles	Weekly or Prior to Use
Explosive Carrier Vehicle	Weekly or Prior to Use
Range Access/Egress Route	Weekly or Prior to Use
Entrance Gate/Lock	Daily, Prior to Use and After Use

Storage Trailer/Magazine	Daily, Prior to Use and After Use
Fire Extinguishers	Monthly and Prior to Use
Personal Protective Equipment	Prior to Use
Circuit Testing Device	Prior to Use
Demolition Site	Prior to Use
Operating Equipment	Prior to Use
Hospital Route	Prior to Use

7.0 METEOROLOGICAL CONDITIONS

In order to control the effects of demolition operations and to make sure of the safety of site personnel, the following meteorological limitations and requirements shall apply to demolition operations:

- Demolition operations will not be conducted during electrical storms or thunderstorms.
- No demolition operations shall be conducted if the surface wind speed is greater than 20 miles per hour.
- Demolition operations will not be conducted during periods of visibility of less than one mile caused by, but not limited to, dense fog, blowing snow, rain, sand or dust storms.
- Demolition shall not be carried out on extremely cloudy days that are defined as: overcast (more than 80% cloud cover) with a ceiling of less than 2,000 feet.
- Demolition operations will not be conducted during any atmospheric inversion condition (low or high altitude).
- Demolition operations will not be conducted during periods of local air quality advisories.
- Demolition operations will not be initiated until 30 minutes after sunrise, and will be secured at least 30 minutes prior to sunset.

8.0 PRE-DEMOLITION/DISPOSAL PROCEDURES

8.1 PRE-DEMO/DISPOSAL OPERATIONAL BRIEFING

It is the belief of PIKA that the success of any operation is dependent upon a thorough brief, covering phases of the task, which is presented to affected personnel. The DS will brief personnel involved in range operations in the following areas:

- Type of MEC being destroyed.
- Type, placement and quantity of demolition material being used.
- Method of initiation (electric, non-electric or Non-El).
- Means of transporting and packaging MEC.
- Route to the disposal site.
- Equipment being used (i.e., galvanometer, blasting machine, firing wire, etc.).

- Misfire procedures.
- Post shot clean up of range.

8.2 PRE-DEMO/DISPOSAL SAFETY BRIEFING

The PIKA SSHO will conduct a safety brief for personnel involved in range operations in the following areas:

- Care and handling of explosive materials.
- Personal hygiene.
- Two man rule and approved exceptions.
- Potential trip/fall hazards.
- Horse play on the range.
- Stay alert for any explosive hazards on the range.
- Location of emergency shelter (if available).
- Parking area for vehicles (vehicles must be positioned for immediate departure, with the keys in the ignition).
- Location of range emergency vehicle (keep engine running).
- Wind direction (to assess potential toxic fumes).
- Location of first aid kit and fire extinguisher.
- Route to nearest hospital or emergency aid station.
- Type of communications in event of an emergency.
- Storage location of demolition materials and MEC awaiting disposal.
- Demolition schedule.

8.3 TASK ASSIGNMENTS

Individuals with assigned tasks will report the completion of the task to the DS. The types of tasks that may be required are:

- Contact the local Police, Fire personnel, USCG and FAA as required.
- Contact hospital/emergency response personnel if applicable.
- Secure access roads to the range area.
- Visually check range for any unauthorized personnel.
- Check firing wire for continuity and shunt.
- Prepare designated pits as required.
- Check continuity of detonators.
- Check time/safety fuse and its burn rate.
- Designate a custodian of the blasting machine, fuse igniters, or Non-El initiator.
- Secure detonators in a safe location.
- Place MEC in pit and place charge in desired location.

8.4 PREPARING EXPLOSIVE CHARGE FOR INITIATION

To prepare the explosive charge for initiation, the procedures listed below will be followed:

- Make sure firing wire is shunted.
- Connect detonator to the firing wire.
- Isolate or insulate connections.
- Prime the demolition charge.
- Place the demolition charge on MEC.
- Depart to firing point (if using non electric firing system, obtain head count, pull igniters and depart to designated safe area).
- Obtain a head count.
- Give one-minute warning signal, using a bullhorn or siren, five minutes prior to detonation, and again at one minute prior to detonation.
- Check the firing circuit.
- Yell **"fire in the hole"** three times (or an equivalent warning) and take cover.
- If using electric firing system connect firing wires to blasting machine and initiate charge.
- Remove firing wires from blasting machine and shunt.
- Remain in designated safe area until DS announces **"All Clear"**. This will occur after a post-shot waiting period of 5-minutes and the DS has and inspected the pit(s).

9.0 POST DEMOLITION/DISPOSAL PROCEDURES

Do not approach a smoking hole or allow personnel out of the designated safe area until cleared to do so, and follow the below listed procedures:

- After the **"All Clear"** signal, check pit for low orders or kick outs.
- Conduct a magnetometer check of the pit and remove any large fragmentation.
- Back fill hole as necessary.
- Police up equipment.
- Notify police, fire, etc. that the operation is complete.

10.0 MISFIRE PROCEDURES

A thorough check of equipment, firing wire and detonators will prevent most misfires. However, if a misfire does occur, the procedures outlined below shall be followed.

10.1 ELECTRIC MISFIRES

To prevent electric misfires, one technician will be responsible for electrical wiring in the circuit. If a misfire does occur, it must be cleared with extreme caution, and the responsible technician will investigate and correct the situation, using the steps outlined below:

- Check firing line and blasting machine connections and make a second initiation attempt.

- If unsuccessful, disconnect and connect to another blasting machine (if available) and attempt to initiate charge.
- If unsuccessful, commence a 30-minute wait period.
- After the maximum delay predicted for any part of the shot has passed, the designated technician will proceed down range to inspect the firing system, and a safety observer must watch from a protected area.
- Disconnect and shunt the detonator wires, connect a new detonator to the firing circuit, check the replacement detonator for continuity, and prime the charge without disturbing the original detonator.
- Follow normal procedures for effecting initiation of the charge.

10.2 NON-ELECTRIC MISFIRES

Working on a non-electric misfire is the most hazardous of operations. Occasionally, despite painstaking efforts, a misfire will occur. Investigation and corrective action should be undertaken only by the technician that placed the charge, using the following procedure:

- If charge fails to detonate at the determined time, initiate a 60-minute wait period plus the time of the safety fuse, i.e., 5-minute safety fuse plus 60 minutes for a total of 65 minutes.
- After the wait period has expired, a designated technician will proceed down range to inspect the firing system. A safety observer must watch from a protected area.
- Prime the shot with a new non-electric firing system and install a new fuse igniter.
- Follow normal procedures for initiation of the charge.

10.3 NON-EL MISFIRE

The use of a shock tube for blast initiation can present misfires that require the following actions:

- If charge fails to detonate, it could be the result of the shock tube not firing. Visually inspect the shock tube, if it is not discolored (i.e., slightly black), it has not fired.
- If it has not fired, cut a one-foot piece off the end of the tube, re-insert the tube in the firing device and attempt to fire again.
- If the device still does not fire, wait 60 minutes and proceed down range to replace the shock tube per instructions outlined below.
- If the tube is slightly black, then a "Black Tube" misfire has occurred, and the shock tube will have to be replaced. When replacing the shock tube, be sure to remove the tube with the detonator in place. Without removing the detonator from the end of the tube, repackage the defective tube and return it to the supplier for credit.

10.4 DETONATING CORD MISFIRE

PIKA uses det cord to tie in multiple demolition shots and to make sure that electric detonators are not buried. Since det cord initiation will be either electrical or non-electrical, the procedures presented in paragraphs 10.1, 10.2, or 10.3, as appropriate to the type of detonator used, will be used to clear a det cord misfire. In addition, the following will be conducted:

- If there is no problem with the initiating system, wait the prescribed time and inspect the initiator to the cord connection to make sure it is properly connected. If it was a bad connection, simply attach a new initiator and follow the appropriate procedures in paragraph 6.0.
- If the initiator detonated and the cord did not, inspect the cord to make sure it is det cord and not time fuze. Also, check to make sure there is PETN in the cord at the connection to the initiator.
- It may be necessary to uncover the det cord and replace it. This must be accomplished carefully to make sure that the demolition charge and the MEC item are not disturbed.

10.5 PERFORATOR MISFIRE

The use of perforators is considerably safer than the use of C-4 and many other demolition materials. If the perforator is not initiated properly, it could malfunction. Since the perforator is covered with tamping material, det cord is used as the initiator. Therefore, in the event of a misfire, the procedures presented in paragraph 10.4 will be followed, along with the items presented below.

- If everything went but the perforator, one of four things has occurred:
  1. Det cord grain size was insufficient to initiate the perforator.
  2. The det cord was dislodged from the perforator when placing tamping materials.
  3. The perforator was defective.
  4. The perforator was moved during the placement of tamping materials.
- Check to make sure the grain size of the det cord is sufficient, with 80 grain size or greater being the recommended size.
- If the det cord connection to the perforator was the problem, make sure that the next connection is secure (use duct tape if necessary).
- If it is evident that the perforator was moved, make sure it is properly secured for the next shot.
- If cord size and connection are sufficient, replace the perforator, leaving the defective one.

11.0 RECORD KEEPING REQUIREMENT

To document the demolition operations procedures and the completeness of the demolition of MEC, the following record keeping requirements shall be met:

- The client or PIKA (as directed) will obtain and maintain required permits.
- The DS will make sure of the accurate completion of the logs, and the SUXOS and QCS will monitor the entries in the log for completeness, accuracy and compliance with meteorological conditions.
- The DS shall enter the appropriate data on the Demolition Shot Record (ESHF-205) to reflect the MEC destroyed, and shall complete the appropriate information on the Explosives Accountability Record/Magazine Data Card (ESHF-203) that indicates the demolition materials used to destroy the MEC.
- The quantities of MEC recovered must also be the quantities of MEC destroyed or disposed.
- PIKA will retain a permanent file of demolition records, including permits, magazine data cards, training and inspection records, waste manifests if applicable, and operating logs.
- Copies of ATF License and any state or local permits must be on hand.

12.0 SAFETY AND PPE REQUIREMENTS

The following safety measures and personal protective equipment shall be used in preventing or reducing exposure to the hazards associated with MEC demolition/disposal operations. These requirements will be implemented unless superseded by site specific requirements stated in the SSHP.

1. Hard hats are required only when working around heavy equipment or when an overhead or head impact hazards exist.
2. Steel toe/shank boots are not required during surface/subsurface location of anomalies unless a serious toe hazard exists, whereupon a fiber safety toe will be used.
3. Safety glasses will be required an eye hazard exists, for example when working around flying dirt/debris, using hand tools, etc. Safety glasses will provide protection from impact hazards, and, if necessary, ultraviolet (UV) radiation (i.e., sunlight).
4. Positive means shall be required to secure the PPE and prevent it from falling and causing an accidental detonation.

13.0 AUDIT CRITERIA

The following items related to demolition/disposal operations on a MEC contaminated site will be audited for compliance with this ESHP:

1. The PIKA Demolition Shot Record (ESHF-205).
2. The Daily Task and Safety Briefing Logs (ESHF-502).

3. The Safety Training Attendance Forms, for the initial and daily site hazard training (ESHF-504).
4. Daily Inspection and Weekly Audit Report Form (ESHF-506).
5. Explosives Accountability Record/Magazine Data Card (ESHF-203).

14.0 ATTACHMENTS

None.

TABLE 207-2: MINIMUM SAFE DISTANCE FROM TRANSMITTER ANTENNAS

Average or Peak Transmitter Power in Watts	Minimum Distance to Transmitter in Meters / Feet
0 – 30	30 / 98.4
31 – 50	50 / 164.1
51 – 100	110 / 360
101 – 250	160 / 525
251 – 500	230 / 755
501 - 1,000	305 / 1,000
1,001 - 3,000	480 / 1,575
3,001 - 5,000	610 / 2,001
5,001 - 20,000	915 / 3,002
20,001 - 50,000	1,530 / 5,020
50,001 - 100,000	3,050 / 10,007
100,001 - 400,000	6,100 / 20,014
400,001 - 1,600,000	12,200 / 40,028
1,600,001 - 6,400,000	24,400 / 80,056

Note: When the transmission is a pulsed or pulsed continuous wave type and its pulse width is less than 10 microseconds, the power column indicates average power. For other transmissions, including those with pulse widths greater than 10 microseconds, the power column indicates peak power.

Source: Table 6-3, DA PAM 385-64, 15 December 1999

TABLE 207-3: MINIMUM SAFE SEPARATION FORMULAS

Unknown (Worst Case)	Un-shielded Munitions		Shielded Munitions	
	Frequency	**Formula**	**Frequency**	**Formula**
Use Table 41-1-1	Up to 2.3 KHz	$D = 0.093 \times (PG)^{0.5}$	Up to 73 KHz	$D = 0.093 \times (PG)^{0.5}$
	2.3 KHz – 450 KHz	$D = 39.7 \times F \times (PG)^{0.5}$	73 KHz – 450 KHz	$D = 126 \times F \times (PG)^{0.5}$
	450 KHz - 400 MHz	$D = 18 \times (PG)^{0.5}$	450 KHz - 400 MHz	$D = 0.6 \times (PG)^{0.5}$
	400 MHz - 75 GHz	$D = (7137/F) \times (PG)^{0.5}$	400 MHz - 2.4 GHz	$D = (226 / F) \times (PG)^{0.5}$
	>75 GHz	$D = 0.093 \times (PG)^{0.5}$	>2.4 GHz	$D = 0.093 \times (PG)^{0.5}$

Where :

D = Safe distance to the transmitter in feet (multiply feet by 0.305 to obtain meters)
P = Output power of the transmitter in watts
G = Numerical gain of transmitter antenna
F = Frequency in MHz (divide KHz by 1,000 to obtain MHz, and multiply GHz by 1,000 to obtain MHz)

To properly use this table, the following assumptions are made:

1. No-fire Current of the EED = 10 mA
2. Safety Factor = At least 10 dB below the no-fire current in EED (or 3.16 numerical)

- EED's Leads = Tuned to match the transmitter's frequency
  - Shielding = If metallic, it provides a minimum of 30 dB or 32 times (numerical) of shielding. Non-metal packs provide no shielding

5. At no time should personnel or munitions be exposed to more than 200 volts / meter

Source: Table 6-4, DA PAM 385-64, 15 December 1999

1.0 PURPOSE

PIKA recognizes that projects involving munitions and explosives of concern (MEC) create and present a unique set of hazards that must be controlled to make sure of a safe, successful project performance. Control of MEC hazards requires a coordinated team effort in which site personnel play an integral role. During a MEC project, site personnel are tasked with making sure of their own safety as well as the safety of their co-workers, the environment and the public. To coordinate and oversee this effort, each project with known or potential MEC hazards will be assigned an Unexploded Ordnance (UXO) Safety Officer (UXOSO) who will be responsible for MEC safety and for implementing this Environmental Safety & Health Procedure (ESHP). This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The forms associated with this ESHP can be found in PIKA ESHP -200 for MEC related forms and ESHP-500 for general safety and health forms.

2.0 SCOPE

2.1 GENERAL APPLICATION

This ESHP is applicable to PIKA projects where PIKA personnel are assigned to the role of UXOSO. This includes any sites where there is a known or potential for exposure to MEC hazards and a UXOSO is assigned to make sure of the safety and health of on-site personnel. The procedures in this program will be strictly adhered to unless otherwise amended within the site-specific project plans.

2.2 SPECIALIZED APPLICATIONS

For those project sites where MEC hazards co-exist with other significant occupational safety or health hazards, the UXOSO may be teamed with an occupational Site Safety and Health Officer (SSHO). In this situation, the UXOSO will be assigned for the duration of the MEC operations and will work together with the SSHO for the protection of personnel and equipment from both occupational and MEC hazards. However, depending upon the nature and scope of the occupational S&H issues versus the scope of the MEC issues, the UXOSO may also act in the role of the SSHO. Further detail related to roles and responsibilities of the UXOSO are contained in PIKA ESHP-525, Site Safety and Health Officer Responsibilities.

3.0 REFERENCES

The Occupational Safety and Health Administration (OSHA) standards listed below apply to the conduct of operations associated with this ESHP. The responsibilities of the UXOSO as outlined in this ESHP are also designed to meet U.S. Army Corps of

Engineers (USACE), Department of Energy (DOE), and other current client requirements.

- OSHA 29 CFR 1910 General Industry Standards.
- OSHA 29 CFR 1926 Construction Standards.
- Department of Defense (DoD) 6055.9-STD, DoD Ammunition and Explosive Safety Standard, February 29, 2008.
- DoD 4145.26-M, DoD Contractor's Safety Manual for Ammunition and Explosives, March 13, 2008.
- USACE Engineering Pamphlet (EP) 1110-1-18, *Ordnance and Explosives Response*, 3 April 2006.
- USACE Engineering Manual (EM) 385-1-1, Safety and Health Requirements Manual, 3 November 2003.
- USACE Engineering Regulation (ER) 385-1-95, *Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations*, 30 March 2007.
- USACE EP 385-1-95a, *Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations*, 27 August 2004.
- USACE EP-75-1-2 *Munitions and Explosives of Concern (MEC) Support during Hazardous, Toxic, or Radiological Waste (HTRW) and Construction Activities*, 1 August 2004.
- USACE, EM 385-1-4009, *Military Munitions Response Actions*, 15 June 2007.
- American conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs®) and Biological Exposure Indices (BEIs®), 2007.
- NIOSH/OSHA/USCG/EPA, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, October 1985. (DHHS (NIOSH) Publication No. 85-115).
- Department of Defense Explosive Safety Board (DDESB) Technical Paper (TP) 16, *Methodologies for Calculating Primary Fragment Characteristics*, 1 December 2003.
- USACE, ER 385-1-92, *Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities* 1 May 2007.
- Procedures for *Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites*, U.S. Army Engineering and Support Center, Huntsville, August 1998.

4.0 RESPONSIBILITIES

4.1 CORPORATE SAFETY AND HEALTH MANAGER

The PIKA Corporate Safety and Health Manager (CSHM) is responsible for the periodic review, update and implementation of this ESHP and the CESHP for their continued integrity and compliance with applicable Federal, state and local MEC regulations. To effectively implement this UXOSO ESHP, the CSHM will take an active role in providing

consultation and regulatory guidance to those personnel assigned to the role of UXOSO. On those project sites where the UXOSO is co-assigned the role of the SSHO, the CSHM responsibilities in ESHP-525 will be implemented by the CSHM. On those sites where there are both a SSHO and a UXOSO, the CSHM will:

1. Consult with the project Senior UXO Supervisor (SUXOS) to make sure that the person selected for the UXOSO position meets the requirements specified by PIKA and the client and that each UXOSO has the specific training, knowledge, and experience necessary to implement the MEC-related hazard identification and control procedures outlined in the SSHP.
2. Consult with the UXOSOs in the field to make sure that MEC-specific safety and health issues are addressed and resolved.
3. Provide technical assistance as needed regarding the implementation of the MEC-related regulations.
4. When needed, assist the UXOSO in providing mobilization and safety training.
5. Conduct periodic inspections (every 30 to 45 days) of project sites for their continued compliance with applicable MEC regulations.

For those projects where there is a significant S&H hazard from MEC items, the CSHM will work closely with senior PIKA UXO-qualified personnel for the continued compliance of operations with not only the project plans, but also with accepted, published MEC location, identification, transportation and demolition procedures presented in the PIKA 200-series ESHPs, and MEC-related DoD regulations.

4.2 PROJECT MANAGER

The Project Manager shall be responsible for the availability of the project personnel and equipment resources needed to implement this ESHP. The Project Manager shall also make sure that this ESHP is incorporated into site specific plans, procedures and training for those sites with MEC contamination issues.

4.3 SITE SUPERVISOR

For those sites with significant MEC hazards, the Site Supervisor (SS) will be a qualified SUXOS. The SUXOS will make sure that this ESHP is implemented by the UXOSO and will work closely with the UXOSO to make sure that feasible controls are utilized to reduce the risk of personnel exposure to MEC hazards. During MEC location, identification, removal, transportation or demolition, the SUXOS will make sure that the UXOSO is addressing the MEC safety and health concerns outlined in the PIKA 200-series ESHPs. While on-site, the SUXOS will have the responsibility for administratively managing the UXOSO, however, the UXOSO will still have a reporting responsibility to the CSHM regarding both MEC and non-MEC S&H issues.

4.4 UXO SAFETY OFFICER

The UXOSO has the overall responsibility for the safety and health of PIKA, subcontractor, government, and visitor personnel while they are at a MEC contaminated site. In this role, the UXOSO must make sure that the requirements of the Work Plan, SSHP, and applicable DoD regulations are implemented by site personnel for the duration of MEC activities. The UXOSO will also make sure that personnel are properly trained, qualified, equipped, and physically protected from the site and operational hazards to the greatest extent feasible. To make sure of MEC safety, the UXOSO will:

1. Initiate and authorize a "Stop Work" order for any imminent safety or health concerns;
2. Implement and enforce the requirements outlined in the SSHP and other DoD or other client-related regulations;
3. Conduct the MEC safety portion of the daily tailgate briefings;
4. Conduct and document MEC training related to site-specific MEC hazards;
5. Investigate and report in a timely manner any MEC-related injuries, illnesses, accidents, incidents, or near misses;
6. Conduct visitor orientation, daily safety inspections, and weekly safety audits;
7. Make sure that MEC-related forms are initiated and competed properly for the capture of relevant MEC and explosives use data;
8. Immediately inform the CSHM and SUXOS when a SOW change is identified that effects the MEC tasks addressed in the SSHP;
9. Provide the CSHM with task hazard data for any new tasks added to the SOW or any tasks that significantly change during the conduct of site operations;
10. Make sure that no MEC operation is performed until safety and health provisions required by this ESHP and the SSHP are implemented;
11. Implement the UXOSO requirements within each PIKA 200-series ESHP; and
12. Make sure field implementation of the PIKA MEC Safety Plan.

5.0 PROCEDURES

5.1 UXOSO MOBILIZATION AND SITE SET-UP PROCEDURES

The UXOSO will become completely familiar with the PIKA CESHP, the site-specific WP, which includes the SSHP with the MEC and non-MEC ESHPs relevant to the project. These documents will be used by the UXOSO as the basis for the mobilization training presented to site personnel and for the safe performance of site operations. Whenever possible, these documents will be given to the UXOSO prior to departure to the site. Additionally, when feasible, the UXOSO should be a member of the pre-mobilization team so that the UXOSO can either perform or assist in the performance of the site mobilization and set-up procedures listed below. In the event that a SSHO is co-

assigned to the project, the UXOSO will assist the SSHO in the performance of the mobilization and set-up procedures outlined below.

1. Coordinate with applicable local emergency response agencies (i.e. Police, Sheriff, Hospital, Life Flight, Ambulance Service and Fire Department).
2. Determine if FAA or Marine Band notices need to be made prior to demolition operations.
3. Survey the site for hazards and validating the accuracy of the site plans.
4. Validating, and if needed modifying, the medical evacuation routes presented in the SSHP and planning the personnel assembly points for emergency evacuations.
5. Inventorying the first aid, equipment, personal protective equipment (PPE), fire extinguishers, etc.
6. Validating, and if needed, changing the number, type, and location of toilet facilities.
7. Obtaining any local certificates required.
8. Preparing evacuation maps and confirming the contact list for hospital and ambulance services.

If the UXOSO is not a member of the pre-mobilization team, or if no pre-mobilization is allowed, the UXOSO will implement items 1 – 8 listed above during the first day of operation. If PIKA is acting a subcontractor to a project, many of the above tasks will already have been completed by the prime contractor prior to the arrival of the UXOSO on site. However, this does not relieve the UXOSO of the responsibility of making sure that the steps listed above have been accomplished. It is imperative that the UXOSO do everything possible to make sure activities are safe and uninterrupted and that a good rapport is established with applicable local authorities.

5.2 TRAINING REQUIREMENTS AND PROCEDURES

5.2.1 General training requirements

All site training required for the performance of MEC operations shall be conducted, or arranged for, by the UXOSO. For the hazard training required by the SSHP, the UXOSO will make sure that the data specified in the following paragraphs are presented to affected workers. Unless otherwise specified in the SSHP, training will be documented using the PIKA Safety Training Attendance Log (ESHF-503). At no time will PIKA personnel be permitted to conduct any site operations involving the potential for exposure to safety or health hazards until they have received appropriate training.

5.2.2 Site-specific and Hazard Information Training

Prior to the initiation of site activities involving the potential for exposure to MEC hazards, the UXOSO, in conjunction with the SS will provide Site-specific and Hazard

Information Training. The outline in Table 208-1 will be used as general guidance for the MEC training. For other non-MEC training required by the SSHP or other project plans, the training outline in ESHP-525 will be used by either the UXOSO or SSHO to conduct the site-specific and hazard information training.

5.2.3 Equipment Training

Equipment operation training will also be conducted for site personnel who will be responsible for the operation of MEC location and detection equipment, earth moving equipment (EMM), power tools or hand tools. Training requirements related to equipment use will be specified in the SSHP and ESHP-525.

5.2.4 Personal Protective Equipment Training

As specified by 29 CFR 1910.132, site personnel required to use PPE shall be given training in the use, care, and limitations of the PPE they are to use. Prior to using the designated PPE on site, affected personnel shall demonstrate an understanding of the training and their ability to properly use the assigned PPE. PPE training shall be documented using the PIKA Personal Protective Equipment Training Form (ESHF-530), and will address the following topics:

1. PPE selection decisions;
2. When PPE is needed;
3. What PPE is needed;
4. How to properly don, doff, adjust, and wear PPE;
5. The limitations of specific pieces/types of PPE; and
6. The proper care, maintenance, useful life, and disposal of PPE.

TABLE 208-1: SITE-SPECIFIC TRAINING TOPICS

TOPIC	SUB-TOPICS TO BE COVERED
Welcome and Introduction	
Work Plan	A. Safety And Health Chain-Of-Command B. Implications Of The Proposed Work/Project Schedule C. General Description of MEC Operations to be Conducted C. Methods For On- And Off-Site Communications D. Logs & Records
History of Facility	Brief Overview of Facility History
SSHP	(see ESHP-525 for additional SSHP topics)
Methods and Procedures	A. Safety Precautions for Suspected Fuzes and MEC Items On Site B. Vegetation grubbing (if applicable) C. MEC Detection Identifications and Markings 1. General 2. Sweep Lanes 3. Surface/Subsurface Anomaly Detection Techniques E. Surface Investigation and Clearance of UXO/MEC D. UXO/MEC Marking Procedures F. Subsurface Investigation and Clearance of UXO/MEC G. UXO/MEC Disposal and Collection Site

	H. Safety and Health Issues of UXO/MEC Disposal 1. UXO/MEC Disposal and Collection Site 2. UXO Disposal Procedures (Range Operations) 3. Inert MEC Disposal Procedures I. Safe Equipment Use 1. UXO Detection 2. Mechanical/Hand Tools 3. Heavy 4. Vehicles

5.2.5 Visitor Training

Site visitors are defined as persons (1) who are not employed at the project site, (2) who do not routinely enter restricted work areas and, (3) whose presence is of short duration (i.e., 1 to 2 days per visit). Site visitors may include client personnel, PIKA personnel, commercial vendors, political representatives, and auditors or inspectors from Federal, state or local regulatory agencies. It is the responsibility of site personnel to watch for visitors approaching the site and to immediately notify the UXOSO or SUXOS of the visitor's arrival. Visitors will be required to comply with the general requirements listed within the project SSHP. For MEC sites, the USACE Military Munitions Response Program Center of Expertise has published and Interim Guidance Document (IGD) 04-01 entitled Essential Personnel and Personal Exposure Limits for Conventional Munitions and Explosives of Concern Exclusion Zones, dated 21 April 2004. The personal exposure limits and definitions of essential personnel presented in this document will be used when assessing visitors that request entry into the exclusion zone while MEC operations are taking place.

5.2.6 Three-Day On-Site Training

During the thee-day on-site supervised training required by 29 CFR 1910.120 and the PIKA CESHP the UXOSO will be responsible for making sure that UXO personnel are adequately trained in the safe application of the MEC location, identification, removal, transportation and demolition procedures. Once site personnel have been given this instruction and been supervised on-site for three days, the UXOSO will make sure that personnel sign the PIKA Three-day Supervised On-site Training Form (see ESHF-511).

5.3 DAILY AND WEEKLY SAFETY BRIEFINGS

5.3.1 Daily Safety Briefing

It is essential that the UXOSO be involved in the Daily Task and Safety Brief given each day prior to commencing work. This briefing must be pertinent and informative regarding MEC operations and safety. The Daily Task and Safety Briefing will be documented using the PIKA Safety Training Attendance Form (see ESHF-503). The MEC-related items to be covered include, but are not limited to:

- The type of MEC anticipated.
- The fuzing and fillers anticipated and the safety precautions that will be used.

- Blow-in-place procedures.
- Consolidated demolition shots.
- On-site hazards that may be encountered (see ESHP-525 for additional occupational S&H topics to be covered).
- Emergency procedures, evacuation routes, and assembly points.
- MEC detection methods and hazards.

5.3.2 Weekly Safety Briefing

At the beginning of each work week, which is normally Monday, a 10-15 minute Weekly Safety Briefing (WSB) will be presented to highlight and discuss a site-specific safety or health topic. Site personnel will be required to attend the training and the UXOSO will document this training in the PIKA Safety Training Attendance Log (ESHF-503). The training will be presented by the UXOSO, or a designated representative, and will be used to cover MEC-related or S&H topics relevant to on-site MEC or other hazards.

6.0 LOGS, FORMS, REPORTS AND RECORDS

An essential element of any project is the continued maintenance of logs, reports and records which are used to document the on-site safety and health process and to log any significant events which may occur on site. In the event that there is an occupational SSHO at the site with the UXOSO, the SSHO will be the primary position responsible for S&H document management. However, the UXOSO will still maintain a UXOSO site log and will coordinate with the SSHO regarding the completion and maintenance of forms related to MEC operations. Described below are the UXOSO responsibilities regarding MEC documentation. Additional information regarding documentation and logs for non-MEC issues is presented in ESHP-525. If no SSHO is co-assigned to the site, the UXOSO will be responsible for logs as outlined in ESHP-525.

6.1 DAILY SAFETY LOG

A daily Safety Log will be maintained on site by the UXOSO. This log will be recorded in a bound book with numbered pages, and will as a minimum the include: weather conditions, inspections conducted, results of the inspections, safety issues addressed each day, and any significant occurrences related to site safety.

The UXOSO must understand that the Daily Safety Log is an integral part of maintaining the safety and health of on-site personnel. The data contained in the log should be of sufficient detail so as to fully document any incidents that could impact the manner in which operations are conducted or have any type of impact on safety and health policies/procedures used on site. Of special importance is the use of the log to document any MEC-related guidance or directives given to either the UXOSO or the SS by an on-site contractor representative. The log can also be used to record

statements/suggestions made by site personnel. When logging events within the log it is also of importance to log not only the initial elements of the event, but also the final disposition and outcome of the event. The UXOSO should periodically review the log to make sure there is closure for each significant event logged.

6.2 TRAINING LOG

The UXOSO is responsible for making sure that MEC training conducted on site is recorded daily, and that the PIKA Safety Training Attendance Log (ESHF-503) is properly completed. Depending upon the number of personnel on site, the UXOSO may record the site training in the bound site Safety Log, without the generation of a dedicated, bound Training Log book. Regardless of where the training is recorded in the permanent record, the Safety Training Attendance Log (ESHF-503) will be completed and maintained on site with the other site records.

6.3 VISITOR LOG

A visitor record will be kept at the entrance to PIKA work sites to record when off-site personnel visit the work site. Visitors to the site must be given a MEC safety briefing and must be logged in and out by the UXOSO as soon as they enter the Support Zone. Additionally, the procedures in IGD 04-01 will be followed and documented. Again, depending upon site size and conditions, the PIKA Site Visitors Entry and Exit Log (ESHF-526) may be used to initially record the entry and exit of site visitors. However, details of the visit, to include the purpose of the visit, and the personnel involved, should be recorded in the bound UXOSO Safety Log.

7.0 DAILY SAFETY INSPECTIONS AND WEEKLY SITE AUDITS

The UXOSO will conduct daily inspections and weekly audits. The UXOSO will use the PIKA Daily Inspection and Weekly Audit Report Form (see ESHF-506) and will make sure that the results are expressed to the SS. The UXOSO will be responsible for inspecting the site daily and auditing the site weekly for compliance with relevant MEC procedures. A copy of the inspection checklist will be forwarded to the CSHM for review at the end of each work week and daily checklist with deficiencies noted will also be forwarded to the CSHM. Once a deficiency has been corrected, the UXOSO will notify the CSHM of the resolution. It is imperative that for each deficiency noted, there is documentation (both on the inspection/audit form and in the Daily Safety Log) of the remedial actions taken to correct the deficiency.

7.1 VEHICLE INSPECTION LOG

The UXOSO will make sure that the PIKA Vehicle Inspection Checklist and Report Form (ESHF-507) is completed for each vehicle prior to its use as an explosive transport vehicle. The UXOSO will make sure that each vehicle used for the transport of MEC is

inspected and found to be in safe condition and that safety equipment is in place before allowing a vehicle to be used for MEC/explosives transportation.

7.2 ACCIDENT/ILLNESS/NEAR MISS REPORT

In the event of a MEC-related emergency, illness, injury, or property accident, the UXOSO will be responsible for making sure appropriate forms are completed and submitted in a timely fashion. The PIKA Accident/Injury/Illness/Near Miss Report (ESHF-514) will be used and completed by the UXOSO for submission to the SUXOS, PM and CSHM. Additional information regarding the use of this form is presented in ESHP-525.

7.3 EXCLUSION ZONE ENTRY/EXIT LOG

The UXOSO will be responsible for making sure that the PIKA Exclusion Zone Entry/Exit Log is maintained. This log is required at MEC sites where an exclusion zone (EZ) is established to control personnel exposures MEC hazards. If this log is required, the UXOSO, or a designated appointee, will make sure that personnel working in the EZ are logged in and out. This will be required to provide accountability for EZ personnel in the event of an emergency.

8.0 SAFETY AND PPE REQUIREMENTS

The UXOSO will follow the safety and PPE requirements applicable for each area of the site where such measures are required to safeguard site personnel. The Task Hazard Assessment forms in the SSHP will be used by the UXOSO to make sure of the use of proper PPE prior to entering a work area for the first time.

9.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The Safety Training Attendance Logs (ESHF-503);
- The Documentation of Hazard Communication Training Form (ESHF-505);
- The Daily Task and Safety Briefing Log (ESHF-502); and
- The Daily Inspection and Weekly Audit Report Form (ESHF-506).

10.0 ATTACHMENTS

None.

1.0 PURPOSE

The purpose of this Munitions and Explosives of Concern (MEC) Environmental Safety & Health Procedure (ESHP) is to provide the operational safety and health requirements and procedures applicable to operation of the PIKA Transportable Flashing Furnace (TFF). This ESHP will be used in conjunction with the PIKA Corporate Environmental, Safety and Health Program (CESHP) Manual, and will be implemented at TFF sites as an operational tool for the safe performance of furnace operations.

2.0 SCOPE

This ESHP applies to PIKA personnel, including contractor and subcontractor personnel involved with TFF operations involving known or potential munitions or explosives of concern. This Plan is not intended to contain requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this Plan for additional for compliance issues.

3.0 REFERENCES

The U.S. Army Corps of Engineers (USACE), Engineering Pamphlet (EP) 385-1-95a entitled *Basic Safety Concepts and Considerations for Munitions and Explosives of Concern* (MEC) (latest edition) is presented as Attachment 1 of this ESHP. This EP contains general guidelines for MEC operations and contains a listing of applicable OSHA, USACE and US Army regulations (AR). This list of references will be used for the conduct of site operations involving MEC contamination to which this Plan will be applied.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for the availability of PIKA personnel and equipment resources needed to effectively implement this ESHP. The PM will also make sure that this ESHP is incorporated into site-specific plans, procedures and training for sites where the TFF will be used.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will make sure that this ESHP is implemented during TFF operations. The SS will also make sure that relevant sections of this ESHP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

4.3 SITE SAFETY AND HEALTH OFFICER

The Unexploded Ordnance (UXO) Safety Officer (UXOSO) will make sure that the safety and health hazards and control techniques associated with the thermal treatment of MEC and munitions debris (MD) are discussed during the initial site hazard training and the daily safety briefings. The UXOSO will also be responsible for daily inspection of site operations and conditions to make sure of their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 DESCRIPTION

The PIKA TFF is designed to flash potentially explosive contaminated metal parts from the 3X contamination level to the 5X contamination level as described in IOC 385-1. The flashing furnace is mounted on a trailer with a detachable doorframe structure and stack for ease of transportation. It is self-contained, except for electrical power for the control panel, fuel oil for the burners and propane for the pilots.

The TFF is designed to handle non-combustible, explosive contaminated (3X) metal loads of up to 10,000 lbs, and to be heated up to 1000°F for 5X conditions. The nominal internal dimensions of the flashing furnace are five feet high by seven feet wide by 17 feet long. It is also designed to be totally contained and mounted onto a 96 inch-wide and 48 foot-long trailer. The transportable unit includes the furnace complete with burners, retractable car bottom, combustion air blower and controls. Not included is the number 2 fuel oil tank with pump and propane tank for the burner pilots.

The TFF utilizes a pair of Hauck NMC 230 nozzle mix burners with a propane pilot for ignition. The NMC 230 burner is rated at 3,317,000 million BTU/hr each with a combustion blower operating at a pressure of 20 ounces per square inch. Total BTU rating of the furnace is greater then 6 million BTU/hr. Typical turndown ratio on oil is 5:1. The total propane fuel consumption by the pilots is at a rate of approximately 40,000 BTU per hour. The propane pilots are on for about 30 seconds each time the burners are ignited.

The standard operating temperature of the TFF is 1400°F; however, the furnace has been designed to withstand operating temperatures of up to 2000°F. This 1400°F operating temperature makes sure the metal parts can be efficiently heated up to 600°F for 5X certification.

The insulation chosen for the flashing furnace is Pyro-Blok Y-module which is a ceramic wool insulation designed for rapid heat up and cool down without thermal cracking. This allows the flashing furnace to be brought up to temperature and then cooled very quickly which is essential for a batch process. This Pyro-Block insulation comes in one square foot module, is six inches thick and comes with a special attachment device to

weld directly to the interior wall. This module form of installation minimizes surface hot spots due to thermal shrinking and also allows for easy repair or patching in the event the insulation is ever damaged. The outer skin temperature of the flashing furnace will be less than 200°F at the operating temperature of 1400°F.

The flashing furnace is equipped with a 20-foot high stack that also serves as an unfired afterburner. This stack is insulated and has interior dimensions of 3'x3'. At an operating temperature of 1400°F and an induced flow of 1800 SCFM, the residence time in the unfired afterburner will be greater than 1.5 seconds. This helps make sure complete combustion of any unburned hydrocarbons in the exhaust stream.

The flashing furnace has a set of air injectors to assist in cool down at the end of the flashing cycle. Each injector is rated at 800 CFM for a total of 1600 CFM. Typical operation is to allow the furnace to cool to 500°F before opening the door and retracting the car bottom. The air injectors provide ambient cooling air to speed this cooling process.

The bottom of the flashing furnace is designed to be able to be retracted from the furnace for ease of loading and unloading. The car bottom can be rolled out approximately 10 feet from the furnace for easy access.

The furnace is designed for daily operation of multiple thermal cycles (batches of materials) per day and is capable of being shut down and restarted without undue damage to the insulation.

The data logging device at the control panel records the temperature cycle measurement at the exhaust stack of each batch to verify 5X certification in accordance with TB 700-4, par 3-10, a & b.

6.0 SAFETY CONSIDERATIONS

The TFF was designed to thermally decontaminate metal parts that are potentially contaminated with trace to small amounts (less than 0.5 pounds net explosive weight) of explosives. As such, the following general safety precautions will be observed during operation:

- Do not use the TFF to burn bulk explosives, or explosives in confined configurations, such as military munitions or improvised explosive devices.
- A strongbox was provided with the unit to contain potentially "popping" items, such as squibs and small caliber small arms ammunition. The strongbox should not be loaded with large caliber items, or items that contain a large amount of explosive, nor should it be overloaded with small popping items.

- Do not eat food or drink beverages while handling potentially contaminated materials.
- Keep car bottom tracks clean of energetic materials.
- All personnel should stand away from the unit while the door is operating or the car bottom is moving. Watch for pinching and crushing hazards.
- Car bottom may overhang trailer if fully extended. Restrict personnel traffic to avoid possible head injuries.
- All personnel should stand away form the furnace while furnace is processing explosive-contaminated materials.
- Do not stand near furnace while operating. Do not stand in front of door while furnace is operating, as the door is designed to vent any overpressure events
- Furnace interior will be hot. Do not stand in front of door while opening
- Furnace surfaces – interior and exterior – could be hot. Use caution to minimize burn hazards.
- Furnace is fuel oil fired, with a propane pilot. Check that connections are properly made and there are no leaks before operating. Check that no open fuel sources or other combustible materials are in close proximity to furnace while operating. No smoking or open flames should be allowed near fuel sources.
- Properly bond equipment, fuel storage, and ground equipment for lightning protection. Equipment may be unsafe to operate in electric storms.
- Metal decking may be slippery when wet. Watch for slipping and tripping hazards.
- Trailer is above ground surface. Minimize personnel on trailer deck. Minimize potential for falls.
- Observe proper safety procedures for electrical system. Watch for electrocution hazards.
- Fans and other equipment have moving parts. Maintain shields in proper order.
- Observe proper fall prevention and safety precautions if work on top of furnace housing is required.

7.0 SITE REQUIREMENTS

General site preparation procedures will include the following:

- Prepare a flat pad of compacted gravel or concrete to park trailer on. Trailer weight, fully loaded is approximately 60,000 pounds, gross. Trailer dimensions are approximately 48'x8.
- Avoid sitting near overhead power lines.
- Assure proper storm water drainage from site.
- Prepare a bermed area (TM5-1300) for the operator, 100 feet from the furnace
- Provide electricity, fuel storage, pump and connections.

8.0 SYSTEM ASSEMBLY

8.1 BLOCKING AND LEVELING

Upon arrival, the TFF should be leveled and blocked up. EDE recommends that the blocks be constructed from railroad ties. The trailer should be blocked on each side on the rear, middle and front portions of the trailer.

8.2 STACK ASSEMBLY

The stack assembly consists of two sections. The lower stack section is a square insulated duct ten feet in length. The upper stack section is an non-insulated, square-to-round transition piece. The following steps assemble the upper and lower stack sections to the furnace:

1. Remove the shipping straps and unbolt the shipping brackets that attach the two stack sections together.
2. Using a crane, lift the upper stack section off and set it aside.
3. Remove plywood shipping covers from the inlet and outlet of the lower stack section and from the furnace stack outlet.
4. Using the bolts and nuts stored in the toolbox, align the upper stack section flange with the lower stack section. Bolt the upper stack section to the lower stack section leaving any two opposing bolt holes open. Note that the insulation DMD not fully extend to the top end of the lower stack section. Bolt this flange end to the upper stack section.
5. Attach eyebolts to the two opposing holes left open with the eye towards the upper stack section.
6. Using the bolts, nuts, and neoprene gasket stored in the toolbox, lift the assemble stack sections and place the lower flange over the furnace stack. Align the flange holes, insert the neoprene gasket between the flanges and bolt the stack sections to the furnace stack.

8.3 DOOR PREPARATION

Execute the following steps before operating the door:

1. Remove the six bolts attaching the tower (door lifting mechanism) to the deck of the trailer.
2. Remove the door shipping clips from each side of the door.
3. Using a crane, lift the tower assembly and place it on top of the furnace housing with the pulleys towards the door.
4. Bolt the tower assembly to the furnace housing.
5. Using the crane, lift the door counterweight to a point approximately 4 to 6 inches below the sprockets, between the tower frame and gear motor.
6. While the counter weight is suspended at this point by the crane, loop the two roller chains over the sprockets and attach the ends of the roller chains to the top of the door.

7. Make sure that there are the same number of links between the counter weight and sprockets on each side.
8. Lower the counterweight and detach the lifting sling from the counterweight and remove the crane.
9. Reconnect the power to the gear motor.
10. Attach the limit switch to the upper portion of the tower.

8.4 STRONG BOX REMOVAL

Remove the two shipping straps and lift the strong box using a forklift.

8.5 CAR BOTTOM PREPARATION

Execute the following steps prior to moving the car bottom:

1. Remove the two shipping bolts. These bolts are located in front of the car bottom wheels located nearest to the control panels. They are accessed through the openings along the bottom of the furnace housing.
2. Remove the shipping straps located near the bottom of the furnace door.

8.6 LOADING PENDANT INSTALLATION

Remove the loading pendant from the toolbox and attach it to the junction box located near the middle of the furnace housing. The loading pendant is used to raise/lower the door and to move the car bottom in/out of the furnace.

8.7 POWER CONNECTION

Open the disconnect enclosure and pull cable through opening located on the bottom of the disconnect enclosure and attach the cable leads. Close the disconnect enclosure. Do not energize circuit until other site preparations and installations are ready. See sections on Site Preparation and Burner Start-up.

8.8 FUEL LINES CONNECTIONS

Connect the fuel and pilot lines. See sections on Site Preparation, Utility Connection and Burner Start-up for further details.

1. Connect the fuel oil line to the pipe line.
2. Connect the propane source to the 3/8 inch pipe line.

8.9 MISCELLANEOUS ASSEMBLY

Additional miscellaneous precautions include the items listed below:

1. Remove debris from the car bottom deck and make sure that the wheel tracks are free and clear. Do not lubricate the tracks.
2. Pick-up shipping straps, duct supports, blocks and bracing materials and place them into the tool box for storage.

9.0 UTILITY CONNECTION

After the TFF has been leveled, secured and blocked, connect the utilities to the trailer as follows:

- Propane. Propane is to be supplied to the TFF to operate the gas pilots on each burner. Each pilot is rated at 21,800 BTU per hour but they will typically be on for less than 30 seconds each time the burners are ignited. After the burners are ignited, the pilots are designed to shut off. The connection for the propane supply is a 3/8 inch line located on the pipe rack directly above the inlet for the fuel oil. Propane supplied to this point is to be at a pressure of 0.5 psi and a rated flow sized for at least 17 Cubic feet per hour (CFH). Connection to the propane inlet line from the on-site supply line is to be made with a flexible connection designed for use with propane.
- Fuel Oil. The TFF is designed to be operated on #2 fuel oil. The maximum fuel usage rate of each burner is approximately 25 gallons per hour on high fire. The fuel oil system to the TFF is to be rated for a maximum flow of at least 50 gallons per hour at a pressure between 30 to 50 psi. The connection for the oil supply is a ¾ inch line located on the pipe rack. Connection to the oil inlet line from the on-site supply line is to be made with a flexible connection designed for use with #2 fuel oil.
- Electrical Power. Electrical power requirements are 240 VAC, 60 Hz, 3-phase, 4-wire, 27 KVA connected load. A 100 amp service installation is recommended. Power should be provided from the service breaker connection via minimum #2 AWG, 4-conductor cable (larger if distance exceeds 250 feet) into the Main Disconnect Breaker Enclosure located on the right side of the Control Panel Assembly. Route power cables such that a clear space below the main disconnect switch is maintained for the data-logging device (EDE installed during set-up.)

The user must make sure that appropriate grounding connections are made to eliminate any ground potential difference between the trailer-mounted equipment and the power connection point.

10.0 OPERATIONAL PROCEDURES

10.1 BURNER START-UP

The TFF control panel provides burner management and modulated temperature control for a one zone, two-burner system. The main, oil fired burners are ignited by gas fired, spark-ignited pilots. Flame supervision is provided by two Honeywell RM7890A1015 flame relays in combination with R7849A1023 amplifiers and C7027A1049UV (ultraviolet) scanners. The unison light off system requires that both burner flames remain on at times for continued operation.

A Honeywell, UDC330B-K0-000-20-0A000-00-0, series single loop controller provides temperature control for the system. The controller receives a thermocouple input from the process and generates a 4-20mA output based on the difference between measured process temperature and the controller's set point. With flame established on both burners and the BURNER CONTROL selector switch in the CONTROL position, the burner control motor will be released from low fire and respond to the 4-20mA heat demand output. The LOW FIRE position of the selector switch overrides the temperature controller and forces the burner control motor to the low fire position.

A Honeywell, DC100L High Temperature Limit instrument with a separate thermocouple input monitors the process temperature and shuts off the burner system if the temperature exceeds the high limit set point. The high limit instrument must be manually reset after an over-temperature shutdown has occurred.

The control system is housed in a 30 inch wide by 36 inch high by 12 inch deep enclosure mounted on the fuel manifold skid. Control relays, circuit breakers, fuses and terminal blocks mount on a sub-panel inside the enclosure. An alarm horn announces limit and burner failures. Remote burner control is also provided by duplicate START and BURNER CONTROL operators in a remote control station with a 150-foot long umbilical cord. Reference Hauck drawings S900030-101 and 200 for panel and skid dimensions and a list of component parts.

APPLICABLE DRAWINGS

S900030-200	Rack Assembly
S900030-100	Panel Assembly
S900030-101 & 102	System Schematic
S900030-103	External Wiring Diagram

10.2 PANEL OPERATION: NORMAL OPERATING SEQUENCE

(Ref. System Schematic S900030-101 & 102) The following steps provide a general overview of the burner operation. This section emphasizes the function of the flame supervision and burner management controls:

1) Open necessary manual shutoff cocks to supply fuel to the system.
2) Twist to the right and release the EMERGENCY STOP.
   a. Power will be supplied to the burner control panel.
   b. The POWER ON indicator will light.
   c. The temperature controller, high temperature limit and flame relay instruments will perform their self-test procedures.
   d. The air control motor will drive open in preparation for purge.

e. The temperature data logging device display will illuminate. Check recorder for adequate paper supply and pen function.

3) Momentarily press the BLOWER START pushbutton.
   a. The combustion Air Blower Motor Starter contractor will be energized and the auxiliary contact will close to latch the starter circuit.
   b. The BLOWER START indicator will light.
4) Place the BURNER CONTROL selector switch on the main panel in the to the CTRL position and verify that the remote BURNER CONTROL switch is in the LOW FIRE position.
5) Verify the high temperature limit set point is correct.
6) Start other equipment required for burner operation.
7) When limits required for burner operation are satisfied, the LIMITS SET indicator will flash.
8) Momentarily press the LIMITS SET pushbutton;
   a. Limits Set relay, R1, will be energized and latched on.
   b. The LIMITS SET indicator will stop flashing and remain on.
   c. Alarm enable relay, R9, will be energized and latched on and the alarm horn circuit will be enabled.

      NOTE: *A momentary interruption of the safety limits series circuit will result in loss of limits set relay, R1 and the alarm horn will sound. The LIMITS SET indicator will remain off until the limit contact closes and will then begin flashing to annunciate that limits are closed and limits set is required.*
9) After limits have been set and the air control motor has reached is full open position;
   a. The air valve open (limit switch or motor auxiliary switch) contact should close.
   b. The Purge Timer (1TR) will begin its timed delay.
   c. The PURGING indicator will flash.
10) When the purge timer has completed its time delay;
   a. Purge latch relay, R2, will energize.
   b. The air control motor will drive to its low fire, start position.
11) After the air control motor reaches low fire;
   a. The low fire limit contact will close.
   b. Low fire relay, R7, will energize.
   c. The PURGING indicator will go out.
   d. The local and remote START pushbutton indicators will flash.
12) Press and hold the START pushbutton for approximately 3 seconds;
   a. Flame relay will be energized and perform its safe start check.
   b. Burner relay, R3, and ignition transformer will be energized.
   c. The START button will stop flashing and may be released.

d. Burner pilot gas and blocking solenoids will be energized and the PILOT indicator for burner will be illuminated.

13) Provided that burner UV scanner detects a satisfactory pilot flame signal;
   a. Ignition transformer will de-energize.
   b. Flame relay will be energized and perform its safe start check
   c. Burner relay, R4, and ignition transformer will be energized.
   d. Burner pilot gas and blocking solenoids will be energized and the PILOT indicator for burner will illuminated.
   e. Purge timer, 1TR will be de-energized and reset.
14) If burner scanner also detects a satisfactory pilot flame signal;
   a. Ignition transformer will de-energize.
   b. The main oil and oil blocking valves will be energized.
15) After the main oil valve is proved open by VOS-1 switch;
   a. Pilot timer, 2T, will energize and begin its timed delay.
16) After the pilot timer has completed its 10-second delay;
   a. Both PILOT indicators will extinguish and the MAIN FLAME indicators will come on.
   b. All pilot gas solenoids will de-energize.
17) Move the remote BURNER CONTROL selector to the CTRL position, provided that the local switch is also in the CTRL position and that temperature controller alarm 1 contact is closed;
   a. Control Relay, R5, will energize.
   b. Both Start indicators will illuminate.
   c. The air control motor will be released from low fire and respond to the 4-20mA signal generated by the temperature controller.
18) To return the burner to low fire, move the BURNER CONTROL selector to the LOW FIRE position;
   a. Control Relay, R5, will de-energize.
   b. The START indicators will extinguish.
   c. The air control motor will drive to its low fire position.
   d. The air control motor will drive to the low fire position.
19) To terminate burner operation, move either the remote or local BURNER CONTROL switches to OFF;
   a. Purge latch relay, R2, will be de-energized.
   b. Both flame relays will be de-energized.
   c. All pilot and main fuel valves will de-energize and close.
   d. All PILOT and MAIN FLAME indicators will extinguish.
   e. The air control motor will drive to high fire in preparation for purge.

10.3 STANDARD LOADING AND TREATMENT CYCLE

The TFF is designed for simple operation. The TFF is furnished with two remote pendants. The loading pendant is located approximately midway on one side of the furnace. The loading pendant has four pushbuttons used to raise/lower the door and to move the car in/out of the furnace. The second pendant is the burner pendant. The burner pendant is connected to the burner control panel and has one pushbutton for starting the burners plus a 3-position selector switch for burner operation. The burner pendant has a 150 foot cable so that the burners can be lit remotely.

1. With the TFF pendant, depress the DOOR UP button until the door rises to the fully up position. Then press the CAR OUT button to retract the car. With the car in the retracted position, it is ready for loading. Load the metal parts to be flashed directly onto the car.
2. After the car has been loaded, press the CAR IN button to move the car back into the furnace. Then press the DOOR DOWN button until the door is back in the full down position. Note if the door is not in the fully down position the interlock will not be made and the system will not operate.
3. With the loaded car in the furnace, the burners are ready to be lit. For safety reasons, the burners can be started remotely by using the burner pendant. To use the burner pendant, the burner control selector switch on the main panel must be in the CTRL position and the burner control switch on the pendant in the LOW FIRE position. Depress the START button to ignite the burners. *Note: Please see the Burner Start-up section for complete burner starting details.* After both burners have been lit, they will remain at low fire until the selector switch is moved to the CONTROL position. In the control position, the burners will ramp up until the desired temperature is reached.
4. After the furnace has been at temperature for the required time, turn the burner selector switch to the off position. This will turn both burners off. Depress the COOLING AIR BLOWER START button on the burner control main panel to start the cooling cycle.
5. For safety reasons, the manufacturer recommends that the loaded car not be removed until the furnace temperature has dropped below 600°F. With the door in the fully open position, retract the car and off load the flashed metal parts. Push the COOLING AIR BLOWER-STOP button. The car is now ready for the loading of a new batch of metal parts to be flashed.
6. Remove the paper record of the batch temperature history from the data logging device, note the date and time the record, and file for future use.

10.4 PANEL OPERATION: FAULTS AND FAILURES

If a satisfactory pilot flame signal is not detected during the ignition sequence;

1. The associated ignition transformer and pilot gas solenoids will de-energize.
2. The ALARM LED of the associated flame relay will light.

3. UV fault relay, R6, will be energized and the RESET pushbutton will flash.
4. The alarm horn will sound.

   NOTE: If the first burner flame had been established, that burner will also shutdown. Investigate the cause of the ignition failure then press the RESET pushbutton to reset the flame relay.

If a flame or ignition failure occurs after burner pilot has been established:

1. The ALARM LED of the associated flame relay will light.
2. UV fault relay, R6, will be energized and the RESET pushbutton will flash.
3. All pilot and main burner fuel valves will be de-energized.
4. All PILOT and/or MAIN FLAME indicators will go out.
5. The air control motor will drive open to prepare for purge.
6. The alarm horn will sound.

   NOTE: Press the ALARM SILENCE button to quiet the alarm horn. Investigate the cause of the flame failure then press the RESET pushbutton to reset the Flame Relay(s).

Momentary interruption of any of the following safety limits will cause immediate burner shutdown.

TERMINAL	DEVICE
10	Combustion air blower motor starter interlock
11	Low combustion air press limit
12	Oil pump motor starter interlock (disabled, not used)
13	Low oil pressure limit
14	Auxiliary limit 1
15	Auxiliary limit 2
16	High temperature limit

The burner shutdown sequence is as follows;

1. Limits set relay, R1, will be de-energized and the LIMITS SET indicator will go out.
2. Purge latch relay, R2, will be de-energized.
3. All flame relays and fuel valves will de-energized.
4. All PILOT and/or MAIN FLAME indicators will go out.
5. The air control motor will drive open to prepare for purge.
6. The alarm horn will sound.
7. Press the ALARM SILENCE pushbutton to quiet the alarm horn. Investigate the cause of the limit failure.

   NOTE: A momentary interruption of the safety limits series circuit will result in loss of limits set relay, R1 and the alarm horn will sound. The

LIMITS SET indicator will remain off until the limit contact closes and will then begin flashing to annunciate that limits are closed and limits set is required.

10.5 FURNACE MAINTENANCE AND LOCK-OUT/TAG-OUT PROCEDURES

This section outlines the minimum requirements to establish a written program and procedures for the placement of appropriate Lock-Out/Tag-Out (LO/TO) devices to prevent the unexpected re-energizing, start-up, or release of stored energy during the maintenance of the Flashing Furnace and associated equipment. The LO/TO procedures outlined in this ESHP will be used in conjunction with PIKA ESHP-521, the PIKA ESHP for the Control of Hazardous Energy (Lock-Out/Tag-Out).

10.5.1 General Requirements

The LO/TO procedures for this device consist of the following elements;

- Energy control procedures for energized equipment.
- Employee training.
- Periodic inspections of servicing or maintenance procedures.
- Start-up and re-energizing procedures.
- Procedures for Lock-Out/Tag-Out of equipment.

Only authorized employees trained in LO/TO procedures for this machine may perform LO/TO procedures for maintenance of the TFF. Normal/routine maintenance will be performed on Fridays. The task and safety briefing will cover LO/TO procedures, and specifically identify maintenance personnel and tasks to be accomplished. Personnel will be notified prior to re-energizing equipment.

10.5.2 Steps for Lock-Out/Tag-Out

1. Notify employees who operate the Furnace.
2. Furnace will already be Locked-Out from previous days shut-down procedure, verify this is fact.
3. The Main Power lever will be in the OFF position, Locked-Out, and Tagged-Out.
4. Appropriate Log entry will be made.
5. Attempt to start furnace by normal means and verify energy isolation.

10.5.3 Steps for Restoring Equipment

1. Search the furnace where maintenance was conducted for equipment or tools that may have been left behind.
2. Notify Furnace personnel when re-energizing.
3. Verify the position of Operators Panel switches.
4. Remove Lock-Out/Tag-Out devices and re-energize as required.

5. Notify Furnace personnel that maintenance or repairs are complete, and that it is ready for normal operations.

10.5.4 Training

All personnel assigned to the Flashing Furnace will be trained on the procedures for Lock-Out/Tag-Out. This training will be conducted by the PIKA Flashing Furnace Supervisor. Training will include the following elements;

1. Recognition of applicable hazardous energy sources.
2. Purpose and use of the energy control procedure.
3. Specific procedures used to Lock-Out/Tag-Out Furnace.
4. Consequences of unauthorized re-energizing of equipment (e.g., electrocution, injuries, etc.).

10.5.5 Inspection

Weekly inspections of the TFF will be conducted and documented. Additionally, an annual inspection of the energy control devices and procedures will be conducted for compliance.

10.5.6 Record Keeping

The following documentation shall be maintained:

- Written Lock-Out/Tag-Out Program
- Training records (annual, new employee)
- Inspections:
  - Annual inspections of procedures
  - Inspection of Lock-Out/Tag-Out devices
- Employee understanding of the requirements of this program

10.5.7 Recommended Spare Parts

To make sure operations are not significantly impacted by a part failure, it is recommended that the following spare parts be maintained at the site.

ITEM	PART #	QTY	DESCRIPTION
1	62459	1	Instrument, Honeywell DC330B-K0-00-21-0F0000-00-0
2	62823	1	Instrument, high limit, Honeywell DC100L-11101000
3	56648	1	Flame relay, Honeywell RM 7890A1015
4	56650	1	Amplifier, Honeywell R7849A1023
5	61961	1	Timer, ATC 407B-100-F3K
6	40744	1	Timer, Solid State, 10 Sec. Omnetics MMS115A1Z9-1/2B
7	17292	2	Relay, 3PDT, P&B KUP14-A35
8	58763	1	Fuse, 5A, Time Delay, Buss MDA-5

9	59697	1	Flasher, SSAC #FS126
10	47574	1	Circuit Breaker, 10 Amp, ABB S271-1K10
11	5889	1 Pk.	Bulb T3-1/4 Bayonet replacement bulb (5 pieces/Pk.)

11.0 RECEIPT, STORAGE AND SALVAGE OF MEC/MD

11.1 RECEIPT CRITERIA

All materials must be accompanied by documentation specifying the following:

- Type and nomenclature
- Quantity and weight
- Classification 3X-5X IAW IOC 385-1
- Bill of laden
- Originator

Any material not accompanied with the above documentation will be rejected, and the material will remain in the possession of the originator for further disposition. Any materials other than MEC or MD will be cause for rejection. Additional criteria for acceptance and processing through the TFF are as follows;

- All visible contaminates and foreign matter removed via steam/pressure washing.
- Paint stripped from visible surfaces.
- Pipes cut into lengths of no greater than 12 feet.
- Piping banded in groups of six with a minimum of three bands per group.

11.2 UNLOADING AND STORAGE OF MEC/MD

Piping will be staged to allow ample access for the fork lift to transfer materials from the staging area to the TFF for processing. A load number will be assigned to group beginning with P0001 and numerically higher for each additional group.

Fittings and flanges will be loaded into DOT boxes and staged in a separate area within the compound. A load number will be assigned to each box beginning with B0001 and numerically higher for each additional box.

Processing equipment will be staged on poly and covered within the compound. Each piece of equipment will be assigned a tracking number beginning with E0001 and numerically higher for each additional item.

11.3 DISPOSITION OF THERMALLY TREATED MATERIALS

Thermally treated MEC/MD will be loaded into DOT boxes, covered and staged within the compound in designated areas. Each DOT box will be labeled and assigned a tracking number beginning with MEC0001 for MEC and OS0001 for MD.

12.0 TFF FACILITY EMERGENCY & EVACUATION PLAN

The purpose of this plan is to educate employees on potential disasters, fire, explosion, severe weather, and "acts of God" specific to the Flashing Furnace Facility. It also includes an action sequence in case of an emergency and evacuation situation. Employees assigned to the Flashing Furnace Facility are to be trained in these procedures and annual drills will be conducted to make sure the plan is achievable.

12.1 POTENTIAL EMERGENCY SITUATIONS

The potential accidents that may result as a function of operating the TFF include the following;

- Personal injury
- Chemical release (Fuel)
- Fire
- Explosion
- Tornado
- Floods
- Electrical Storm/Severe Thunderstorm

12.2 PREVENTATIVE MEASURES.

The following will be implemented to prevent or limit an emergency incident;

- Use prescribed PPE (i.e. hard hats, eye protection, fall protection, etc.) during on-site activities.
- Discontinue operations when inclement/hazardous weather conditions pose a threat to a safe working environment.
- Keep sources of ignition away from the work areas and locate fire extinguishers near areas such as fuel supply tanks and re-fueling station where flammable materials are being used.
- When refueling fuel supply tanks, use care to reduce spillage into containment sump.
- When re-fueling Material Handling Equipment (MHE), use care to reduce spillage and have Spill Mats (In Spill Response Kit) ready for use if necessary.
- Use Extreme care when Furnace door is open and the Car Bottom is extended, Furnace contents are extremely hot.
- Use Extreme care when handling Furnace contents with MHE, treated metal will remain Hot for extended time periods.
- Fuel Tank sumps are designed to accommodate 110% of Tank contents to reduce the environmental impact of a potential tank rupture and or leak. Sumps must remain free of non-hazardous liquids such as rainwater, ice, and snow.
- All personnel will be thoroughly trained in Emergency Procedures.

12.3 EMERGENCY EQUIPMENT / RESPONSE PERSONNEL

Emergency equipment and personnel, as described below, will be available within the Flashing Furnace compound as noted. Posters identifying emergency equipment location are located at the rear trailer door and at fire extinguisher locations. Addtionally, every member of the Furnace crew will be CPR/First Aid certified (and current). Primary and Secondary CPR/First Aid responders for each days operation will be briefed and identified at the daily Task Order / Safety meeting.

- Emergency Eyewash: Located in rear trailer office
- First Aid Kits: Located in front trailer office
- Stretcher: Located in rear office trailer
- Fire Blanket: Located at Fuel tanks
- Fire Extinguishers: Located at following locations;
  Fire Station #1 - Outside office trailer
  Fire Station #2 - On Furnace
  Fire Station #3 – On Blast Wall between Generator & Fuel tanks

12.4 EMERGENCY ESCAPE ROUTES

Emergency escape routes will be posted in the office trailer and will be reviewed daily or as necessary. Personnel are to remain familiar with these routes and will participate in an Emergency Action Drill upon assignment (during indoctrination), and periodically (at least annually).

12.5 HOSPITAL MAP

Prior to the start of operations, a hospital map with written directions will be created and posted in the office trailer. Personnel will be briefed on the map and directions and will be able to transport injured personnel if needed. The route to the hospital will be driven periodically to make sure it is free of construction or other obstructions.

12.6 SPECIFIC ACTION SEQUENCE

12.6.1 Physical Injury or Chemical exposure

- Secure Area – Make sure that the area is free of any additional hazards that may endanger rescue or emergency personnel.
- Summon Medical Assistance – Quickly assess the extent of injury and, *if necessary*, call **the local emergency response number (911 or site specific number)** to coordinate professional medical assistance.
- Administer First Aid –For minor non-emergent injuries or chemical exposure requiring medical treatment beyond First Aid, the victim will be transported to designated hospital. Perform First Aid/CPR as necessary and secure injured employee until professional medical personnel arrive.

- Chemical Exposure – Emergency response actions listed in the applicable MSDS for chemical exposures will be followed as closely as the situation permits. Modes of entry and typical responses to chemical exposure emergencies will include;
    - ***Inhalation*** – Move victim to fresh air and call for emergency assistance as indicated below.
    - ***Skin Contact*** – Use copious amounts of soap and water. Wash and rinse affected area thoroughly, then provide appropriate medical attention. Victim will wash eyes at the Emergency Eyewash Station for 15 minutes, Hands and skin will be washed at the Hand Wash Station.
    - ***Ingestion*** – Transport to designated hospital.
    - ***Puncture wound or Laceration*** – Provide First Aid and Transport to Hospital.
- Disposal of Biological Waste – After injured personnel have been removed from the incident site, surfaces contaminated by body fluids must be cleaned and disinfected in accordance with SHP-06.02. Body fluids and related biological waste must be disposed of as medical waste. A Bloodborne Pathogen Kit is included in The Medical Trauma Kit.

12.6.2 Chemical Release (Fuel Spill)

The Furnace Facility has the following sources of Flammable Liquids/Flammable Gases;

- #2 Diesel Fuel tank which supplies Furnace Fuel.
- #2 Diesel Fuel tank which supplies fuel to the generator and for refueling of material handling equipment/machinery.
- Propane tank which supplies Gas to the Burner Igniters.

12.6.3 Definitions

For the remainder of this procedure, the following definitions will apply:

- **Small Spill**. 200L or less.
- **Large Spill**. 200L or more.
- **Reportable Quantities (RQ)**. 25 Gallons or more.
- **MHE**. Material Handling Equipment (JCB/Lull, etc.)
- **Engineering Controls**. Methods of controlling exposures by modifying the source or reducing the quantity of contaminants released into the environment.
- **NFPA Hazard Rating**. Classification of a chemical by a four color diamond representing health, flammability, reactivity and specific hazard by a numbered hazard rating from 0-4.

12.6.4 Spill Containment

Each fuel tank sits in a containment sump designed to accommodate 110% of tank contents.

12.7 POTENTIAL DIESEL FUEL HAZARDS

12.7.1 Fire or Explosion

- Highly Flammable: Will be easily ignited by heat, sparks or flames.
- Vapors may form explosive mixture with air.
- Vapors may travel to source of ignition and flash back.

12.7.2 Health Risks

- Inhalation or contact may irritate or burn skin and eyes.
- Fire may produce irritating, corrosive and/or toxic gases.
- Vapors may cause dizziness or suffocation.
- Runoff from fire control may cause pollution.

12.7.3 Protective Clothing

Modified Level "D" protective clothing will be worn for small spill cleanup, consisting of the following;

- Tyvek suit
- Latex gloves
- Chemical resistant outer gloves
- Safety glasses
- Splash shield
- Vinyl Over-boots

12.7.4 Evacuation

Large Spill. Consider initial downwind evacuation for at least 300 meters (1000 feet). The layout of the TFF relative to the surrounding area inherently reduces the need for downwind evacuation. Predominant winds are from the northerly direction, an unusual westerly wind could affect personnel in the direction of the main gate (east).

- ELIMINATE ignition sources (no smoking, sparks, or flames).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop, or at least minimize the leak if it can be done without risk.
- Use clean non-sparking tools to collect absorbent material.
- Implement appropriate engineering controls to reduce or minimize spillage.

12.7.5 Spill Response Kit

The Spill Response Kit is located at the entry point to the Fuel tanks, it contains the following items;

- Absorbent material
- Tyvek suits
- Latex gloves

- Outer liquid resistant work gloves
- Liquid resistant Outer-boots
- Splash Shield
- Hazardous Spill Repair Kit
- Pipe Wrench

12.7.6 Spill Clean-up Procedures

For small spills:

- Don PPE contained in the Spill Response Kit.
- Use Absorbent towels to absorb fuel .
- Retrieve 55 GL drums to place used towels in.
- Seal container.
- Label container as appropriate.
- Arrange for transport of drum(s) to temporary storage.
- Coordinate disposition with PIKA Environmental Program Manager.

For large spills;

- Secure site.
- Make notifications.
- Contact the PIKA PM and await further instructions.

12.7.7 First Aid

- Move the victim to fresh air or upwind.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 15 minutes.
- Wash skin with soap and water.
- Apply artificial respiration if victim is not breathing.
- Remove and isolate contaminated clothing and boots.
- Keep victim warm and quiet.
- Evaluate situation and transport to a medical facility if necessary.
- Severe exposure could require the administration of Oxygen.
- Make sure that medical personnel are aware of the material involved.

12.7.8 Reporting

The primary responsibility for notification lies with the PIKA Site Supervisor. In the event of an incident, the Site Supervisor will notify company, client, and government authorities in accordance with the site SSHP.

12.7.9 Site Control

To prevent unauthorized entry into the hazard area, the PIKA Site Supervisor will establish positive site control at the predetermined points as defined in the SSHP.

12.8 POTENTIAL PROPANE HAZARDS

12.8.1 Fire or Explosion

- Extremely Flammable
- Will be easily ignited by heat, sparks or flames
- Will form explosive mixtures with air
- Vapors from liquefied gas are initially heavier than air and spread along the ground
- Vapors may travel to source of ignition and flash back
- Containers may explode when heated
- Ruptured cylinders may become self propelled

12.8.2 Health Risks

- Vapors may cause dizziness or asphyxiation without warning
- Some may be irritating if inhaled at high concentrations
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite
- Fire may produce irritating and/or toxic gases

12.8.3 Evacuation

For a leak of any kind, eliminate ignition sources (no smoking, sparks, or open flames) if safe to do so and immediately evacuate the area consider initial downwind evacuation for at least 800 meters (1/2 mile).

12.8.4 First Aid

- Move victim to fresh air or upwind.
- Apply artificial respiration if victim is not breathing.
- Remove and isolate contaminated clothing and boots.
- Keep victim warm and quiet.
- Evaluate situation and transport to a medical facility if necessary.
- Exposure could require the administration of Oxygen.
- Make sure that medical personnel are aware of the material involved.

12.8.5 Propane Release Procedures

The leak has to be stopped or minimized from upwind if this can be done without risk. The approved PPE for a Propane leak is a SCBA.

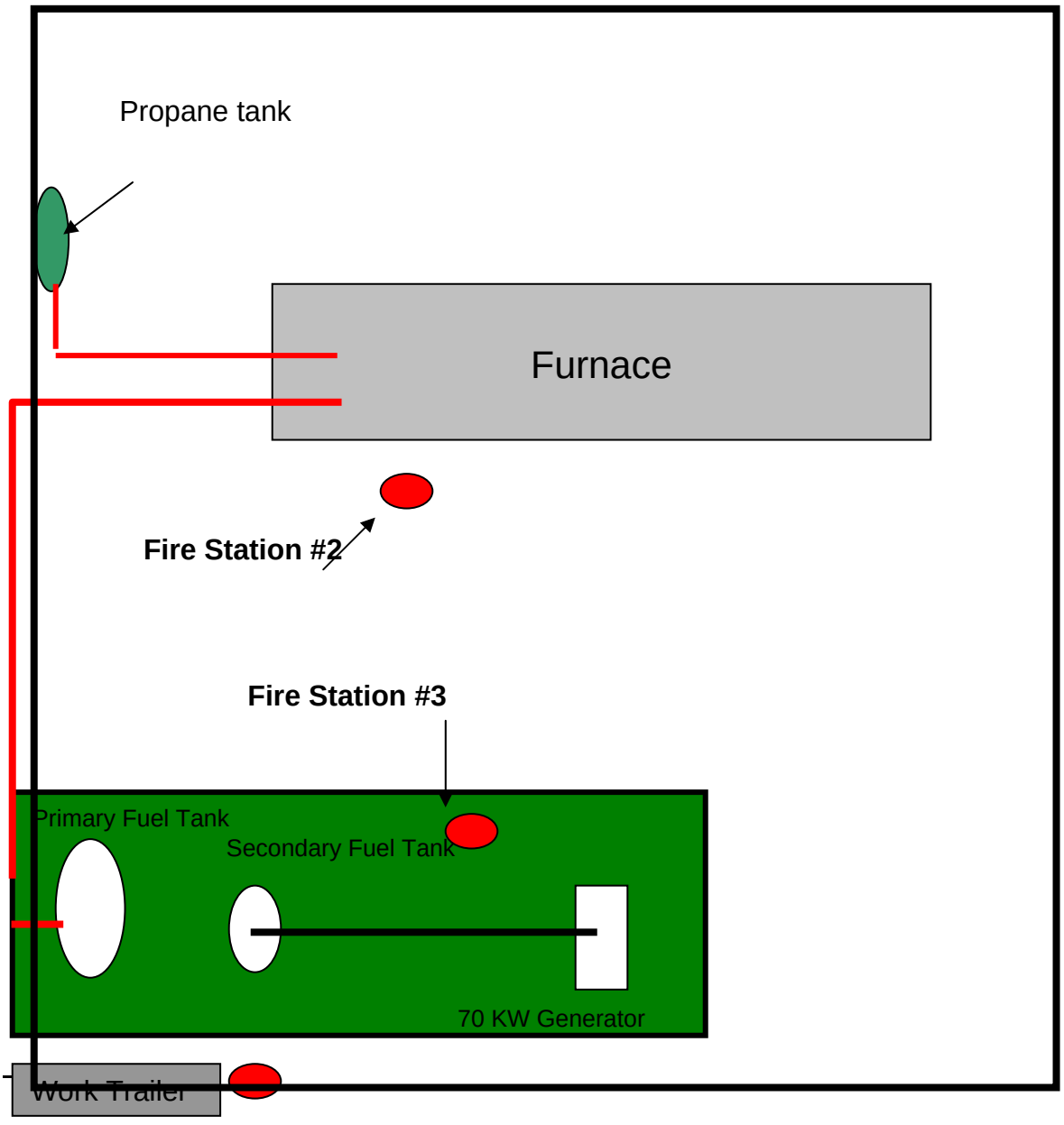
12.9 FIRE AND FIRE FIGHTING

Fire fighting will only be performed by PIKA personnel if the fire is a small scale incipient fire that can be fought with portable fire extinguishers. Once the fire moves past the incipient stage or if it cannot be fought safely with existing personal fire

extinguishers, PIKA personnel will evacuate the site and summon assistance from local fire department.

12.9.1 Fire Fighting Equipment

Facility layout denoting fire fighting stations and equipment are as follows;



12.9.2 Fire at Operators Station

- Sound Air Horn Alarm.
- Secure fuel sources (Propane and Fuel Oil) at Furnace.
- Push EMERGENCY STOP Button.
- Turn OFF Main Power Breaker.
- Extinguish fire with portable fire extinguisher.

  NOTE: **If fire cannot be extinguished**…

  1. Evacuate operator station and personnel from compound.
  2. Notify Security Post #1 of situation.
  3. Perform the following steps during egress:
- Turn off Propane Tank Valve.
- Shut down generator.
- Engage Fuel Emergency Shut Off Button at work trailer.

If fire is extinguished, perform the following;

- Notify PIKA PM.
- Set a "Re-flash" watch.
- Lock-out/Tag-out System.
- Assess the situation.
- Phone report to PIKA Site Supervisor, make recommendations.
- Determine possible causes of ignition.
- Correct if possible.
- Commence Clean-up operations.
- Debrief at PIKA Office with essential site personnel.

12.9.3 Fire at Fuel Tank(s)

- Sound Air Horn Alarm.
- Equipment Operator evacuate equipment to egress side of compound.
- Secure fuel sources (Propane and Fuel Oil) at Furnace.
- Push EMERGENCY STOP Button.
- Turn OFF Main Power Breaker.
- **Furnace Operator** egress with #2 Fire Extinguisher and commence fire fighting efforts.
- **Furnace Supervisor** take #1 Fire extinguisher from work trailer, engage Fuel Emergency Shut Off Button en-route to extinguish fire.
- Fire Station (extinguisher) #3 is located at Fuel Tank exclusion area if required.
- Use Fire Blanket located at Fuel Tank exclusion area as appropriate.
- If fire extinguishers are expended, and fire is still burning, initiate emergency evacuation procedures.

12.10 EVACUATION

In the case of an emergency situation, such as fire or explosion, the air-horn will be sounded (by the Furnace Supervisor) for 10 seconds. This is the audible alarm to initiate evacuation of the Flashing Furnace Facility. Personnel will evacuate and assemble at the main assembly area account for personnel. Notifications will be made and a designated person(s) will wait at the assembly area until given further response directions. Evacuation and treatment of potential victims or casualties must be considered.

12.11 SITE SHUT DOWN

Reasonable efforts will be made to secure fuel and electrical sources when the evacuation alarm is sounded (these steps will most likely have already been accomplished).

12.12 EXPLOSION

If an explosion were to occur anywhere on the site, PIKA personnel will immediately evacuate the site and perform the following:

- Secure Site - perform damage control as situation dictates, do not further endanger personnel.
- Notifications - Immediately notify the PIKA PM and CSHM.
- Evacuate - Evacuate personnel to designated assembly point.
- Administer First Aid - Perform First Aid/CPR as necessary and secure injured employee until professional medical personnel arrive; OR, for minor non-emergency injuries or chemical exposure requiring medical treatment beyond First Aid, the victim will be transported to the designated hospital.

12.13 TORNADO, FLOOD, ELECTRICAL/THUNDERSTORM

The key factor here is anticipation and prior knowledge obtained from weather reports.

- Secure site well in advance of the anticipated severe inclement weather.
- For notification discuss Emergency Action Strategy with the Client Environmental Coordinator and take appropriate action.

SHORT-STEP START UP PROCEDURE

1. Open Fuel supply valves .
2. Release the EMERGENCY STOP.
3. Press the BLOWER START pushbutton.
4. BURNER CONTROL switch on Main Panel to Low Fire.
5. Remote BURNER CONTROL switch to Control.
6. Verify High Temp Limit Set Point.
7. When limits for burner operation are satisfied, LIMITS SET indicator flashes.
8. Press LIMIT SET pushbutton.
9. After Limits have been set, and the air control motor has reached full open position, The PURGING Indicator will flash.
10. After the air control motor reaches Low Fire, The PURGING indicator gMD out, The local and remote START pushbuttons indicators will flash.
11. Press and hold the START Pushbutton for 3 seconds.
12. PILOT Indicators Light (#1 then #2).
13. After the Pilot Timer has completed it's 10 second delay, both PILOT indicators will extinguish, and the MAIN FLAME indicators will light.
14. Move the Remote BURNER CONTROL selector switches to CTRL (The Burners will Ramp Up until the desired temperature has been reached).
15. Proceed with treatment.
16. To return the Burner to Low Fire, move the BURNER CONTROL selector to the LOW FIRE position.
17. To terminate Burner operation, move either the remote or local BURNER CONTROL switches to OFF.
18. After the BURNER is turned OFF, Start the COOLING FAN, run until the temperature reaches 180 Degrees F or less.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide PIKA personnel with master copies of safety and health forms referenced in PIKA's 300-Series Construction and Decontamination and Demolition (D&D) ESHPs.

2.0 SCOPE

This ESHP applies to all PIKA projects where PIKA personnel are engaged in activities that require the use of a specific form as outlined in the relevant 300-Series ESHPs. The forms in this ESHP are to be the only acceptable versions of the 300-Series forms to be used. Future revisions to these forms and the subsequent distribution of the revised edition will be made using PIKA's Document Control Program.

3.0 REFERENCES

No Federal, state or local regulations apply to this ESHP. However, the following PIKA policies and procedures are applicable to the implementation of this ESHP.

- The PIKA Corporate Environmental Safety and Health Program (CESHP) .
- The PIKA ESHP-525, Site Safety and Health Officer (SSHO) ESHP.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) is responsible for both quality and safety on projects to which they are assigned. As such, the PM will be responsible for personnel utilizing these forms do so in a manner that effectively and efficiently captures all required project data. The PM will also make sure that the Site Supervisor (SS) is provided ample administrative supplies to allow for the effective storage, maintenance and archiving of all project-related D&D forms.

4.2 SITE SUPERVISOR

The SS will implement this ESHP as needed and evaluate the utilized forms to determine that they are used and properly completed by site supervisory personnel when they required by the CESHP or the ESHPs that apply to work conducted on the site. Where called upon by a form, the SS will review the form contents for completeness and accuracy and sign in the appropriate space provided.

4.3 SITE SAFETY AND HEALTH OFFICER

The SSHO will conduct periodic inspections of the D&D forms relevant to the project to determine if they are properly used, completed, stored, and maintained for the duration of the project. The SSHO will assist the SS as needed in the preparation of the D&D forms and at the completion of the project to verify effective archiving of the data.

Prior to the conduct of project tasks, the SSHO will review all relevant ESHPs and will make sure that all forms referenced in the ESHPs are completed in a timely and effective manner.

5.0 PROCEDURES

No procedures are required of this ESHP.

6.0 AUDIT CRITERIA

All forms attached to this document may be considered auditable items if they are required by a PIKA ESHP that applies to on-site operations.

7.0 ATTACHMENTS

The following forms are attached to this ESHP.

ESHF-301.....Crane Inspection Checklist
ESHF-302.....Hot Work Permit
ESHF-303.....Scaffolding Inspection Checklist
ESHF-304.....Fall Protection Inspection Checklist

MFG.	MODEL#	SERIAL#	DATE:

For All Conditions Check The Appropriate Box S=Satisfactory U=Unsatisfactory Na=Not Applicable

	CONDITIONS	S	U	NA	Number Item for Reference Remarks
Fluid Level	1. Crankcase Oil				
	2. Coolant				
	3. Hydraulic oil				
CAB(s)	4. Electrical System				
	5. House Lock				
	6. Service/Parking Brake				
	7. Swing Brake/House Lock				
	8. Gauges				
	9. Housekeeping				
	10. Fire Extinguisher(s)				
	11. Load Chart				
	12. Windows/Mirrors				
Functions	13. Travel				
	14. Steering				
	15. Outriggers				
	16. Boom Up/Down				
	17. Hoist(s) Up/Down				
	18. Swing				
Safety Devices	19. Anti-Two Block				
	20. LMI/Load wt. Indicator				
	21. Boom length indicator				
	22. Boom angle indicator				
	23. Lights/Locks/Buzzers				
	24. Back-up Alarm/Horn				
	25. Boom kick-out				
Booms, Jibs & Accessories	26. Load Block/Ball Hooks				
	27. Safety Latches				
	28. Wedge Sockets				
	29. Sheaves				
	30. Wire Rope Retainers				
	31. Main Boom				
	32. Jib/Extension				
Lower Works	33. Tires/Inflation				
	34. Carrier/Car body				
	35. Shoes/Tracks/Chain				
	36. Outriggers				
	37. Machine Guards				
	38. Hoist Brakes/Clutches				
Upper Works	39. Hoses/Tubing				
	40. Hoists				
	41. Wrapping on Drums				
	42. Rope Reeving				
	43. Wire Rope				
	44. Gantries/Bridles				

Consult operator's manual for additional inspection items. Do not operate crane until unsafe conditions are corrected.

Operator Signature _____ Supervisor Signature _____

Date: _____ Time: _____
Location: _____
Issued To: _____
Site Safety Officer: _____
Supervisor: _____

Do not cut or use open-flame or spark producing equipment until the following precautions have been taken:

Protective Equipment Used: _____
_____
_____

Initial Each Item:

_____ The location where the work is to be done has been personally examined and found free of flammable or explosive hazards.
_____ Any available fire protection systems are in service.
_____ here are no flammable dusts, vapors, liquids, or unpurged tanks (empty) in the area.
_____ Gas Meter reading is <10% LEL (if there is a potential for flammable/explosive atmosphere).
_____ All combustibles have been moved away from the operation, or otherwise protected with fire curtains or equivalent.
_____ Ample portable fire extinguishing equipment has been provided, inspected and found to be serviceable.
_____ Arrangements have been made to patrol the area at least 1/2 hour after the work has been completed.
_____ The phone number for the local fire department is _____

This form must be filled out daily whenever HOT WORK is being conducted and posted at the job site.

NOTE: the following jobsite self-inspection checklist is to be used by site safety coordinators only at locations where R&R controls the work. Check "Yes" for items passing inspection. If there is a comment, check the comment box ("C") and use the COMMENT NOTE page for recording details. Items not passing inspection ("No") must be accompanied by a comment.

Project Name: _____ Date: _____

Project Location: _____

Client: _____ Site Supervisor: _____

LINE ITEM	Y	N	NA	C
CAPACITY				
1. Is the scaffold capable of supporting, without failure, its own weight and at least 4 times the maximum intended load? 1926.451(a)(1)				
2. Is the scaffold designed by a qualified person? And is the scaffold designed and loaded in accordance with that design? 1926.451(a)(6)				
SCAFFOLD PLATFORM CONSTRUCTION				
3. Are all platforms on all working levels fully planked? 1926.451(b)(1)				
4. Is the space between the platform and the uprights no more than 1 inch? 1926.451(b)(1)(I)				
5. Is the scaffold platform and walkway at least 18 inches wide? 1926.451(b)(2)				
6. Are all front edges no more than 14 inches from the face of the work? (Unless guardrails and/or personal fall arrest systems are used) 1926.451(b)(3)				
7. Are each end of the platform, unless cleated or restrained by hooks or equivalent means, extended over the centerline of its support by at least 6 inches? 1926.451(b)(4)				
8. Do platforms that are 10 feet or less in length extend over their support by more then 12 inches? And if so is the platform designed to support without tipping? 1926.451(b)(5)(i)				
9. Are platforms 10 feet or greater in length extending over their support more than 18 inches? And if so is the platform designed to support without tipping? 1926.451(b)(5)(ii)				
10. When scaffold planks are abutted to create a long platform are each abutted end resting on a separate support surface? 1926.451(b)(6)				
11. When scaffold platforms are overlapped, does the overlap only occur over supports and extend at least 12 inches, unless the platforms are nailed? 1926.451(b)(7)				
12. Are all platforms that rest on a bearer at an angle (other than a right angle) laid first? And are platforms that rest at right angles over the same bearer laid second, on top of the first platform? 1926.451(b)(8)				
13. If the platform is coated does it obscure the top or bottom of the wood surfaces? (Wood platforms cannot be covered with opaque finishes) 1926.451(b)(9)				
14. Are all scaffold components manufactured by the same manufacturer? 1926.451(b)(10)				
15. If a scaffold of dissimilar metals has been used has a competent person inspected it? 1926.145(b)(11)				
SCAFFOLD ACCESS				
16. If the scaffold platform is more than 2 feet above or below a point of access, is a ladder (or equivalent) used? 1926.451(e)(1)				

LINE ITEM	Y	N	NA	C
17. Is the ladder positioned so that the bottom rung is not more than 24 inches above the scaffold supporting level? 1926.451(e)(2)(ii)				
SCAFFOLD USE				
18. Does a competent person before each work shift inspect scaffolds for defects? 1926.451(f)(3)				
19. Have clearance between scaffolds and power lines been maintained? 1926.451(f)(6)				
20. If the scaffold was moved, erected, dismantled or altered was it under the supervision of a competent person? 1926.451(f)(7)				
21. Has snow, ice, or other slippery material been cleared from the scaffold? 1926.451(f)(8)				
FALL PROTECTION				
22. At ten feet or above is personal fall arrest system or a guardrail in place? 1926.451(g)(1)(vi)				

Comments:

_____

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Inspector's Name: _____

Inspector's Signature: _____

The following jobsite self-inspection checklist is to be used by site Supervisor or Site Safety and Health Officer to evaluate compliance with OSHA requirements. Check "Y" for items passing inspection. If there is a comment, check the comment box "C" and use the COMMENT NOTE section for recording details. Items not passing inspection "N" must be accompanied by a comment. Work requiring fall protection will not be conducted until all applicable items have been checked "Y"

Project: _____ Location:_____ Date: _____

Site Supervisor: _____ Competent Person: _____

NOTE: OSHA 1926.501 - Each employee on a walking and/or working surface with an unprotected side or edge which is 6 feet or more above a lower level shall be protected from falling by the use of a personal fall arrest system, guardrails, or safety net system.

1. TRAINING: OSHA 1926.503	**Y**	**N**	**NA**	**C**
1. Employees trained to be familiar with the current OSHA fall protection standards.				
2. Employees trained to understand and recognize work area fall hazards.				
3. Employees trained to maintain, inspect, and the use of the fall protection systems.				
4. Employees trained on procedures to prevent objects from falling from elevated work areas.				
5. The training is documented. Competent person designated.				
6. Is there a Fall Protection Plan?				
2. PERSONAL FALL ARREST SYSTEM: OSHA 1926.502(d)	**Y**	**N**	**NA**	**C**
1. Full body harnesses, with shock absorbing lanyards, and self-locking snaphooks are used				
2. Lifelines, lanyards, and components are used for fall protection only and not to hoist materials.				
3. Lifelines are secured above the point of operation to an anchorage or structural member capable of supporting a minimum dead weight of 5000 pounds per employee attached to it.				
4. D-rings and snaphooks shall have a minimum tensile strength of 5000 pounds.				
5. Fall arrest systems are rigged such that an employee can neither free fall more than 6 feet, nor contact any lower level.				
6. Self-retracting lifelines and lanyards should automatically limit free fall distance to 2 feet or less.				
7. Ropes and straps (webbing) used in lanyards, lifelines, and strength components of the full body harnesses shall be made from synthetic fibers.				
3. GUARDRAIL SYSTEMS: OSHA 1926.502(b)	**Y**	**N**	**NA**	**C**
1. Top-rails shall be 42 inches high and Mid-rails shall be 21 inches above the walking level.				
2. The guardrail systems shall be capable of withstanding a force of at least 200 pounds in any outward or downward direction, at any point along the top edge.				
3. The guardrail systems shall be surfaced as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing.				
4. Steel banding and plastic banding shall not be used as top rails or midrails.				
4. SAFETY NET SYSTEMS; OSHA 1926.502(c)	**Y**	**N**	**NA**	**C**
1. The safety net systems are 30 feet or less below elevated walking or working surface.				
2. The safety net systems shall extend outward 8 to 10 feet from the edge of the working surface.				
3. The strength of the safety net system shall be certified or tested by dropping a 400 pound, 30-inch diameter bag of sand.				

Comments:

1.0 PURPOSE

This Environmental Safety & Health Procedure (ESHP) describes work practices that are required by OSHA as described in 29 CFR Subpart N, "Cranes, Derricks, Hoists, Elevators, and Conveyors". This procedure is designed to effectively reduce the risks and hazards associated with crane operations. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP).

2.0 SCOPE

This ESHP applies to all PIKA personnel, including contractor and subcontractor personnel, and tasks involving crane operations. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues. This does not apply to 'Hammerhead' Tower Cranes since their construction and application to is not typically ESHP applicable to PIKA operations. In the event that a Tower crane is required for a given site, special requirements and plans will be developed and incorporated in the site plans.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of crane operations associated with the ESPH. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. This ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

1. OSHA 29 1926 Subpart N; Cranes, Derricks, Hoists, Elevators, and Conveyors.
2. Department of Energy Standard 1090-2004 Hoisting and Rigging.
3. Mobile Power Crane and Excavator and Hydraulic Crane Standards PCSA Standard No.4.
4. American National Standards B.30.5.
5. USACE EM 385-1-1, Section 15 (Rigging) and Section 16.C (Cranes and Derricks).

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the personnel and equipment resources needed to implement this ESHP. The PM will also determine if the requirements in this ESHP are relevant to the site and will incorporate this ESHP into site specific plans, procedures and training for sites where this ESHP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will implement this ESHP for operations that involve personnel exposure to falls and involve the use of crane systems and devices. SS will also discuss the relevant sections of this ESHP in the daily safety briefings. The SS will document information related to the daily implementation of this ESHP in appropriate site documentation logs and forms.

4.3 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA Corporate Environmental Safety and Health Program, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to the implementation of this ESHP and the protective measures used to safeguard site personnel.
4. Periodically auditing PIKA work sites to determine compliance with this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for assisting the SS and site personnel with the identification of safety and health hazards and the use of control techniques associated with this ESHP. The SSHO will assist the SS with the discussion of the requirements in this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will inspect site operations and conditions to make determine their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 DEFINITIONS

As used in this ESHP, the following definitions shall be applied:

1. Jib – A jib is the extension attached to the boom point to provide added boom length for lifting specified loads. The jib may be in line with the boom or offset to various angles.
2. Auxiliary Hoist – A secondary hoist rope system used either in conjunction with, or independently of, the main hoist system.
3. Boom – The long, usually fabricated, part of a crane that makes it possible for the load sheaves to be maneuvered directly over the load to be lifted.

6.0 PROCEDURES

6.1 GENERAL SAFETY REQUIREMENTS

The following general safety requirements will apply to all crane operations:

1. All reciprocating, rotating, or moving parts will be guarded to prevent possible employee contact or hazard.
2. The swing radius will be barricaded to prevent an employee from being struck by, or crushed by the rotating superstructure of the crane.
3. All cab glass will be safety glass and free of defects.
4. A fire extinguisher of at least 5 BC units will be available in all cabs or operating stations.
5. Cranes will be set up on a firm surface and be leveled prior to operation.
6. No modifications that effect capacity or safe operation will be made to a crane without the approval of the manufacturer's written approval.
7. Crane operations and equipment will comply with Mobile Power Crane and Excavator and Hydraulic Crane Standards PCSA Standard No.4.

6.2 CRANE INSPECTION

A competent person or agency will perform an annual inspection on each crane or boom truck. A record of this inspection will be kept on the crane or boom truck, at the project office, and the PIKA Corporate Office. Additionally, a competent person will inspect the crane prior to and during each use, to assure it is in safe operating condition. Deficiencies or defective parts will be promptly repaired. A project site Crane Inspection Form will be used to document these inspections (ESHF-301).

6.3 WIRE ROPE REQUIREMENTS

Wire rope will be removed from service when any of the following conditions exist:

1. In running ropes, 6 randomly distributed wires are broken in one lay, or 3 wires broken in one strand in one lay.
2. In standing ropes, there are more than 2 broken wires in one lay in sections between end connections, or more than one broken wire at an end connection.
3. Wear or corrosion exceeds one-third of the original diameter of outside wires.
4. Or reduction of normal rope diameter due to stretching, in accordance with WCB regulation 54.18.
5. Kinking, crushing, bird caging, or any other damage which distorts the rope structure.
6. Evidence of heat damage from any cause or source.
7. Reduction from nominal diameter of:
   - More than 1/64" for up to and including 5/16"
   - More than 1/32" for 3/8" to ½"
   - More than 3/64" for 9/16" to ¾"
   - More than 1/16" for 7/8" to 1 1/8"

- More than 3/32" for 1 ¼" to 1 1/2"

8. In standing ropes, more than two broken wires in one lay in sections beyond end connections, or more than one broken wire at an end connection.
9. Wire rope safety factors will be in accordance with American National Standards Institute B.30.5-1968 or SAE J959-1966.

6.4 OPERATING PRACTICES

Crane operators will comply with the manufacturer's ratings and limitations. Rated load capacities, recommended operating practices, standard hand signals and special hazard warnings will be posted on applicable equipment, and be visible to the operator. Additionally, the following practices shall be generally applied to crane operations:

1. Hoisting will be performed in a smooth, controlled manner.
2. Practices that apply a side load to the bottom of the load, such as dragging a load so it can be lifted, are not permitted.
3. Employees must be kept clear of suspended loads.
4. Operators will not leave the controls while a load is suspended.
5. Custom-made lifting devices, such as lifting beams, must be designed by a qualified engineer and will be proof tested to 125% of its rated load prior to its initial use. Records will be kept at the job site.
6. Tag lines will be used on loads unless they create a hazard.

6.5 FACTORS WHICH DECREASE CRANE CAPACITY:

Some cranes, due to their construction, do not have full lifting capacity throughout their axis of rotation and boom length. Consult the manufacturer's manual to determine if restrictions for "over front", "over side", or "over rear" exist. Additional factors that may decrease crane capacity include:

1. As boom length increases, capacity decreases.
2. As boom angle increases, capacity decreases.
3. As load radius increases, capacity decreases.

The lifting capacity on the jib is often significantly less than the lifting capacity of the main boom, and is often more restricted in permissible boom angles. Consult the manufacturer's manual for specific information. Also consult the manufacturer's manual before attempting a lift on rubber. At no time is there any factor that increases crane capacity beyond those shown on the load charts. Follow the charts and instructions.

6.6 OPERATIONS NEAR ELECTRICAL LINES

Overhead wires will be considered energized unless the Owner or the utility company indicates it has been de-energized and visibly grounded. Except where wires have been de-energized and grounded, or where insulating barriers have been erected to prevent

contact with the wires, the following operating clearances must be maintained between equipment and wires;

1. For lines rated 50kV or less: 10 feet.
2. For line rated over 50 kV: 10 feet plus 0.4 inches for each kV over 50 kV.
3. For equipment **in transit with boom lowered and no load,** the following clearances apply:
   - For lines rated 50 kV or less: 4 feet.
   - For lines rated at 50 kV to 345 kV: 10 feet.
   - For lines rated at 345 to 750 kV: 16 feet.

A designated spotter will be assigned to monitor operating clearance where the operator cannot visually monitor the crane movement. A direct line of communications must be in place between the spotter and operator.

6.7 CRANE SUSPENDED PERSONNEL PLATFORM

6.7.1 General Requirements

The use of a crane to hoist employees is prohibited. Exceptions to this rule occur when the use of conventional means of reaching the work site, such as; personnel hoist, ladder, stairway, aerial lift, elevating work platform, or scaffold would be more hazardous, or are not possible because of structural design and/or work site conditions. When required, the safety precautions listed below will apply:

1. Hoisting will be performed in a slow, cautious manner, with no sudden movement of the crane or personnel platform.
2. Load lines will have a 7:1 safety factor, except where rotation resistant rope is used, which will have a 10:1 safety factor.
3. Load and boom hoist drum brakes, swing brakes, and locking devices such as pawls or dogs, will be engaged when the occupied personnel platform is in a stationary working position.
4. The crane will be level and on firm footing. Outriggers (if equipped) will be fully deployed.
5. The use of machines having live booms (booms in which lowering is controlled by a brake without aid from other devices which slow the lowering speeds) is prohibited.
6. The boom angle indicator must be functional and in view of the operator.
7. Cranes with telescoping booms will be equipped with a device to indicate to the operator the boom length, or the load radius will be accurately determined prior to hoisting personnel.
8. Cranes will be equipped with a positive-acting anti-two-blocking device (i.e., a device that stops hoisting before two-block occurs).

9. The crane will be capable of lowering the personnel platform under power ("power down"). Free fall is prohibited.
10. Platform operations will be stopped in dangerous weather or other impending danger.
11. Employees being hoisted will have direct visual or radio contact with the operator.
12. All employees in the personnel platform must utilize a body belt/harness system with lanyard appropriately attached to the lower load block or overhaul ball or to a structural member within the personnel platform capable of supporting a fall impact for employees using the anchorage.

6.7.2 Personnel Platform Design and Specifications

The personnel platform and suspension system will be designed by a qualified engineer/qualified person competent in structural design and will meet the requirements contained in 29 CFR 1926, Subpart N, as well as the following:

1. The suspension system will be designed to minimize tipping of the platform caused by employee movement.
2. Personnel platform guardrails must meet the requirements of Subpart M of 29 CFR 1926, the OSHA Standards for the Construction Industry.
3. Personnel platforms will be enclosed from the toe board to mid-rail with either solid construction, or metal mesh with maximum opening of ½ inch.
4. Personal platforms will have a grab rail inside the perimeter for the use by employees.
5. Access gates will swing inward, and will have a restraining device to prevent accidental opening.
6. Employees will have adequate room to stand on the platform, and will be provided overhead protection where an overhead hazard exists.
7. Rough edges that employees may come in contact with are not permitted.
8. A qualified welder will perform any welding on the personnel platform or its components.
9. The personnel platform will have a plate or permanent marking that indicates its weight and rated load capacity.

6.7.3 Personnel Platform Loading

Loads will be evenly distributed and will not exceed the rated load capacity of the personnel platform. Personnel platforms will be used only for employees, their tools, and the materials necessary to perform their work. Personnel platforms will not be used to lift tools or material when not lifting a person. Tools and materials will be secured to prevent displacement.

6.7.4 Personnel Platform Rigging

When personnel platforms are used, the following requirements will apply to the rigging:

1. Multi-leg slings will have a master link to enable even distribution of the load among the legs.
2. Hooks on balls or load blocks will have a positive locking latch.
3. All rigging and wire will have a 5:1 safety factor, except where rotation resistant rope is used which will have a 10:1 safety factor.
4. Shackles will be bolt-type anchor shackles, which require the use of a nut, bolt and pin for closure.
5. All eyes in wire rope slings will be fabricated with thimbles.
6. Personnel platform rigging will not be used for any other purpose.

6.7.5 Pre-Lift Meeting

A meeting will be held with all personnel involved in the personnel platform lift to review this section and the work procedures to be followed. This meeting will be held at each new work or crane location and repeated for employees new to the operation.

6.7.6 Trial Lift, Inspection and Proof Testing

A trial lift duplicating the path of the actual lift will be performed prior to the actual lift with an occupied personnel platform. Trial lifts will be performed according to the following:

1. The operator will determine if the crane and lift are safe, and that the crane will not exceed 50 percent of its rated capacity at any point during the lift.
2. Trial lifts will be repeated if the crane has moved, or if the lift route is changed.
3. After the trial lift and prior to the actual lift, the platform will be lifted a few inches and inspected to determine that it is still balanced and secure.
4. The platform and its rigging will be inspected for any defects. Defects must be corrected prior to hoisting personnel.

6.7.7 Proof Testing of Personnel Platforms

At each job site, prior to hoisting employees and after any repair or modification, the platform and rigging will be proof tested to 125% of the platforms rated load capacity. The proof testing will be performed by holding the platform in a raised position with the test load evenly distributed on the platform. This may be done at the same time as the trial lift. After the proof test has been conducted, the platform will be re-inspected. Proof testing requirements will be satisfied prior to hoisting personnel.

6.7.8 Work Practices

Employees will keep body parts inside the platform while the platform is moving. EXCEPTION: This will not apply to signalman on the platform. Before employees enter

a hoisted platform, the platform must be secured to the structure that is being worked on, unless this creates a hazard.

6.7.9 Crane Travel with Personnel Platforms

Travel is prohibited with personnel platforms except for portal, tower and locomotive cranes, unless there is no safe way to perform the work. If travel is required, the following conditions will be met:

1. Travel will be restricted to a fixed runway or track.
2. Travel will be limited to the load radius of the boom used during the lift.
3. The boom will be parallel to the direction of travel.
4. A complete trial run, including the provisions of the trial lift, must be performed prior to traveling with personnel.
5. If travel must be performed on a rubber-tired carrier, the following will apply:
   - The condition and air pressure of the tires will be checked.
   - The operation must be within 50 percent of the cranes rated capacity while operating in a pick-and-carry mode.
   - Outriggers may be partially retracted to permit travel as required.

7.0 ATTACHMENTS

None.

8.0 DOCUMENTATION

Annual Crane Inspection Record

1.0 PURPOSE

The purpose of this Environmental Safety and Health Plan (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the safe conduct of rigging operations. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to all PIKA personnel, including subcontractor personnel, and operations involving the rigging of materials. This ESHP is not intended to contain all requirements needed to for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA 29 1926.251 Subpart H; Rigging Equipment for Material Handling.
- US Army Corps of Engineers, Engineering Manual 385-1-1, Section 15, Rigging.
- Department of Energy Standard 1090-2004 Hoisting and Rigging.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the personnel and equipment resources needed to implement this ESHP. The PM will also determine if the requirements in this ESHP are relevant to the site and will incorporate this ESHP into site specific plans, procedures and training for sites where this ESHP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will implement this ESHP for operations that involve personnel exposure to falls and involve the use of rigging materials and systems. The SS will also discuss the relevant sections of this ESHP in the daily safety briefings. The SS will document information related to the daily implementation of this ESHP in appropriate site documentation logs and forms.

4.3 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA Corporate Environmental Safety and Health Program, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to the implementation of this ESHP and the protective measures used to safeguard site personnel.
4. Periodically auditing PIKA work sites to determine compliance with this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for assisting the SS and site personnel with the identification of safety and health hazards and the use of control techniques associated with this ESHP. The SSHO will assist the SS with the discussion of the requirements in this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will inspect site operations and conditions to make determine their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 PROCEDURES

This procedure addresses inspections, load ratings and general safety requirements for rigging equipment and activities.

5.1 INSPECTION

All slings and rigging equipment shall be visually inspected prior to each use and will be thoroughly inspected at regular intervals any defective slings shall be removed from service immediately.

- Makeshift couplers, reducers or hooks attached to slings shall not be used.
- Slings, which have been contacted by an electric arc, molten metal or welding slag, shall be removed from service.
- Nylon or fiber slings, which bear nicks, cuts, burns, or other damage, must not be used.
- Hooks which have opened more than 15% (throat opening measured at the narrowest point), twisted more than 10% from the original plane of the hook or show cracks, shall be deemed defective and removed from service.
- Chain slings showing defects such as deformation, stretching, cracks or gouges shall be removed from service.

Wire rope slings shall be considered unserviceable if, upon inspection, any of the following effects are found:

- In running ropes, 6 randomly distributed wires are broken in one lay, or 3 wires broken in one strand.
- In standing ropes, there are more than 2 broken wires in one lay in sections between end connections, or more than one broken wire at an end connection.
- Wear or corrosion exceeds one-third of the original diameter of outside wires.
- Or reduction of normal rope diameter due to stretching.

5.2 LOAD RATINGS

The load imposed on any sling, bridle, rope, fitting, or spreader shall not exceed the safe working load recommended by the manufacturer. The safe working load shall be warranted by the manufacturer or by a registered professional engineer and clearly marked on the lifting equipment. Additionally, the following shall apply to load ratings:

- Painting of nylon rope used as slings for the purpose of load rating identification may cause damage to the fibers from solvents and is therefore prohibited. Printed tags suitably fastened to the slings are recommended.
- The safe working load for any sling assembly shall be no greater than the rating of the weakest component.
- The rating for a sling assembly comprised of three or more legs shall be limited to the rating of three legs only.
- The safe working load of a, two-leg sling assembly, decreases as the lift angle between the legs increases.
- The rating for any sling that is used to lift at an angle of less than 90 degrees to the horizontal must be reduced in accordance with the manufacturer's recommendations.

5.3 GENERAL REQUIREMENTS

The following general requirements related to crane operation and rigging shall be implemented:

- Employees shall refrain from standing or walking beneath crane booms.
- In the event of emergency repair work of hoisting equipment with a suspended load, the area below the load shall be barricaded and the load blocked up or otherwise supported.
- Employees are not to ride loads, hooks, wrecking balls, or slings suspended from hoisting equipment.
- Side pulls shall be avoided in all cases. The load must be directly under the hoist.
- The safety latch on the hook of hoisting equipment must be in the closed position.

- Job fabricated rigging hardware will be prohibited unless designed and certified by a qualified engineer, and properly tested at 125% of the rated safe workload.
- Repairs to ropes, slings, and rigging accessories will only be done by the manufacturer or in accordance with the manufacturers written instruction and tested at 125% of their rated load.
- Shock loading is prohibited.
- Slings shall be padded or protected from sharp edges of their loads.
- Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load.
- Eyes in wire rope bridles, slings, or bull wires shall not be formed by wire rope clips or knots.
- Slings shall not be shortened with knots or bolts.

6.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The Daily Operational and Safety Logs.
- The Safety Meeting Attendance Log for the initial site hazard training.
- The Safety Meeting Attendance Log for the Daily Safety Briefing; and
- The Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

None.

1.0 PURPOSE

The purpose of this Environmental Safety and Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving welding, torch cutting or other hot work. This ESPH will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP is outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations involving welding, torch cutting or other hot work. This ESHP is not intended to contain all requirements needed to for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. This ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

1. Applicable parts of OSHA Construction Industry Standard 29 CFR Part 1926, Subpart J.
2. Applicable sections of OSHA General Industry Standard 29 CFR Part 1910, Subpart Q and Subpart H.
3. USACE EM 385-1-1, Section 10.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the personnel and equipment resources needed to implement this ESHP. The PM will also determine if the requirements in this ESHP are relevant to the site and will incorporate this ESHP into site specific plans, procedures and training for sites where this ESHP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will implement this ESHP for operations that involve personnel exposure to cutting and welding hazards and the use of cutting and welding equipment.

The SS will also discuss the relevant sections of this ESHP in the daily safety briefings. The SS will document information related to the daily implementation of this ESHP in appropriate site documentation logs and forms.

4.3 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA Corporate Environmental Safety and Health Program, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to the implementation of this ESHP and the protective measures used to safeguard site personnel.
4. Periodically auditing PIKA work sites to determine compliance with this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for assisting the SS and site personnel with the identification of safety and health hazards and the use of control techniques associated with this ESHP. The SSHO will assist the SS with the discussion of the requirements in this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will inspect site operations and conditions to make determine their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 PROCEDURES

All personnel, including contractor and subcontractor personnel, involved in welding and cutting operations shall be familiar with the potential safety and health hazards associated with the conduct of this operation, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

5.1 PREPARE WORK AREA FOR HOT WORK ACTIVITIES

Cutting and burning operations will not take place until all safety precautions have been met. The area surrounding the operations and the actual material to be welded/cut shall be inspected for ignition sources. One person shall be designated as “fire watch” during all cutting and burning operations, and the work area should be secured with ropes or barricades prior to cutting and burning activities. Site personnel will be

notified of the location and time of hot work operations. A Hot Work permit (ESHF-302) will be completed prior to cutting and burning of any material.

5.2 EQUIPMENT INSPECTION AND USE

Equipment used for cutting and burning operations shall be thoroughly inspected prior to start-up. The SS or SSHO will document this inspection in the site operational or safety log.

5.3 SAFETY HAZARDS AND OPERATIONAL CONTROL TECHNIQUES

5.3.1 *General Procedures*

Welders/cutters and their supervisors shall be trained in the safe operation of welding/cutting equipment, safe welding/cutting procedures, and respiratory and fire protection. Additionally, the following will be conducted:

1. Welding/cutting equipment will be inspected prior to use;
2. Personnel in the affected area shall be protected from welding rays, flashes, sparks, molten metal, and slag.
3. Welding/cutting equipment and operations shall be IAW the standards and recommended practices found in ANSI Z49.1.
4. Respiratory protection will be supplied if welding/cutting generate hazardous metals such as antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, ozone, selenium, silver or vanadium.
5. Suitable fire protection and fire watch procedures shall be implemented to protect the welder/cutter, property and site personnel; and
6. Welders/cutters will be provided with applicable PPE to aid their protection from heat, fire, slag, molten metal and welding ray/flash hazards.

5.3.2 *General Requirements for Gas Cylinders*

When gas cylinders are used on site, the following general provisions shall be met:

1. Cylinders, whether full or empty, shall not be used as rollers or supports.
2. No individual other than the gas supplier shall attempt to mix gases in a cylinder, no one except the owner of the cylinder, shall refill a cylinder, and no one shall use a cylinder's contents for purposes other than those intended by the supplier.
3. Cylinders used shall meet the Department of Transportation requirements published in 49 CFR Part 178, Subpart C, Specification for Cylinders.
4. No damaged, defective or leaking cylinders shall be used; and
5. Only cylinders with current hydrostatic test dates will be allowed in the work area. Cylinders without current test dates will be returned to the supplier.

5.3.3 *Handling and Storing Compressed Gas Cylinders*

Compressed gas cylinders shall be handled and stored according to the following:

1. Valve protection caps shall be in place and secured.
2. When cylinders are hoisted, they shall be secured on a cradle, sling board, or pallet.
3. They shall not be hoisted or transported by means of magnets or choker slings, and are never lifted by the protective cap.
4. Cylinders shall be moved by tilting and rolling them on their bottom edges, they shall not be intentionally dropped, struck, or permitted to strike each other violently.
5. When cylinders are transported by vehicle, they shall be secured in a vertical position.
6. Bars shall not be used under valves or valve protection caps to pry cylinders loose when frozen, rather warm, not boiling, water shall be used to thaw cylinders loose.
7. Unless cylinders are firmly secured on a special carrier intended for this purpose, regulators shall be removed and valve caps put in place before cylinders are moved.
8. A suitable cylinder truck, chain, or other securing device shall be used to keep cylinders from falling or being knocked over while in use.
9. When work is finished, cylinders are moved at any time, or cylinders are empty, the cylinder valve shall be closed, and the cutting/welding hose/regulator assembly will be removed and the valve cap replaced securely; and
10. Compressed gas cylinders shall be secured in an upright position at all times except, if necessary, for short periods of time while cylinders are actually being hoisted or carried.

5.3.4 *Placing Cylinders*

Compressed gas cylinders shall be placed in accordance with the following:

1. Cylinders will be stored in a cool, dry, well protected location at least 20 feet from highly combustible materials.
2. The storage area must be well marked, with NO SMOKING signs posted in the immediate vicinity.
3. Cylinders shall be kept far enough away from the actual welding or cutting operation so that sparks, hot slag, or flame will not reach them, or if this is impractical, fire resistant shields shall be utilized to protect the cylinders and hose/regulator assemblies.
4. Cylinders shall be placed where they cannot become part of an electrical circuit, and electrodes shall not be struck against a cylinder to strike an arc.
5. Fuel gas cylinders shall be placed with valve end up whenever they are in use. They shall not be placed in a location where they would be subject to open flame, hot metal, or other sources of artificial heat.
6. Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined spaces; and

7. Oxygen cylinders in storage shall be separated from fuel cylinders or other combustibles (especially oil and grease) by a distance of at least 20 feet, or by a non-combustible fire barrier of at least five feet in height, with a fire rating of at least one hour.

5.3.5 *Use of Fuel Gas*

Before a regulator to a cylinder valve is connected, the valve shall be opened slightly and closed immediately. (This action is generally termed "cracking" and is intended to clear the valve of dust or dirt that might otherwise enter the regulator.) The person cracking the valve shall stand to one side of the outlet, not in front of it. The valve of a fuel gas cylinder shall not be cracked where the gas would reach welding work, sparks, flame, or other possible sources of ignition.

The cylinder valve shall always be opened slowly to prevent damage to the regulator. For quick closing, valves on fuel gas cylinders shall not be opened more than 12 turns. When a special wrench is required, it shall be left in position on the stem of the valve while the cylinder is in use so that the fuel gas flow can be shut off quickly in case of emergency. In the case of coupled cylinders, at least one wrench for uncoupling shall always be available for immediate use. Nothing shall be placed on top of a fuel gas cylinder that may damage the safety device or interfere with the quick closing of the valve.

Fuel gas shall not be used through torches or other devices equipped with shutoff valves without the cylinder or manifold being attached to a pressure-reducing regulator. Before a regulator is removed from a cylinder valve, the cylinder valve will be closed and the gas released from the regulator. If a leak is found around the valve stem when the valve on a fuel gas cylinder is opened, the valve shall be closed and the gland nut tightened. If this action does not stop the leak, the use of the cylinder shall be discontinued, and it shall be properly tagged and removed from the work area. In the event that fuel gas should leak from the valve stem, and the gas cannot be shut off, the cylinder shall be properly tagged and removed from the work area. If a regulator attached to a cylinder valve will effectively stop a leak through the valve seat, the cylinder need not be removed from the work area. If a leak should develop at a fuse plug or other safety device, the cylinder shall be removed from the work area.

5.3.6 *Fuel Gas and Oxygen Manifolds*

Fuel gas and oxygen manifolds will be used according to the following:

1. Fuel gas and oxygen manifolds shall bear the name of the substance they contain in letters at least 1-inch high which shall be either painted on the manifold or on a sign permanently attached to it.
2. Fuel gas and oxygen manifolds shall be placed in safe, well ventilated, and accessible locations, and they shall not be located within enclosed spaces.

3. Manifold hose connections, including both ends of the supply hose that lead to the manifold, shall be such that the hose cannot be interchanged between fuel gas and oxygen manifolds and supply header connections.
4. Adapters shall not be used to permit the interchange of hose.
5. Hose connections shall be kept free of grease and oil.
6. When not in use, manifold and header hose connections shall be capped; and
7. Nothing shall be placed on top of a manifold that will damage the manifold or interfere with the quick closing of the valves.

5.3.7 *Hoses*

Fuel gas and oxygen hoses shall be easily distinguished from each other. The contrast may be made by different colors or by surface characteristics readily distinguishable by touch. Oxygen and fuel gas hoses shall not be interchangeable. A single hose having more than one gas passage shall not be used. When parallel sections of oxygen and fuel gas hose are taped together, not more than 4 out of 12 inches shall be covered by tape.

All hose carrying acetylene, oxygen, natural or manufactured fuel gas, or any gas or substance that may ignite or enter into combustion or be harmful to employees, shall be inspected at the beginning of each working shift. Defective hose shall be removed from service. Additionally, hose which has been subject to flashback, or which shows evidence of severe wear or damage, shall be tested to twice the normal pressure to which it is subject, but in no case less than 300 psi. Defective hose, or hose in doubtful condition will not be used.

Hose couplings shall be the type that cannot be unlocked or disconnected by means of a straight pull without rotary motion. Boxes used for the storage of gas hose shall be ventilated, and hoses, cables, and other equipment shall be kept clear of passageways, ladders and stairs.

5.3.8 *Torches*

Torches used for cutting or welding will be used and maintained in accordance with the following provisions:

1. Clogged torch tip openings shall be cleaned with suitable cleaning wires, drills, or other devices designed for such purpose.
2. Torches in use shall be inspected at the beginning of each working shift for leaking shutoff valves, hose couplings, and tip connections. Defective torches shall not be used.
3. Torches shall be lighted by friction lighters or other approved devices, and not by matches or from hot work.

5.3.9 *Regulators and Gauges*

Oxygen and fuel gas pressure regulators, including their related gauges, shall be in proper working order while in use.

5.3.10 *Oil and Grease Hazards*

Oxygen cylinders and fittings shall be kept away from oil or grease. Cylinders, cylinder caps and valves, couplings, regulators, hose, and apparatus shall be kept free from oil or greasy substances and shall not be handled with oily hands or gloves. Oxygen shall not be directed at oily surfaces, greasy clothes, or within a fuel oil or other storage tank or vessel.

5.3.11 *Arc Welding*

5.3.11.1 Manual Electrode Holders

Manual electrode holders will be used in accordance with the following requirements:

1. Only manual electrode holders which are specifically designed for arc welding and cutting, and are of a capacity capable of safely handling the maximum rated current required by the electrodes, shall be used.
2. Any current-carrying parts passing through the handle that is held by either the welder or cutter shall be fully insulated against the maximum voltage encountered to ground.

5.3.11.2 Welding Cables and Connectors

Arc welding cables and connectors will be used in accordance with the following requirements:

1. All arc welding and cutting cables shall be of the completely insulated, flexible type, capable of handling the maximum current requirements of the work in progress, taking into account the duty cycle under which the arc welder or cutter is working.
2. Only cable free from repair or splices for a minimum distance of 10 feet from the cable end to which the electrode holder is connected shall be used, except that cables with standard insulated connectors or with splices whose insulating quality is equal to that of the cable are permitted.
3. When it becomes necessary to connect or splice lengths of cable one to another, insulated connectors with a capacity equivalent to that of the cable will be used.
4. If connections are effected by cable lugs, they shall be securely fastened together to give good electrical contact, and the exposed metal parts of the lugs shall be completely insulated; and
5. Cables in need of repair shall not be used, and when a cable, other than the cable lead referred to in subparagraph (2) of this paragraph, becomes worn to the extent of exposing bare conductors, the portion exposed shall be protected by means of rubber and friction tape or other equivalent insulation.

5.3.11.3 Ground Returns and Machine Grounding

When arc welding equipment is used, the following shall apply to machine grounding:

1. A ground return cable shall have a safe current carrying capacity equal to or exceeding the specified maximum output capacity of the arc welding or cutting unit which it services.
2. When a single ground return cable services more than one unit, its safe current-carrying capacity shall equal or exceed the total specified maximum output capacities of all the units that it services.
3. When a structure or pipeline is employed as a ground return circuit, it shall be determined that the required electrical contact exists at all joints.
4. The generation of an arc, sparks, or heat at any point shall cause rejection of the structures as a ground circuit.
5. When a structure or pipeline is continuously employed as a ground return circuit, all joints shall be bonded, and periodic inspections shall be conducted to determine that no electrolysis or fire hazard condition exists.
6. The frames of arc welding and cutting machines shall be grounded either through a third wire in the cable containing the circuit conductor or through a separate wire which is grounded at the source of the current.
7. Grounding circuits, other than the structure, shall be checked to determine that the circuit between the ground and the grounded power conductor has resistance low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

5.3.11.4 Arc Welding Operating Instructions

Personnel shall be instructed in the safe operation of arc welding and cutting as follows:

1. When electrode holders are to be left unattended, the electrodes will be removed and the holders placed or protected so that they cannot make electrical contact with personnel or conducting objects.
2. Hot electrode holders shall not be dipped in water; this may expose the operator to electric shock.
3. When the operator has occasion to leave his work or to stop work for any appreciable length of time, or when the arc welding or cutting machine is to be moved, the power supply switch to the equipment will be opened; and
4. Any faulty or defective equipment will be reported to the supervisor.

5.3.11.5 Arc Welding Shielding

Whenever practicable, arc welding and cutting operations will be shielded by noncombustible or flame-proof screens which will protect personnel from the direct rays of the arc.

5.4 FIRE PREVENTION

When practical, objects to be welded, cut, or heated will be moved to a designated safe location. If the objects cannot be readily moved, movable fire hazards in the vicinity will be taken to a safe place, or otherwise protected. Additionally, the following safety precautions will be followed:

1. If the object to be welded, cut, or heated cannot be moved and if the fire hazards cannot be removed, positive means shall be taken to confine the heat, sparks, and slag, and to protect the immovable fire hazards from them.
2. No welding, cutting, or heating shall be done where the application of flammable paints, presence of other flammable compounds, or heavy dust concentrations creates a hazard.
3. Suitable fire extinguishing equipment will be immediately available in the work area and will be maintained in a state of readiness for instant use.
4. Fire watchers shall be required whenever welding/cutting is performed in a location or under conditions where other than a minor fire could develop, or when any of the following conditions exist:
   a. Appreciable combustible material is closer than 35 feet from the welding/cutting operation.
   b. Appreciable combustible materials are farther than 35 feet from the welding/cutting operation, but are easily ignited by sparks.
   c. Wall or floor openings within 35 feet of the welding/cutting operation expose combustible materials in the adjacent areas to the potential for fire; or
   d. Combustible material is located adjacent to metal partitions which could by ignited by conduction or radiation of heat.
5. Fire watchers shall have adequate and proper fire fighting equipment readily available and be trained in the use of that equipment, and the fire alarm notification system.
6. Fire watchers will also be required to maintain their watch for 30 minutes after welding/cutting operations have ceased.
7. When welding, cutting, or heating is performed on walls, floors, and ceilings, since direct penetration of sparks or heat transfer may introduce a fire hazard to an adjacent area, the same precautions shall be taken on the opposite side as are taken on the side on which the welding is being performed.
8. To eliminate the potential for fire in an enclosed space resulting from gas escaping through leaking or improperly closed torch valves, the gas supply to the torch shall be positively shut off at some point outside the enclosed space and the hose shall be removed from the space whenever:
   a. The torch is not to be used.
   b. Or whenever the torch is left unattended for a substantial period of time, such as during the lunch period; and
   c. At the end of the work day.

9. Open end fuel gas and oxygen hoses shall be immediately removed from enclosed spaces when they are disconnected from the torch or other gas-consuming device.
10. Except when the contents are being removed or transferred, drums, pails, and other containers, which contain or have contained flammable liquids, shall be kept closed. Empty containers shall be removed to a safe area apart from hot work operations or open flames.
11. Drums, containers, or hollow structures which have contained toxic or flammable substances shall either be filled with water or thoroughly cleaned of such substances, ventilated and tested before welding, cutting, or heating is undertaken on them; and
12. Before heat is applied to a drum, container, or hollow structure, a vent or opening shall be provided for the release of any built-up pressure during the application of heat.

5.5 VENTILATION FOR WELDING, CUTTING AND HEATING

5.5.1 *Mechanical Ventilation*

Mechanical ventilation should be provided for welding operations when the area contains less than 10,000 cubic feet of space per welder, the ceiling height is less than 16 feet, or structural barriers significantly prevent cross-ventilation. When mechanical ventilation is required, the air flow rate shall be 2,000 cubic feet per minute, per welder, or 100 linear feet per minute across each welder's breathing zone. For purposes of this section, mechanical ventilation shall meet the following requirements:

1. Mechanical ventilation shall consist of either general mechanical ventilation systems or local exhaust systems.
2. General mechanical ventilation shall be of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fumes and smoke exposures below the limits as defined in the Z-tables in 29 CFR 1910.1000.
3. Local exhaust ventilation shall consist of freely movable hoods intended to be placed by the operator as close as practicable to the work, and this system shall be of sufficient capacity and so arranged as to remove fumes and smoke at the source to keep the fume/smoke concentration within safe limits as defined in Subpart D, 29 CFR 1926.
4. Contaminated air exhausted from a working space shall be discharged into the open air or otherwise clear of the source of intake air.
5. All air replacing that withdrawn shall be clean and respirable; and
6. Oxygen shall not be used for ventilation purposes, comfort cooling, blowing dust from clothing, or for cleaning the work area.

5.5.2 *Ventilation for Welding, Cutting, and Heating in Confined Spaces*

Except as provided in above, either general mechanical or local exhaust ventilation meeting the requirements of paragraph (5.1) of this section shall be provided whenever welding, cutting, or heating is performed in a confined space.

When sufficient ventilation cannot be obtained without blocking the means of egress, the personnel in the confined space shall be protected by airline respirators, and an individual shall be stationed outside the confined space to communicate with, and aid those working inside the space. Additional confined space precautions may be needed dependant upon the nature of the confined space and the operations being conducted in the confined space. The PIKA confined space ESHP (ESHP-504) will be consulted and implemented for any hot work conducted inside a confined space.

5.5.3 *Ventilation for Metals of Toxic Significance*

Welding, cutting, or heating in any enclosed spaces involving the metals specified in this subparagraph shall be performed with either general mechanical or local exhaust ventilation meeting the requirements listed above.

1. Zinc-bearing base or filler metals or metals coated with zinc-bearing materials.
2. Lead base metals.
3. Cadmium-bearing filler materials.
4. Chromium-bearing metals or metals coated with chromium-bearing materials.

Filter-type respirators in accordance with the requirements of Subpart E, 29 CFR 1926, shall be used to protect personnel performing such operations in the open air except that employees performing such operations on beryllium-containing base or filler metals shall be protected by air line respirators. Other personnel exposed to the same atmosphere as the welders or burners shall be protected in the same manner as the welder or burner.

5.6 PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

The following personal protective equipment shall be used in preventing or reducing exposures associated with welding and cutting operations. These requirements will be implemented unless superseded by site-specific requirements stated in the Site Safety and Health Plan.

1. Welding hoods or goggles with appropriate shades will be worn as required in Table 303-1 (on following page).
2. Leather steel-toed boots.
3. Protective clothing, such as leather welding gloves, aprons and chaps; and
4. Hardhat if required.

6.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The Daily Operational and Safety Logs.
- The Safety Meeting Attendance Log for the initial site hazard training.
- The Safety Meeting Attendance Log for the Daily Safety Briefing; and
- The Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

None.

Table 303-1: Welding Shades

Shade Welding Operation	Shade Number
Shielded metal-arc welding 1/16-, 3/32-, 1/8-, 5/32- inch diameter electrodes	10
Gas-shielded arc welding (nonferrous) 1/16-, 3/32-, 1/8-, 5/32-inch diameter electrodes	11
Gas-shielded arc welding (nonferrous) 1/16-, 3/32-, 1/8-, 5/32-inch diameter electrodes	12
Shielded metal-arc welding 3/16-, 7/32-, ¼-inch diameter electrodes	12
5/16-, 3/8-inch diameter electrodes	14
Atomic hydrogen welding	10 – 14
Carbon arc welding	14
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1 inch to 6 inches	4 or 5
Heavy cutting, over 6 inches	5 ort 6
Gas welding (light), up to 1/8-inch	4 or 5
Gas welding (medium), 1/8-inch to ½-inch...	5 ort 6
Gas welding (heavy), over ½-inch	6 or 8

1.0 PURPOSE

The purpose of this Environmental Safety and Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to ladders, stairways, and other forms of access. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to all PIKA personnel, including subcontractor personnel, and operations involving ladders, stairways and other means of access. This ESHP is intended to addresses the following issues: general safety requirements for stairways and ladders; stairway requirements; stairways in temporary service during construction; stair-rails and handrails; fixed ladders; use of all ladders, including job-made ladders; and ladder and stairway training. This ESHP is not intended to contain all requirements needed to determine regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

1. 29 CFR 1926 Subpart X; Stairways and Ladders; and
2. USACE EM 385-1-1, Section 21.D.

4.0 DEFINITIONS

As used and referenced in this ESHP, the following definitions shall apply.

1. **Equivalent -** Alternative designs, materials or methods to protect against a hazard that the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in the standard.
2. **Portable Ladder** - A ladder that can be readily moved or carried.
3. **Point of Access** - All areas used by employees for work related passage from one area or level to another. Such open areas include doorways, passageways, stairway openings, studded walls, and various other permanent or temporary openings used for such travel.

4. **Job-Made Ladder** - A ladder that is fabricated by employees, typically at the construction site, and is not commercially manufactured. This definition does not apply to any individual-rung/step ladders.
5. **Fixed-ladder -** A ladder that cannot be readily moved or carried because it is an integral part of a building or structure. A *side-step fixed ladder* is a fixed ladder that requires a person getting off at the top to step to the side of the ladder side rails to reach the landing. A *through fixed ladder* is a fixed ladder that requires a person getting off at the top to step between the side rails of the ladder to reach the landing.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the personnel and equipment resources needed to implement this ESHP. The PM will also determine if the requirements in this ESHP are relevant to the site and will incorporate this ESHP into site specific plans, procedures and training for sites where this ESHP is to be implemented.

5.2 SITE SUPERVISOR

The Site Supervisor (SS) will implement this ESHP for operations that involve personnel exposure to falls and involve the use of ladders and stairways. The SS will also discuss the relevant sections of this ESHP in the daily safety briefings. The SS will document information related to the daily implementation of this ESHP in appropriate site documentation logs and forms.

5.3 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA Corporate Environmental Safety and Health Program, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to the implementation of this ESHP and the protective measures used to safeguard site personnel.
4. Periodically auditing PIKA work sites to determine compliance with this ESHP.

5.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for assisting the SS and site personnel with the identification of safety and health hazards and the use of control techniques associated with this ESHP. The SSHO will assist the SS with the discussion of the requirements in this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will inspect site operations and conditions to make determine their initial and continued compliance with this ESHP and other regulatory guidelines.

6.0 PROCEDURES

6.1 GENERAL REQUIREMENTS FOR STAIRWAYS AND LADDERS

A stairway or ladder must be provided at all points of access where there is a break in elevation of 19 inches or more and no ramp, runway, embankment, or personnel hoist is provided. When there is only one point of access between levels, it must be kept clear to permit free passage by workers. If there are more than two points of access between levels, at least one point of access must be kept clear at all times. Fall protection systems required for stairways and ladders must be installed and inspected before employees begin work that requires them to use stairways, ladders, and the respective fall protection systems.

6.1.1 Stairway Requirements

Stairways that will not be a permanent part of the structure on which construction work is performed must have landings 30 inches deep and 22 inches wide at every 12 feet or less of vertical rise. Additionally, the following will apply:

1. Stairways must be installed at least 30 degrees, and no more than 50 degrees, from the horizontal.
2. Where doors or gates open directly onto a stairway, a platform must be free of dangerous projections such as protruding nails.
3. Stairways in temporary service during construction.
4. Except during construction of the actual stairway, stairways with metal pan landings and treads must not be used where the treads and/or landings have not been filled in with concrete or other material, unless the pans of the stairs and/or landings are temporarily filled in with wood or other material. Treads and landings must be replaced when worn below the top edge of the pan.
5. Except during construction of the actual stairway, skeleton metal frame structures and steps must not be used (where treads and/or landings are to be installed at a later date), unless the stairs are fitted with secured temporary treads and landings.
6. Temporary treads must be made of wood or other solid material, and installed the full width and depth of the stair.

6.1.2 Stair Rails and Handrails

Where stairways have four or more risers, or rising more than 30 inches, whichever is less, the stairway must have at least one handrail. Stair rails and handrails must comply with the following:

1. A stair rail also must be installed along each unprotected side or edge. When the top edge of the stair rail system also serves as a handrail, the top edge of the stair rail must not be more than 37 inches nor less than 36 inches from the surface of the tread. The handrails must not be more than 37 inches nor less than 30 inches from the upper surface of the handrail to the surface of the tread.
2. Stair rails must not be less than 36 inches above the surface of the tread.
3. Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members must be provided between the top rail and the steps of the stair rail system.
4. Handrails and the top rails of the stair rail systems must be capable of withstanding without failure, at least 200 pounds of weight applied within two inches of the top edge in any downward or outward direction, at any point along the top edge.
5. Stair rail systems and handrails must be surfaced to prevent injuries from punctures or lacerations, and to keep clothing from snagging.
6. Handrails must provide an adequate handhold for employees to grasp to prevent falls.
7. The ends of stair rail systems and handrails must be constructed to prevent dangerous projections, such as rails protruding beyond the end posts of the system.
8. Temporary handrails must have a minimum clearance of three inches between the handrails and walls, stair rail systems, and other objects.

6.1.3 General Requirements for Ladders

Double-cleated ladders or two or more ladders must be provided when ladders are the only way to enter or exit a work area for 25 or more employees, or when a ladder serves simultaneous two-way traffic. When using ladders, the following must apply:

1. Ladder rungs, cleats, and steps must be parallel, level, and uniformly spaced when the ladder is in position for use.
2. Rungs, cleats, and steps of ladders must be uniformly spread (10 to 14 inches).
3. Ladders must not be tied or fastened together to create longer sections unless they are specifically designed for such use.
4. A metal spreader or locking device must be provided on each stepladder to hold the front and back sections in an open position when the ladder is being used.
5. Two or more separate ladders used to reach an elevated work area must be offset with a platform or landing between the ladders, except when portable ladders are used to gain access to fixed ladders.

6. Ladder components must be surfaced to prevent injury from punctures or lacerations and to prevent snagging of clothing.
7. Wood ladders must not be coated with any opaque covering, except for identification or warning labels, which may be placed only on one face of a side rail.
8. The minimum clear distance between side rails for all portable ladders must be 11-1/2 inches.
9. The rungs and steps of portable metal ladders must be corrugated, knurled, dimpled, coated with skid-resistant materials, or treated to minimize slipping.

6.1.4 Fixed Ladders

Fixed ladders used on site will comply with the following:

1. A fixed ladder must be capable of supporting at least two loads of 50 pounds each, concentrated between any consecutive attachments.
2. Individual rung and stepladders must extend at least 36 inches above an access level or landing platform.
3. Each step or rung of a fixed ladder must be capable of supporting a load of at least 250 pounds applied in the middle of the step or rung.
4. The minimum clear distance between the sides of individual rung and stepladders and the side rails of other fixed ladders must be 16 inches.
5. The rungs of individual rung and stepladders must be shaped to prevent slipping off the end of the rungs.
6. The rungs and steps of fixed metal ladders must be corrugated, knurled, dimpled, coated with skid-resistant material, or treated to minimize slipping.
7. The minimum perpendicular clearance between fixed ladder rungs, cleats, and steps, and any obstruction behind the ladder must be seven inches, except for clearance for an elevator pit ladder, which must be 4-1/2 inches.
8. The minimum perpendicular clearance between the centerline of fixed ladder rungs, cleats, and steps, and any obstruction on the climbing side of the ladder must be 30 inches. If obstructions are unavoidable, clearance may be reduced to 24 inches, provided a deflection device is installed to guide workers around the obstruction.
9. The step-across distance between the center of the steps or rungs of fixed ladders and the nearest edge of a landing area must be no less than seven inches and no more than 12 inches. A landing platform must be provided if the step-across distance exceeds 12 inches.
10. Fixed ladders without cages or wells must have at least a 15-inch clear width to the nearest permanent object on each side of the centerline of the ladder.
11. Fixed ladders must be provided with cages, wells, ladder safety devices or self-retracting lifelines where the length of climb is less than 24 feet but the top of the ladder is more than 24 feet above lower levels.

If the total length of a climb on a fixed ladder equals or exceeds 24 feet, the following requirements must be met with either:

1. Ladder safety devices;
2. Self-retracting lifelines and rest platforms at intervals not to exceed 150 feet;
3. A cage or well, and multiple ladder sections, each ladder section not to exceed 50 feet in length; or
4. A cage or well, and multiple ladder sections.

These ladder sections must be offset from adjacent sections, and landing platforms must be provided at maximum intervals of 50 feet.

The side rails of through- or side-step fixed ladders must extend 42 inches above the top level or landing platform served by the ladder. Parapet ladders must have an access level at the roof if the parapet is cut to permit passage through the parapet, if the parapet is continuous; the access level is the top of the parapet.

Steps or rungs for through-fixed-ladder extensions must be omitted from the extension, and the extension of side rails must be flared to provide between 24 inches and 30 inches clearance between side rails. When safety devices are provided, the maximum clearance between side rail extensions must not exceed 36 inches.

6.2 USE OF ALL LADDERS, INCLUDING JOB-MADE LADDERS

When portable ladders are used for access to an upper landing surface, the side rails must extend at least three feet above the upper landing surface. The ladder must be secured, and a grasping device, such as a grasp rail, must be provided to assist workers in mounting and dismounting the ladder. A ladder extension must not deflect under a load as this may cause the ladder to slip off its support. Additional ladder requirements include the following:

1. Ladders must be maintained free of oil, grease, and other slipping hazards.
2. Ladders must not be loaded beyond the maximum intended load for which they were built, nor beyond their manufacturers' rated capacity.
3. Ladders must be used only for the purpose for which they were designed.
4. The preferred pitch of fixed ladders shall be considered to come in the range of 75 degrees to 90 degrees with the horizontal.
5. Ladders must be used on stable and level surfaces unless secured to prevent accidental movement.
6. Ladders must not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental movement. Slip-resistant feet must not be used as a substitute for the care in placing, lashing, or holding a ladder upon slippery surfaces.

7. Ladders placed in areas such as passageways, doorways, driveways, or where they can be displaced by workplace activities or traffic, must be secured to prevent accidental movement, or a barricade must be used to keep traffic or activities away from the ladder.
8. The area around the top and bottom of the ladders must be kept clear.
9. Ladders must not be moved, shifted, or extended while in use.
10. Ladders must have non-conductive side rails if they are used where the worker or the ladder could contact exposed energized electrical equipment.
11. The top or top step of a stepladder must not be used as a step.
12. When ascending or descending a ladder, the worker must face the ladder.
13. Each worker must use at least one hand to grasp the ladder when moving up or down the ladder.
14. A worker on a ladder must not carry any object or load that could cause the worker to lose balance and fall.

6.3 TRAINING REQUIREMENTS

OSHA requires that who use ladders and stairways be trained to recognize hazards related to ladders and stairways and to use proper procedures to minimize these hazards. The SS/SSHO shall review the following items with employees who use ladders:

1. The nature of fall hazards in the work area.
2. The correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used.
3. The proper construction, use, placement, and care in handling of all stairways and ladders.
4. The maximum intended load-carrying capacities for the ladder system being used.

7.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The Daily Operational and Safety Logs.
- The Safety Meeting Attendance Log for the initial site hazard training.
- The Safety Meeting Attendance Log for the Daily Safety Briefing.
- The Daily Safety Inspection Checklist.

8.0 ATTACHMENTS

None.

1.0 PURPOSE

The purpose of this Environmental Safety and Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of scaffolding. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP. This ESHP will also be implemented along with the fall protection requirements outlined in PIKA ESHP-306.

2.0 SCOPE

This ESHP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations involving the use of scaffolding. This ESHP is not intended to contain all requirements needed to for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA Construction Industry Standard 29 CFR 1926 Subpart L Scaffolds.
- USACE EM 385-1-1, Section 22, Work Platforms.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the personnel and equipment resources needed to implement this ESHP. The PM will also determine if the requirements in this ESHP are relevant to the site and will incorporate this ESHP into site specific plans, procedures and training for sites where this ESHP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will implement this ESHP for operations that involve personnel exposure to falls and involve the use of fall protections systems. The SS will also discuss the relevant sections of this ESHP in the daily safety briefings. The SS will document information related to the daily implementation of this ESHP in appropriate site documentation logs and forms.

4.3 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA Corporate Environmental Safety and Health Program, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to the implementation of this ESHP and the protective measures used to safeguard site personnel.
4. Periodically auditing PIKA work sites to determine compliance with this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for assisting the SS and site personnel with the identification of safety and health hazards and the use of control techniques associated with this ESHP. The SSHO will assist the SS with the discussion of the requirements in this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will inspect site operations and conditions to make determine their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 DEFINITIONS

For the implementation of this ESHP, the following definitions will apply:

Body harness: a design of straps which may be secured about the employee in a manner to distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders, with means for attaching it to other components of a personal fall arrest system.

Brace: a rigid connection that holds one scaffold member in a fixed position with respect to another member, or to a building or structure.

Competent person: An employee who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Coupler means a device for locking together the tubes of a tube and coupler scaffold.

Fabricated decking and planking: manufactured platforms made of wood (including laminated wood, and solid sawn wood planks), metal or other materials.

Fabricated frame scaffold (tubular welded frame scaffold): a scaffold consisting of a platform(s) supported on fabricated end frames with integral posts, horizontal bearers, and intermediate members.

Fall Arrestor: any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyard, or automatic self-retracting lifeline lanyard, which dissipates a substantial amount of energy during a fall arrest or limits the energy imposed during fall arrest.

Guardrail system: a vertical barrier, consisting of, but not limited to, toprails, midrails, and posts, erected to prevent employees from falling off a scaffold platform or walkway to lower levels.

Lifeline: a component consisting of a flexible line that connects to an anchorage at one end to hang vertically (vertical lifeline), or that connects to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

Lower levels: areas below the level where the employee is located and to which an employee can fall. Such areas include, but are not limited to, ground levels, floors, roofs, excavations, pits, tanks, materials, water, and equipment.

Maximum intended load: the total load of all persons, equipment, tools, materials, transmitted loads, and other loads reasonably anticipated to be applied to a scaffold or scaffold component at any one time.

Mobile scaffold: means a powered or non-powered, portable, caster or wheel-mounted supported scaffold.

Open sides and ends: the edges of a platform that are more than 14 inches (36 cm) away horizontally from a sturdy, continuous, vertical surface (such as a building wall) or a sturdy, continuous horizontal surface (such as a floor), or a point of access.

Outrigger: the structural member of a supported scaffold used to increase the base width of a scaffold in order to provide support for and increased stability of the scaffold.

Platform: a work surface elevated above lower levels. Platforms can be constructed using individual wood planks, fabricated planks, fabricated decks, and fabricated platforms.

Rated load: the manufacturer's specified maximum load to be lifted by a hoist or to be applied to a scaffold or scaffold component.

Scaffold: any temporary elevated platform (supported or suspended) and its supporting structure (including points of anchorage), used for supporting employees or materials or both.

Unstable objects: items whose strength, configuration, or lack of stability may allow them to become dislocated and shift and therefore may not properly support the loads imposed on them.

Walkway: a portion of a scaffold platform used only for access and not as a work level.

6.0 PROCEDURES

6.1 SCAFFOLD REQUIREMENTS

Scaffolds present a significant safety hazard to personnel due to the nature of erecting the scaffold and working on an elevated platform. The items listed below are the general precautions and requirements that shall apply to the use of tube or frame scaffolds. For any other type of scaffolds, Subpart L of 29 CFR 1926 shall be consulted.

1. Guardrails, midrails, and toe boards must be installed on all open sides of scaffolds. Guardrails, midrails, and toe boards should be constructed from components furnished by the manufacturer. Where this is not possible, sound 2 x 4-inch lumber must be used for the guardrails and midrails, 1 x 4-inch lumber for the toe boards.
2. An access ladder or equivalent safe access shall be provided.Where a built-in ladder is part of a scaffold system, it shall conform to the requirements for ladders. Climbing of braces shall be prohibited.
3. Scaffold planks must be at least 2 x 10 inch full-thickness lumber, structural grade, or the equivalent.
4. Scaffolds shall be plumb and level.
5. Scaffolds (other than suspended scaffolds) shall bear on base plates upon sills or other adequate foundation.
6. Working levels of work platforms shall be fully planked or decked.
7. Scaffold planks must be cleated or secured and must extend over the end supports by at least six inches, but not by more than 12 inches.
8. Damaged scaffold members must be removed from service immediately.

9. Access ladders must be provided for each scaffold. Climbing off the end frames is prohibited unless their design incorporates an approved ladder.
10. Scaffolds must be tied off to the building or structure at intervals that do not exceed 30 feet horizontally and 26 feet vertically.
11. Scaffolds should not be overloaded. Materials should be brought up as needed. Excess materials and scrap should be removed from the scaffold when work is completed. Check 29 CFR 1926, Subpart L for tables.
12. Barrels, boxes, kegs, and similar unstable objects must never be used as work platforms or to support scaffolds.
13. Where persons are required to work or pass under a scaffold, a screen of 18-gauge, 1/2-inch wire mesh or equivalent protection is required between the toe board and the guardrail.
14. Overhead protection is required if employees working on scaffolds are exposed to overhead hazards. Such protection should be comprised of 2 x 10 inch planks or the equivalent.
15. Unauthorized personnel must not alter scaffolds or work platforms.
16. Personnel are not permitted to ride on rolling scaffolds.
17. Brakes must be locked when scaffold is not in motion.
18. Employees working from suspended scaffolds must be tied off with safety line and a full-body harness.

6.2 SCAFFOLD INSPECTION

Prior to the use of newly erected scaffolding on a jobsite, the SS/SSHO shall inspect the scaffold installation by completing a “Scaffold Inspection Checklist” (ESHF-303) to determine the scaffold compliance with OSHA requirements.

7.0 ATTACHMENTS

None.

1.0 PURPOSE

The purpose of this Environment Safety and Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures associated with fall protection systems. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to all PIKA personnel, including subcontractor personnel, and operations involving personnel exposure to fall hazards. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA 29 1926 Subpart M; Fall Protection.
- USACE EM 385-1-1, Section 21, Safe Access and Fall Protection.

4.0 DEFINITIONS

As presented below, the following definitions shall apply to this ESHP.

1. **Anchorage -** A secure point of attachment for lifelines, lanyards, or deceleration devices capable of withstanding the anticipated forces applies during a fall and is capable of supporting at least 5000 pounds.
2. **Competent Person -** One who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.
3. **Connecting Means -** A device, lanyard, or lifeline used to connect the body support to the anchorage in such a way as to provide protected movement during an elevated work task.
4. **Deceleration Device -** Any mechanism that serves to dissipate a substantial amount of energy during a fall arrest.

5. **Personal Fall Arrest System (PFAS) -** Includes the proper anchorage, body support (harness) and connecting means (lanyard and lifelines) interconnected and rigged to arrest a free fall.
6. **Full Body Harness -** A body support configured of connected straps to distribute a fall arresting force over at least the thighs, shoulders, and pelvis. The harness provides a D-ring for attaching a lanyard, lifeline, or deceleration device.
7. **Guardrail Systems -** A barrier erected to prevent employees from falling to lower levels.
8. **Lanyard -** A flexible line of rope, wire rope, or strap that generally has a connector at each end for connecting the body harness to a deceleration device, lifeline, or anchorage. Lanyards are usually 2,4 or 6 feet long and come with or without a shock absorber.
9. **Leading Edge -** The advancing edge of a floor, decking or formwork that changes location as additional sections are placed. Leading edges not actively under construction are considered to be "unprotected sides and edges," and a qualified person shall engineer appropriate methods of fall prevention.
10. **Low Slope Roof -** "Low slope roof" means a roof having a slope less than or equal to 4 in 12 (vertical to horizontal).
11. **Qualified Person -** A person who by reason of education, experience or training is familiar with the operation to be performed and the hazards involved. A qualified person must engineer the design of fall arrest systems.
12. **Warning Line System -** A barrier erected on the working surface to warn employees they are approaching an unprotected fall hazard.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the personnel and equipment resources needed to implement this ESHP. The PM will also determine if the requirements in this ESHP are relevant to the site and will incorporate this ESHP into site specific plans, procedures and training for sites where this ESHP is to be implemented.

5.2 SITE SUPERVISOR

The Site Supervisor (SS) will implement this ESHP for operations that involve personnel exposure to falls and involve the use of scaffolding systems. The SS will also discuss the relevant sections of this ESHP in the daily safety briefings. The SS will document information related to the daily implementation of this ESHP in appropriate site documentation logs and forms.

5.3 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA Corporate Environmental Safety and Health Program, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to the implementation of this ESHP and the protective measures used to safeguard site personnel.
4. Periodically auditing PIKA work sites to determine compliance with this ESHP.

5.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for assisting the SS and site personnel with the identification of safety and health hazards and the use of control techniques associated with this ESHP. The SSHO will assist the SS with the discussion of the requirements in this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will inspect site operations and conditions to make determine their initial and continued compliance with this ESHP and other regulatory guidelines.

6.0 PROCEDURES

6.1 FALL PROTECTION SYSTEMS

A fall hazard exists when any employee in a work area is exposed to a fall greater than six feet from one level to another. Before an employee begins work, one of the following fall protection systems must be provided or installed.

- Guardrails - Top edge height of top rails shall be 42 inches plus or minus 3 inches above the working/walking level. Midrails or screens will be installed between the top edge of the guardrail system and the walking/working surface. Guardrail systems will be able to withstand 200 pounds.
- Safety nets – These systems will be installed as close as practicable under the walking/working surface, but no more then 30 feet below the walking/working level. Drop tests will be performed before initial use, after a fall, and at least at six month intervals.
- PFAS - A personal fall arrest system consisting of an anchorage, connectors, body harness that may include a lanyard, deceleration device, lifeline or suitable combination of these will be utilized when necessary to protect the employee.

Additionally, the following shall apply:

- Positioning device systems shall be rigged such that an employee cannot free fall more then 2 feet and the anchorage is capable of supporting twice the potential impact of an employees load or 3,000 pounds, whichever is greater.
- The warning line system shall be erected around the sides of the roof work area.
- Control lines will be erected not less than 6 feet nor more than 25 feet from the unprotected or leading edge. The control line will extend along the entire length of the leading edge. Each line will be marked at not more than six-foot intervals with high visibility material. Each line will have a minimum breaking strength of 200 pounds.
- The employer will designate a competent person to monitor the safety of other employees while engaged in work that requires a fall protection system.
- Holes in floors, roofs, and other walking/working surfaces must have covers.
- Toeboards will be erected along the edge of the overhead walking/working surface. The toeboards will be capable of withstanding a force of at least 50 pounds. Each will be a minimum of 3 ½ inches in vertical height from their top edge to the level of the surface.
- Fall protection plans only apply to employees engaged in leading edge work, precast concrete erection work, or residential construction work who can demonstrate that it is infeasible to use conventional fall protection equipment.

6.2 SCAFFOLD ERECTION/DISMANTLING

When erecting or dismantling scaffolding employees will be protected from falls that exceed six feet. If possible, fall protection will be provided by means of a harness and lifeline connected to an anchorage above that is separate from the scaffolding. If an overhead anchorage is not available, employees will attach their harness/lanyard to a secured scaffold end frame. Scaffolds used as anchorage must be secured to the building or structure at the ten-foot level or braced to prevent tipping. Open-sided floors six feet or more above a lower level will be protected by a standard guardrail system, a safety net system, or employees shall be protected by a personal fall protection system and a warning line system. Employees engaged in skeleton steel construction and exposed to falls greater than 25 feet, will be protected with a personal fall arrest system.

6.3 TRAINING REQUIREMENTS

Employees who may be exposed to fall hazards must be trained on how to recognize the hazards of falling and how to minimize the hazards. Training must be documented with name of employee trained, date of training, and signature of the trainer. This training will include:

- A description of each fall hazard on the project and specific measures will be used to protect the employee from these hazards;
- Instruction on the use, inspection, and maintenance of fall protection equipment;

- RRIG's Fall Protection Procedure; and
- The requirements of the 29 CFR 1926, Subpart M.

6.4 FALL PROTECTION INSPECTION

Prior to the use of required fall protection systems on a jobsite, the SS/SSHO shall inspect the fall protection system by completing a Fall Protection Inspection Checklist (ESHF-304) to determine compliance with OSHA requirements.

7.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The Daily Operational and Safety Logs;
- The Safety Meeting Attendance Log for the initial site hazard training;
- The Safety Meeting Attendance Log for the Daily Safety Briefing;
- The Daily Safety Inspection Checklist; and
- The Fall Protection Inspection Checklist.

8.0 ATTACHMENTS

None.

1.0 PURPOSE

The purpose of this Environmental Safety and Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of pneumatic nail guns and staplers. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to all PIKA personnel, including subcontractor personnel, and operations involving the use of pneumatic nail guns and staplers. This ESHP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

1. OSHA General Industry Standard 29 CFR Part 1910.243 and 29 CFR 1926.302.
2. USACE EM 385-1-1, Section 13.D.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the personnel and equipment resources needed to implement this ESHP. The PM will also determine if the requirements in this ESHP are relevant to the site and will incorporate this ESHP into site specific plans, procedures and training for sites where this ESHP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will implement this ESHP for operations that involve personnel exposure to pneumatic tools and stapler. The SS will also discuss the relevant sections of this ESHP in the daily safety briefings. The SS will document information related to the daily implementation of this ESHP in appropriate site documentation logs and forms.

4.3 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA Corporate Environmental Safety and Health Program, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to the implementation of this ESHP and the protective measures used to safeguard site personnel.
4. Periodically auditing PIKA work sites to determine compliance with this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for assisting the SS and site personnel with the identification of safety and health hazards and the use of control techniques associated with this ESHP. The SSHO will assist the SS with the discussion of the requirements in this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will inspect site operations and conditions to make determine their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 PROCEDURES

All site personnel who will be involved with the use of pneumatic nail guns or staplers will read this ESHP and the manufacturer's instruction manual. When possible, a copy of the manufacturer's instruction manual will be attached to this ESHP and maintained on site with other site plans.

5.1 INITIAL TRAINING

Prior to operating a pneumatic nail gun or stapler, the operator will be trained in the proper operation of the tool. At no time will any worker attempt to operate a pneumatic nail gun or stapler without proper training. An individual with experience in the use of the tool will provide the training required by this paragraph. The training will be documented using the PIKA Safety and Health Training form. Topics to be addressed in the training shall include:

1. Daily inspection of the tool and air supply system.
2. Proper use of personal protective equipment (PPE).
3. Specifications of the tool cycling system.
4. Operational procedures related to the loading and use of the tool.

5. Adjustment of the air supply to ensure optimum function of the tool.
6. Proper lubrication, use of a line lubrication system, and removal of jammed fasteners.
7. Cold weather precautions (if needed).
8. Daily and preventative maintenance and cleaning of the tool and air supply system.

5.2 VISUAL INSPECTION

Prior to the operation of pneumatic tools each work day, the operator will visually inspect the tool, the air line(s), and the compressor to make sure no defects are present. At no time will personnel use a pneumatic tool that is observed to be defective in any manner. Defects in the tool, air line(s) or compressor will be brought to the attention of the SSHO and the tool will be removed from service until repaired by manufacturer approved service personnel. During the visual inspection, personnel will check the following tool elements:

1. Smooth trigger and work contact element movement.
2. Screw and bolt tightness.
3. Cracks, tears or excessive wear to the air line(s).
4. Smooth operation of the nail/staple loading and feeding mechanisms.
5. Excessive wear or cracking of plastic or metal parts.
6. Damage to any parts.

5.3 GENERAL SAFETY AND HEALTH WORK PRACTICES

Prior to the operation of a pneumatic nail gun or stapler, personnel will make sure they comply with the general safe work practices outlined below, along with any tool-specific requirements outlined in the manufacturer's instruction manual. The minimum safe work practices include:

1. ANSI Z87.1 approved safety glasses will be worn by the tool operator and any personnel working within 100 feet of the tool. The operator will confirm that nearby personnel are wearing safety glasses prior to actuating the tool.
2. Manufacturer's safe operating pressures for hydraulic hoses, valves, filters, and other fittings will not be exceeded.
3. Do not use hoses for hoisting or lowering tools.
4. Do not fire a nail or staple into a knot in the wood or on another fastener.
5. Hydraulic or pneumatic tools that are used on or around energized lines or equipment will have non-conducting hoses that have adequate strength for the normal operating pressures.
6. Pneumatic tools shall not be connected to an air source or loaded until just prior to use. Additionally, the air source will be removed from the tool prior to reloading or removal of a jammed fastener.

7. When using a pneumatic tool, the operator will use proper hearing protection unless sound level data exists or the SSHO assesses the operations indicating that noise levels are not exceeded.
8. Prior to performing reloading, cleaning or maintenance, the air system will be disconnected from the tool.
9. The manufacturer's procedures will be followed for determining the optimal pressure for ensuring the proper discharge of the fastener. Do not use excessive pressure, as this will increase operational noise and the wear on the tool. At no time should the maximum operating pressure of the tool be exceeded.
10. Never use high-pressure bottle or cylinder air, flammable gas or any source that exceeds 200 psi.
11. Any air system used to actuate a pneumatic tool will, as a minimum, be equipped with an air filter system, regulator, and pressure gauge. If required by the manufacturer a lubrication system, with the appropriate lubricant, on the airline will also be used.

5.4 CLEANING

It is important that all dirt and foreign material be removed from around the work contact element and its spring. Any dirt that prevents the movement of the work contact element will cause the tool to become unsafe. External tool parts should be cleaned as follows:

1. Disconnect the air supply from the tool.
2. Remove fasteners.
3. Wipe surfaces using a cloth.
4. Clean the exterior with a mild solvent, wipe excess solvent, and allow the solvent to dry before using the tool.
5. Do not immerse the tool in any cleaning solution or use any volatile solvents like gasoline, mineral spirits, as this will damage the o-rings and cause the tool to malfunction.

5.5 TOOL MALFUNCTION

Tool operators will remain alert to tool malfunctions. A malfunctioning tool must be immediately removed from use and not used again until it has been repaired and restored to proper function. A tool with the problems listed below becomes dangerous and unsafe. This list is representative only and not all inclusive:

- Work contact element that sticks or binds along its vertical path of travel.
- Trigger sticks or binds.
- Air leaks from the tool. Personnel must understand that some air leaks effect safety and others do not. Be safe and assume that any air leak effects safety and have the tool repaired before using the tool again.

The operator if expressly allowed by the manufacturer's instruction manual may repair any malfunction that can be repaired using the manufacturer's troubleshooting actions.

6.0 SAFETY AND PPE REQUIREMENTS

The following safety measures and personal protective equipment shall be used in preventing or reducing the hazards associated with pneumatic nail gun and stapler use. These requirements will be implemented unless superseded by specific requirements stated in the SSHP.

1. Hardhat and safety boots shall be worn when operating a nail gun or stapler.
2. Safety glasses with side shields shall be worn at all times by both the operator and anyone within a 50 foot radius of the nail gun or stapler operations.
3. Hearing protection shall be worn if noise exposure potential is greater than 85 dBA TWA.
4. Leather, or other protective, gloves shall be worn when using the nail gun or stapler.

7.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The Daily Operational and Safety Logs.
- The Safety Meeting Attendance Log for the initial site hazard training.
- The Safety Meeting Attendance Log for the Daily Safety Briefing.
- The Daily Safety Inspection Checklist.

8.0 ATTACHMENTS

None.

1.0 PURPOSE

The purpose of this Environmental Safety and Health Procedures (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of drill rig operations. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations involving the use of a drill rig. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

1. OSHA Construction Industry Standard 29 CFR Part 1926, Subpart O.
2. OSHA General Industry Standard 29 CFR Part 1910, Subpart N.
3. USACE EM 385-1-1, Sections 16 A and M and Section 18 A and B.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the personnel and equipment resources needed to implement this ESHP. The PM will also determine if the requirements in this ESHP are relevant to the site and will incorporate this ESHP into site specific plans, procedures and training for sites where this ESHP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will implement this ESHP for operations that involve personnel exposure to drill rig operations and the hazards of soil drilling. The SS will also discuss the relevant sections of this ESHP in the daily safety briefings. The SS will document information related to the daily implementation of this ESHP in appropriate site documentation logs and forms.

4.3 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA Corporate Environmental Safety and Health Program, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to the implementation of this ESHP and the protective measures used to safeguard site personnel.
4. Periodically auditing PIKA work sites to determine compliance with this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for assisting the SS and site personnel with the identification of safety and health hazards and the use of control techniques associated with this ESHP. The SSHO will assist the SS with the discussion of the requirements in this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will inspect site operations and conditions to make determine their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 PROCEDURES

All personnel, including contractor and subcontractor personnel, involved in drill rig shall be familiar with the potential safety and health hazards associated with the conduct of this operation, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

5.1 GENERAL

In general, the following items will apply to all drill rig operations.

1. Labels will clearly indicate the function and direction of control levers and be posted on the lower unit controls of all drills.
2. An emergency safety power shutoff device will be installed and clearly labeled.
3. Equipment will be shutdown during repairs or when refueling.
4. All hazardous gears and moving parts will be shielded to prevent accidental contact.
5. A fire extinguisher, rated 5 pounds or larger, will be carried on all units and removed to a position within 25 feet of the work site during drilling operations.
6. Exhaust systems will be equipped with spark arresters when operated in areas where there is a potential fire hazard.
7. Daily safety meetings will be conducted and noted in the project field log as to the safety concerns pertaining to that day's use of drilling and boring equipment.

8. The location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installation and over head power lines that reasonably may be expected to be encountered during drilling and boring operations, shall be determined prior to drilling or boring.
9. A warning device or signal person shall be provided where there is danger to employees from moving drilling and boring equipment.
10. All unnecessary vehicles shall be parked away from the drill rig a distance equal to or greater than the height of the drill rig mast.
11. Operators and passengers shall wear seat belts when driving drilling and boring equipment over the road.
12. Employees shall not be allowed under or in a derrick being raised or lowered.
13. No smoking or open flames shall be permitted around or while operating the drill rig.
14. Drilling and boring equipment shall be equipped with the appropriate first aid kit.
15. Employees shall be knowledgeable of equipment operations, safe distances and areas to locate themselves to prevent accidents from hoists, augers, etc.
16. When maintenance or servicing is to be accomplished on power driven equipment, the immediate source of power shall be locked out (refer to ESHP-521 for Lockout/Tagout requirements).
17. Drilling and boring operations shall be restricted to daylight hours only unless adequate lighting is established.
18. The proper size of tong shall be used on each size of auger and or pipe.
19. To protect the public from on-site hazards, the SSHO shall determine a safe distance around the work area and place barricades, construction fencing, barrier tape, etc., around the work site until the project is completed.
20. Loose, ill-fitting clothing can get caught in drilling and boring equipment, therefore, proper fitting clothing will be required, and any loose fitting clothing will be secured when operating or working on this equipment.
21. Long hair that extends below the employee's shirt collar shall be tied in a manner to prevent contact with moving and rotating equipment parts.
22. If drilling is to be conducted in an area where there is suspect ordnance or explosives contamination, the procedures for clearing access lanes and work areas and for conducting down hole monitoring for ferrous anomalies will be presented in the Work Plan and Site Safety and Health Plan.

5.2 PRE-DRILLING REQUIREMENTS

Prior to initiating drill rig operations, the following provisions will be observed.

1. Overhead and underground utilities must be located and marked or flagged. The in accordance with 29 CFR 1926.550, nearest power line to the mast must be greater than 10 feet.
2. The site must be clear and level to accommodate the drill and equipment.

3. Prior to operating any drill rig a general inspection of the rig shall be made prior to each shift of operation and the results recorded on the Equipment Inspection Checklist (ESHF-508). If a crane is involved, see ESHP-518 and use the crane inspection form, as applicable.
4. In the event that the drilling is to be conducted on a site with the potential for munitions and explosives of concern (MEC) contamination, a MEC avoidance survey shall be conducted to locate an anomaly-free access path and work area for the drill rig. Additionally, a down-hole MEC survey will be conducted to prevent the auger from coming in contact with any MEC items.

5.3 OFF-ROAD MOVEMENT OF DRILL RIGS

Before moving a drill rig, an inspection will be made of the route of travel for depressions, slumps, gullies, ruts, and similar obstacles. Additionally, the following will apply.

1. The brakes of a drill rig carrier will always be checked before traveling.
2. All passengers will be discharged before a drill rig is moved on rough or hilly terrain.
3. The front axle of 4x4 or 6x6 vehicles or carriers will be engaged when traveling off road on hilly terrain.
4. Caution will be used when traveling on a hillside.
5. Obstacles such as small logs, small erosion channels, or ditches will be crossed squarely, not at an angle.
6. When lateral or overhead clearance is close, someone on the ground will be used as a guide.
7. After the drill rig has been moved to a new drilling site, all brakes or locks must be set. Wheels will be blocked on steep grades.
8. The mast (derrick) of the drill rig will not be in the raised or partially raised position during off-road travel.
9. Loads on the drill rig and supporting trucks will be tied down during transport.

5.4 SURFACE DRILLING OPERATIONS

Prior to initiating surface drilling operations, the following requirements will be met. Additional site-specific requirements may be needed based upon the unit being used and the conditions of the site. Any site-specific requirements will be outlined in the site plans.

1. Level and stabilize the drill rig before the mast is raised and before drilling begins.
2. All gears will be disengaged, the cable drum brake will be set and no rope should be in contact with the cathead before the power unit is started.
3. Check for overhead obstructions prior to lifting the mast.
4. Where manual (hand) signals are used, only one person shall be designated to give signals to the operator, and the signal person shall be located to see the area of concern load and be clearly visible to the operator.
5. The drill will not be driven from hole to hole with the mast in the raised position.
6. Operation of the drill will only occur from the position of the controls.
7. Drill operations will cease during an electrical storm.

8. All unattended boreholes will be adequately covered, protected, or back-filled.
9. A safety chain and cable arrangement will be used to prevent water swivel and mud line whip.
10. Drill operators will brake or set the chucks to prevent engagement of the transmission prior to removal of the chuck wrench.
11. A cat line or hoisting cable and plug will be used for braking prior to tightening of the chuck.
12. After braking, drill rods will be allowed to drain completely before removal from the working area.
13. Employees exposed to pubic vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflective or highly visible material.
14. Hoisting capacity and weight of the drill rod will be known to prevent collapse of the mast.

5.5 AUGERS

Mismatched auger sections will not be used and only tight-fitting pins designed for the auger will be used. A daily inspection of the auger will be made before the equipment is used, and augers will only be cleaned when the drill rig is in neutral and the augers have stopped rotating. A special handle designed for cleaning auger flights and pressurized water for jet cleaning is recommended. A sign indicating the following information should be installed on all equipment and in full view of the operator:

1. All personnel must be clear before starting the machine.
2. Stop the auger to clean it.
3. Stop engine when repairing, lubricating, or refueling.
4. Do not wear loose-fitting clothing or gauntlet type glove

6.0 AUDIT CRITERIA

The following items relating to drill rig operations will be audited to determine compliance with this ESHP:

- The Daily Operational and Safety Logs;
- The Documentation of Training form for the initial site hazard training;
- The Documentation of Training form for the Daily Safety Briefing; and
- The Equipment Inspection Checklist.

7.0 ATTACHMENT

None.

1.0 PURPOSE

The purpose of this Environmental Safety and Health Procedures (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the transportation of hazardous materials. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations involving the transportation of hazardous materials. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- U. S. Code of Federal Regulation (CFR) – 49 CFR 173, United States Department of Transportation
- USACE EM 385-1-1, Section 18, Motor Vehicles and Aircraft.
- U.S. Environmental Protection Agency, 40 CFR part 262.

4.0 DEFINITIONS

As used in this procedure, the following terms apply:

1. **Hazardous Material** - a substance or material, which has been determined to be hazardous by the Secretary of Transportation; U.S. Department of Transportation (DOT).
2. **Packaging** - a receptacle and any other components or materials necessary for the receptacle to perform its containment function in conformance with the minimum packing requirements of this subchapter. For radioactive materials packaging, see 49 Code of Federal Regulations (CFR) 173.403.
3. **Carrier/Transporter** - a person engaged in the transportation of passengers or property by: (1) Land or water, as a common, contract, or private carrier, or (2) Civil aircraft.

4. **Shipping Paper** - a shipping order, bill of lading, manifest or other shipping document serving a similar purpose and containing the information required by 49 CFR 172.202, 172.203 and 172.204.
5. **Hazardous Waste** - any material that is subject to the Hazardous Waste Manifest Requirements of the U.S. Environmental Protection Agency specified in 40 CFR part 262.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the personnel and equipment resources needed to implement this ESHP. The PM will also determine if the requirements in this ESHP are relevant to the site and will incorporate this ESHP into site specific plans, procedures and training for sites where this ESHP is to be implemented.

5.2 SITE SUPERVISOR

The Site Supervisor (SS) will implement this ESHP for operations that involve personnel exposure to operations involving the handling or transportation of hazardous materials. The SS will also discuss the relevant sections of this ESHP in the daily safety briefings. The SS will document information related to the daily implementation of this ESHP in appropriate site documentation logs and forms.

5.3 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA Corporate Environmental Safety and Health Program, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to the implementation of this ESHP and the protective measures used to safeguard site personnel.
4. Periodically auditing PIKA work sites to determine compliance with this ESHP.

5.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for assisting the SS and site personnel with the identification of safety and health hazards and the use of control techniques associated with this ESHP. The SSHO will assist the SS with the discussion of

the requirements in this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will inspect site operations and conditions to make determine their initial and continued compliance with this ESHP and other regulatory guidelines.

6.0 PROCEDURES

6.1 PACKAGING

Containers or packages used to ship hazardous materials must conform to applicable codes, statutes, regulations, etc. They shall be adequately marked and labeled in accordance with applicable codes, statutes, regulations, etc. Containers shall be stored and transported in such a manner that they will not fall, trip, break, etc., and the hazardous material contents will not spill or otherwise escape from the container. Empty containers shall be treated and handled as full containers. Their hazardous properties shall be regarded the same as the material they previously contained until they are properly cleaned and rendered empty.

6.2 CARRIERS/TRANSPORTERS

Carriers engaged by the company to transport hazardous materials must demonstrate evidence that they possess any required current regulations, licenses, certificates, etc., to transport such hazardous materials. In addition, carriers must also provide evidence of adequate liability insurance.

6.3 SHIPPING PAPERS

The required shipping documents (e.g., manifest, bills of lading, certificates, etc.) shall be properly completed and signed by the parties who own, or in the case of waste, who originally generated the waste, prior to offering hazardous materials for transport. It shall be prohibitive for any employee of PIKA to sign a hazardous waste manifest as the "Generator" without prior authorization from the President of PIKA or the Project Manager.

6.4 PERSONAL VEHICLES

Hazardous materials shall not be transported in personal vehicles.

7.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The Daily Operational and Safety Logs;
- The Safety Meeting Attendance Log for the initial site hazard training;
- The Safety Meeting Attendance Log for the Daily Safety Briefing; and
- Transportation Manifests, Bills of Lading, Certificates.

8.0 ATTACHMENTS

None.

1.0 PURPOSE

The purpose of this Environmental Safety and Health Procedures (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations which involve personnel exposure to hazardous materials and the control of contamination. In order to safeguard the safety, health and well being of all site workers, it is imperative that every possible effort be made to control the spread of contamination before, during and after hazardous waste site activities. Therefore, it is the purpose of this ESHP to outline general guidelines for establishing site-specific procedures for establishing work zones, conducting personnel and equipment decontamination, and establishing personal hygiene standards.

2.0 SCOPE

This ESHP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations where contamination controls are required to protect site personnel from the spread of contamination, and where personal hygiene standards will be applied. This ESHP is not intended to contain all requirements for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the requirements as outlined in the standards and regulations below.

- OSHA General Industry Standard 29 CFR 1910.120, and Construction Industry Standard 29 CFR 1926.51, Hazardous Waste Operations and Emergency Response.
- OSHA Construction Industry Standard 29 CFR 1926.51, Sanitation.
- USACE EM 385-1-1, Section 28, Hazardous, Toxic, and Radioactive Waste (HTRW) and Underground Storage Tank (UST) Activities.
- USACE EM 385-1-1, Section 02, Sanitation.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the personnel and equipment resources needed to implement this ESHP. The PM will also determine if the requirements in this ESHP are relevant to the site and will incorporate this ESHP

into site specific plans, procedures and training for sites where this ESHP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will implement this ESHP for operations that involve personnel exposure to on-site contamination and the use of decontamination procedures. The SS will also discuss the relevant sections of this ESHP in the daily safety briefings. The SS will document information related to the daily implementation of this ESHP in appropriate site documentation logs and forms.

4.3 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA Corporate Environmental Safety and Health Program, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to the implementation of this ESHP and the protective measures used to safeguard site personnel.
4. Periodically auditing PIKA work sites to determine compliance with this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for implementing this ESHP and any site-specific contamination control procedures outlined in the SSHP. This will include acquisition of the required decontamination supplies, and the initial set-up and daily inspection of the personnel decontamination station (PDS) and other decontamination facilities. Although the SS will designate the PDS attendant, it will be the SSHO's responsibility to determine if the procedures for personnel and equipment decontamination are executed correctly.

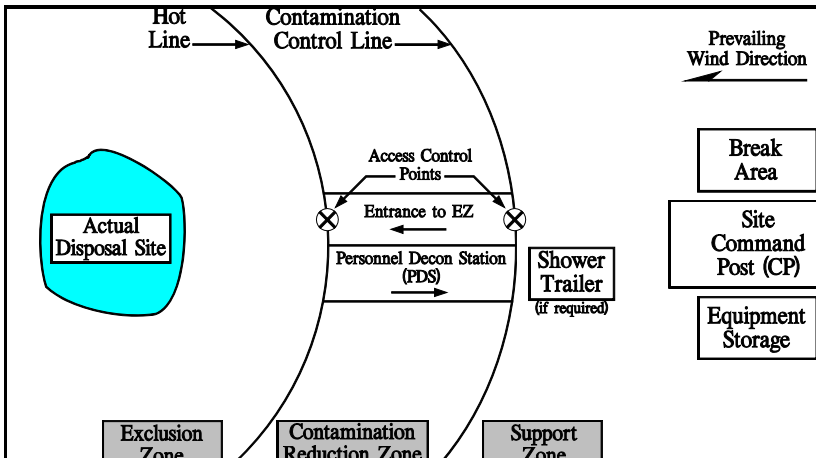
5.0 PROCEDURES

5.1 SITE WORK ZONES

One of the most effective methods for reducing or eliminating the potential for employee exposure to site hazards is through the use and enforcement of site control zones and access control points. Establishment of work zones and control of their access can prevent site personnel and the general public from entering hazardous areas where the potential for exposure to hazardous waste exists. The boundaries and access

control points for each work zone will be clearly identified with signs and segregated with flagging, rope or by other means, to prevent accidental intrusion by unauthorized personnel. Whenever feasible, or if the level of hazard dictates, the site entry will be controlled through the use of fences and locking gates. Control zones and access control points will be established in accordance with (IAW) the SSHP, and evaluated daily, to determine if hazards found inside a given zone do not migrate outside the zone. See Figure 403-1 for a graphic of a typical site set-up.

FIGURE 403-1: TYPICAL SITE LAYOUT



5.1.1 EXCLUSION ZONE

The EZ is a work area where the greatest hazard potential for exposure to safety and health hazards may be, or is known to exist. Personnel entering the EZ must be logged in/out using the PIKA Exclusion Zone Entry/Exit Log and will wear the prescribed levels of PPE. EZ entry and exit control points will be established to regulate the flow of personnel and equipment into and out of the EZ. This will assist in containing contamination inside the EZ and prevent contamination of personnel and equipment. The entry/exit control points will be established up wind from the EZ to prevent airborne contaminants from migrating into "clean" areas. The site's prevailing wind direction will be used to select the entry/exit control points, but alternate entry/exit points need to be available in the event that the wind direction changes or an emergency arises which precludes the use of the primary entry/exit point. No tobacco product use, eating, drinking application of cosmetics or other hand to face activities are allowed in this area unless strictly specified in the SSHP.

Note: Due to hot weather,it may become necessary to modify the requirement for not drinking in the EZ. This may be accomplished by establishing a break area inside the EZ, upwind from the work site, which is accessed through a scaled down version of the personal decontamination station. Personnel would be allowed to enter this area to drink cool fluids and rest. This modification may

be implemented only if the potential for contamination is low, proper procedures are established and if approved by the PIKA CSHM.

5.1.2 CONTAMINATION REDUCTION ZONE

The contamination reduction zone (CRZ) is the transition zone between the EZ and the support zone and serves as a buffer to reduce the probability of clean areas becoming contaminated or affected by hazards in the EZ. It provides additional assurance that the transfer of contamination on personnel, equipment, or in the air is limited through the use of a combination of decontamination, segregation of site operations, dilution ventilation, and distance between the exclusion and support zones. The CRZ is the location of the personnel decontamination station (PDS), the equipment decontamination station (EDS) and the emergency PDS (EPDS). These stations will be used to prevent the spread of contamination into clean areas through the application of site-specific decontamination procedures. Site-specific decontamination steps will be developed and outlined in the SSHPs. No tobacco product use, eating, drinking application of cosmetics or other hand to face activities are allowed in the CRZ or any of the decontamination stations, unless specified in the SSHP.

5.1.3 SUPPORT ZONE (SZ)

The Support Zone (SZ) is the area outside the CRZ and is the location of the administrative and other support functions required to keep the operations in the EZ and CRZ functioning smoothly. The support zone includes facilities such as the change area, lunch and break areas, office trailers/areas and supply storage areas. Personnel in the SZ can wear normal work clothes since this area is designated as the clean area and contaminated equipment and clothing must be left in the CRZ or EZ. The SZ is designated as the tobacco product use, eating and drinking area. The location of the support facilities inside the SZ should be selected through careful consideration of the following:

- Site layout, including topography, open spaces and available access roads;
- Location of utilities, such as power, telephones and water;
- Line-of-sight to all activities in the EZ;
- Wind direction, the SZ should be located up-wind from the PDS; and
- Distance from the EZ (i.e. not more than 100 meters to the SZ if possible).

5.2 SITE SANITATION AND PERSONAL HYGIENE

To minimize the potential for contact or spread of site contaminants, site sanitation facilities will be established and maintained IAW 29 CFR 1910.120(n) and 29 CFR 1910.141. During the development of the SSHP, the CSHM will designate the personal hygiene procedures and site sanitation facilities to be established prior to initiation of site activities.

5.3 POTABLE WATER SUPPLY

An adequate supply of potable (drinkable) water shall be on site at all times, and will be supplied IAW the following provisions:

- Containers used for potable water shall be capable of being tightly closed, equipped with a tap and maintained in a clean sanitary condition;
- A container used for distribution of drinking water shall be clearly labeled as to its contents and not used for any other purpose;
- Water shall not be dipped from the container and use of a common cup will not be allowed; and
- Where single service cups are provided, sanitary containers will be provided for the storage of the unused cups and for the disposal of the used cups.

5.4 NONPOTABLE WATER

Outlets and storage containers for nonpotable water, such as water for fire fighting or decontamination will be clearly labeled to indicate that the water is not suitable for drinking, washing or cooking. There shall at no time be a cross connection or open potential between a system furnishing potable water and a system furnishing nonpotable water.

5.5 WASHING FACILITIES

Hand and face washing facilities will be set up in the SZ to be utilized by personnel exiting the CRZ prior to eating, drinking, tobacco use, or other hand to face activities. When feasible, washing facilities will consist of hot and cold running water, soap and drying towels. If this is not feasible, handi-wipes or an equivalent will be provided.

5.6 SITE HOUSEKEEPING

All work areas will be maintained in a clean/neat fashion, free of loose debris and scrap. Any materials/equipment not being used will be removed and stored or disposed of accordingly. All work areas will be supplied with a trash receptacle with lid, which will be emptied daily.

6.0 PERSONNEL DECONTAMINATION

6.1 GENERAL REQUIREMENTS

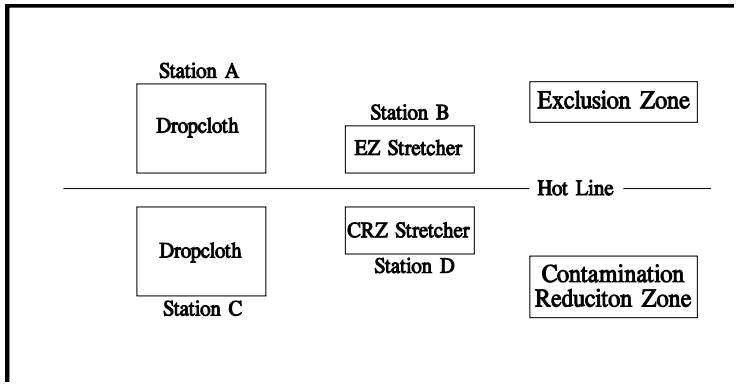
A personnel decontamination station (PDS), with an emergency PDS (EPDS) as shown in Figure 403-2 will be established in the CRZ to facilitate decontamination, protective clothing removal and to prevent EZ personnel from transferring contamination to the SZ. The PDS/EPDS will be established prior to, and utilized during, any site activities involving the potential for personnel exposure to chemical contaminant hazards. To help eliminate the airborne migration of contaminants, the PDS/EPDS will be established up-wind from the EZ and will be geographically located to minimize exposure of unprotected personnel and equipment to contaminated personnel/equipment. During

the set up of the PDS/EPDS, signs shall be set up at each station to remind personnel of the proper activity to be conducted at the particular station.

Personnel exiting the EZ will pass through the PDS to facilitate the removal of contamination. As personnel move through the PDS, PPE will be removed in the order of highest to lowest potential contamination. This outside-in removal process will be used to minimize the contamination of inner clothing or the body. The decontamination steps to be used for each level of protection are described later in this ESHP, and are graphically depicted in Figures 403-3 through 403-6. The EPDS will be utilized for emergency decontamination of personnel who, due to injury or illness, cannot pass through the PDS.

Personnel may be required to shower completely (including the washing of hair) prior to entering the SZ, changing into street clothes and/or prior to leaving the site. This determination will be made based upon the site contaminants and the risk of personnel exposures. Personnel shall under all circumstance wash hands, face, and other exposed skin areas immediately after leaving the CRZ for breaks, lunch or at the end of each work day. If a shower facility is required, the hot and cold water systems will be used to provide warm water for showers. Shower facilities will have a means for segregating members of the opposite sex. The shower room will have adequate shower heads and deck mats for walkways and a floor drain. Towels, washcloths, liquid soap, and shampoo will be provided for all personnel required to use the shower. Work clothes worn inside the EZ will be left in the shower/change facility, and with the exception of clothing worn for operations in the support zone, no company provided work clothing, shoes, or boots will be worn off or carried out of the work site. Space will be provided in the clean room for storage of the employee's street clothes along with benches to facilitate changing of clothing.

FIGURE 403-2: EMERGENCY PERSONAL DECONTAMINATION STATION



As stated earlier, the SSHO will be responsible for ensuring that the PDS and the EPDS are set-up each day and ready for operation prior to site personnel entering the EZ. The Site Supervisor will designate personnel to assist in setting up the PDS/EPDS and to assist the work party in the doffing of PPE as they process out of the CRZ. Personnel exiting the EZ will proceed through the specified wash, rinse and PPE removal steps relevant to the level of protection they are wearing. The procedures to be followed for doffing Level A, Level B, Level C and Modified Level D are outlined below in paragraphs 5.2.1 through 5.2.5. These steps correlate to the PDS and EPDS maps found in Figures 403-3 through 403-6.

If site activities call for the use of Level A or Level B, the PDS stations 2 through 4 will be placed inside a containment structure (sand box) constructed from 2" X 6" lumber, lined with 10 mil or greater plastic and filled with small gravel. The box will be large enough to contain the three wash/rinse pans/tubs and will have a drain attached which leads to a collection station. The wash/rinse pans/tubs will be large enough for a man to stand in and will have a least 12" sides. The containment system will only be used when site events dictate increased precautions to prevent the contamination of soil and the spread of contamination. Such events will necessitate the washing/decontamination of the gravel and collection of the run-off, due to the potential for migration of contaminants into the gravel during decontamination activities. Upon completion of the project, the contents of the containment system will be tested and disposed of accordingly.

6.2 PERSONNEL DECONTAMINATION PROCEDURES

In order to significantly minimize the potential for contaminant contact and migration, it is imperative that site personnel decontaminate thoroughly, remove PPE very carefully, and follow the decontamination procedures outlined in the following paragraphs. Although these procedures apply to personnel exiting the EZ, their implementation is of

pivotal importance to all other site personnel, the environment and the general public. Site personnel utilizing these procedures must remember and understand that improper decontamination can lead to not only personal contamination, but also to contamination other site personnel, company equipment, and personal property and relations. The procedures listed below represent the minimum requirements for personnel and equipment decontamination. If deemed necessary by site Activities or conditions, revised or additional procedures may be added to this Plan by the SSHO. Additional or revised decontamination procedures must receive approval of the PIKA CSHM.

6.2.1 Levels A/B (w/ Encapsulating Suit) Decontamination Procedure

The following PDS procedure applies to the decontamination of Level A ensembles and Level B ensembles with encapsulating suits. PDS procedures for Level B with non-encapsulating suit are addressed in paragraph 5.2.2 of this Section. The PDS for Level A and this type of Level B will be set-up utilizing the PDS map found in Figure 403-3.

Station 1: Equipment Drop
Enter PDS at Station 1 and deposit all reusable equipment on the drop cloth.

Station 2: Outer Garment Decontamination (Chemical suit, gloves and boots)
This station involves washing all outer garments with a decontamination solution. Start at head and brush or spray down to soles of boots. Scrub boots, including the bottoms, gloves and any other part of the suit necessary to remove all dirt, mud or other foreign debris.

Station 3: Outer Garment Wash (Chemical suit, gloves and boots)
Starting at the head and working down, scrub entire surface of outer garments with brush and decontamination solution mixed to manufacturer's specifications.

Station 4: Outer garments Rinse
Starting at the head and working down, use clean water to brush off or spray all soap residue from the outer garment.

Station 5: Tape Removal
Remove all tape that would restrict the removal of the outer garments and place it in a plastic lined disposal container.

Station 6: Boot/Boot Cover Removal (Boot Rack)
Remove over boots, boot/boot covers and place on boot rack if serviceable; if not place boots in plastic lined container. The PDS attendant may assist from cold side of Hot Line, and to help personnel not to place non-booted feet behind the Hot Line. A chair or bench and boot jack will be provided at this station to assist in the removal of boots.

Station 7: Outer Glove Removal

Remove outer gloves and place on table, if serviceable; if not, place in plastic lined container. Personnel should exercise extreme caution, and making every effort not to touch the inner gloves with the outside of the outer gloves during their removal.

Station 8: Outer Suit Removal for Tank Change

A PDS attendant will assist in the removal of the outer suit. The outer suit should be removed only as far as necessary to gain access to the SCBA tank and permit its removal and replacement. Once the suit has been removed shut-down the SCBA using standard procedures and disconnect the face piece supply hose.

Station 9: Tank Replacement and Redress

Once the exhausted tank has been replaced with a full one, the PDS attendant will assist in redressing the worker, to include, donning/closure of the suit, replacement of the boots and outer gloves, and the taping of the boots/gloves. A bench or chair will be provided to allow the suited worker to sit during the redressing. (If required by hot weather conditions, and approved by the CSHM, the SCBA face piece may be removed and this station used as a rest area where half suited personnel may sit and be given liquids via a squirt bottle. If this is required, additional procedures will be required.)

Station 10: Outer Suit Removal

Remove outer suit and place on table if reusable. The PDS attendant or buddy will assist in removal of the suit in an inside out fashion, using caution to touch the outer part of the suit with the inner gloves as little as possible. If suit is unserviceable, put into plastic lined disposal container.

Station 11: SCBA Tank and Backpack Removal

Using proper SCBA shut-down procedures turn off tank air and disconnect the face piece from the supply hose. Remove tank and backpack and place on table. PDS attendant or buddy will assist.

Station 12: Inner Glove Wash and Rinse

Wash inner gloves in decontamination solution mixed to manufacturer's specifications, and rinse in clean water.

Station 13: Face piece Removal and Wash/Rinse

Remove face piece. If face piece will be used again on this day, use supplied wipes to clean the face piece, inside and out. Place face piece in personally assigned bag and place on table or rack, for collection by PDS attendant later. Place wipes into Station 14 disposal container. If this is the last use of the day, dunk face piece in sanitizing solution and then rinse with clean water. Place face piece on table for collection later during the daily PDS clean up.

Station 14: Inner Glove Removal
Remove inner gloves and place into plastic lined waste container, using caution not to touch the outside of the inner gloves with the hands.

Station 15: Enter Shower Trailer:
Proceed to trailer, remove clothing and enter shower. While in the shower, wash entire body, including hair. Exit shower and redress.

6.2.2 Level B Decontamination (Non-encapsulating Suit)

The following PDS procedure applies to the decontamination of Level B ensembles with non- encapsulating suits. The PDS for this type of Level B decontamination will be set-up utilizing the PDS map found in Figure 403-4.

Station 1: Equipment Drop
Enter PDS at Station 1 and deposit all reusable equipment on the drop cloth.

Station 2: Outer Garment Decontamination (Chemical suit, gloves and boots)
This station involves washing all outer garments with a decontamination solution made of two parts water and one part household bleach. Start at head and brush or spray down to soles of boots. Scrub boots, including the bottoms, gloves and any other part of the suit necessary to remove all dirt, mud or other foreign debris.

Station 3: Outer Garment Wash (Chemical suit, gloves and boots)
Starting at the head and working down, scrub entire surface of outer garments with brush and decontamination solution mixed to manufacturer's specifications.

Station 4: Outer garments Rinse
Starting at the head and working down, use clean water to brush off or spray all soap residue from the outer garment.

Station 5: Tape Removal
Remove all tape that would restrict the removal of outer garments and place in a disposal container.

Station 6: Boot/Boot Cover Removal (Boot Rack)
Remove over boots, boot/boot covers and place on boot rack if serviceable; if not place boots in plastic lined container. The PDS attendant may assist from cold side of Hot Line, and will help non-booted people to not place non-booted feet back across the Hot Line. A chair or bench and boot jack will be provided at this station to assist in the removal of boots.

Station 7: Outer Glove Removal

Remove outer gloves and place on table, if serviceable; if not, place in plastic lined container. Personnel should exercise extreme caution, and make every effort not to touch the inner gloves with the outside of the outer gloves during their removal.

Station 8: Tank Replacement and Redress

Shut-down the SCBA using standard procedures, and disconnect the face piece from the supply hose. The PDS attendant will disconnect the exhausted tank and replace it with a full one. Once this has been accomplished, the PDS attendant will assist in redressing the worker, to include, replacement of the boots and outer gloves, and the taping of the boots/gloves. A bench or chair will be provided to allow the suited worker to sit during the redressing. (If required by hot weather conditions, and approved by the CSHM, the SCBA face piece may be removed and this station used as a rest area where half suited personnel may sit and be given liquids via a squirt bottle. If this is required and approved, additional procedures will be required.)

Station 9: SCBA Tank and Backpack Removal

Using proper SCBA shut-down procedures turn off tank air and disconnect the face piece from the supply hose. Remove tank and backpack and place on table. PDS attendant or buddy will assist.

Station 10: Outer Suit Removal

Remove outer suit and place on table if reusable. The PDS attendant or buddy will assist in removal of the suit in an inside out fashion, using caution to touch the outer part of the suit with the inner gloves as little as possible. If suit is unserviceable, put into plastic lined disposal container.

Station 11: Inner Glove Wash and Rinse

Wash inner gloves in decontamination solution and rinse in clean water.

Station 12: Face piece Removal and Wash/Rinse

Remove face piece. If face piece will be used again on this day, wipe down the face piece, inside and out, using wipes provided. Place face piece in personally assigned bag and place on table or rack, for collection by PDS attendant later. Place wipes into Station 14 disposal container. If this is the last use of the day, dunk face piece in sanitizing solution and then rinse with clean water. Place face piece on table for collection later during the daily PDS clean up.

Station 13: Inner Glove Removal

Remove inner gloves and place into plastic lined waste container, using caution not to touch the outside of the inner gloves with the hands.

Station 14: Enter Shower Trailer:

Proceed to trailer, remove clothing and enter shower. Shower entire body, including hair. Exit shower and redress.

6.2.3 Decontamination for Level C

This paragraph applies to the decontamination of personnel dressed in Level C, which includes the use of a half or full face respirator. The PDS for Level C decontamination will be set-up utilizing the PDS map found in Figure 403-5.

Station 1: Equipment Drop

Enter Decontamination Line at Station 1 and deposit all reusable equipment on the drop cloth.

Station 2: Outer garment Decontamination (Chemical suit, gloves and boots)

This station involves washing all outer garments with a decontamination solution made of two parts water and one part household bleach. Start at head and brush or spray down to soles of boots. Scrub boots, including the bottoms, gloves and any other part of the suit necessary to remove all dirt, mud or other foreign debris.

Station 3: Outer garments Wash (Chemical suit, gloves and boots)

Staring at the head and working down, scrub entire surface of outer garments with brush and decontamination solution mixed to manufacturer's specifications.

Station 4: Outer garments Rinse

Starting at the head and working sown, use clean water and brush off or spray all soap residue from the outer garment.

Station 5: Tape Removal

Remove all tape that would restrict the removal of the outer garments and place it in a plastic lined disposal container.

Station 6: Boot/Boot Cover Removal (Boot Rack)

Remove over boots, boot/boot covers and place on boot rack if serviceable; if not place in plastic lined container. The PDS attendant may assists from cold side of Hot Line, and will help non-booted personnel not to place non-booted feet back across the Hot Line. A chair or bench will be provided and a boot jack placed at this station to assist in boot removal.

Station 7: Outer Glove Removal

Remove outer gloves and place on table, if serviceable; if not, place in plastic lined container. Personnel should exercise extreme caution and make every effort not to touch the inner gloves with the outside of the outer gloves during their removal.

Station 8: Outer Suit Removal
Remove outer suit and place on table if reusable. The PDS attendant or buddy will assist in removal of the suit in an inside out fashion, using caution to touch the outer part of the suit as little as possible. If suit is unserviceable, put into plastic lined disposal container.

Station 9: Inner Glove Wash and Rinse
Wash inner gloves in decontamination solution mixed to manufacturer's specifications and rinse in clean water.

Station 10: Respirator Removal and Wash/Rinse
Remove respirator face piece. If face piece will be used again on this day, wipe down the face piece, inside and out, using wipes provided. Place face piece in personally assigned bag and place on table or rack, for collection by PDS attendant later. Place wipes into Station 14 disposal container. If this is the last use of the day, remove cartridges, and dispose of them in designated plastic lined container. Dunk face piece in sanitizing solution and then rinse with clean water. Place face piece on table for collection later during the daily PDS clean up.

Station 11: Inner Glove Removal
Remove inner gloves and place into plastic lined waste container, using caution not to touch the outside of the inner gloves with the hands.

Station 12: Conduct Field Wash
Using soap and water, or handi-wipes, wash hands, face and neck.
(If required by site conditions a shower trailer may be needed. If so, Station 12 will read as follows:

Station 12: Enter Shower Trailer:
Enter shower trailer, remove clothing and enter shower. Shower entire body, including hair. Exit shower and redress.)

6.2.4 Modified Level D Decontamination

This paragraph applies to the decontamination of personnel dressed in Modified Level D, which includes the use of protective clothing, but no respiratory protection. The PDS for Modified Level D decontamination will be set-up utilizing the PDS map found in Figure 403-6.

Station 1: Equipment Drop
Enter PDS at Station 1 and deposit all reusable equipment on the drop cloth. This includes the unused five minute escape pack.

Station 2: Outer garments Wash (Chemical suit, gloves and boots)
Starting at the head and working down, scrub entire surface of the outer garments, to include the bottoms of the boots, with brush and decontamination solution.

Station 3: Outer garments Rinse
Starting at the head and working down, use clean water and brush off or spray all soap residue from the outer garment.

Station 4: Tape Removal
Remove all tape that would restrict the removal of the outer garments and place it in a plastic lined disposal container.

Station 5: Boot/Boot Cover Removal (Boot Rack)
Remove over boots/boot covers and place on boot rack if serviceable; if not place in plastic lined container. The PDS attendant may assists from cold side of Hot Line, and will help non-booted personnel to not place their non-booted beet feet back across the Hot Line. A chair or bench and boot jack will be placed at this station to assist in boot removal.

Station 6: Outer Glove Removal
Remove outer gloves and place on table, if serviceable; if not, place in plastic lined container. Personnel should exercise extreme caution, and make every effort not to touch the inner gloves with the outside of the outer gloves during their removal.

Station 7: Outer Suit Removal
Remove outer suit and place on table if reusable. The PDS attendant or buddy will assist in removal of the suit in an inside out fashion, using caution to touch the outer part as little as possible. If suit is unserviceable, put into plastic lined disposal container.

Station 8: Inner Glove Wash and Rinse
Wash inner gloves with decontamination solution and rinse in clean water.

Station 9: Inner Glove Removal
Remove inner gloves and place into plastic lined waste container, using caution not to touch the outside of the inner gloves with the hands.

Station 10: Conduct Field Wash
Using soap and water, or handi-wipes, wash hands, face and neck.

7.0 PDS ATTENDANT

7.1 GENERAL REQUIREMENTS

The PDS attendant plays an integral role in ensuring that the PDS is set-up and operated in a manner that prevents the contamination of site personnel, equipment and eliminates the migration of contamination to clean areas of the site. Depending upon site conditions, level of protection and number of personnel working in the EZ, more than one PDS attendant may be needed to facilitate the smooth conduct of the PDS.

7.2 PDS ATTENDANT'S DUTIES

In support of the PDS, the PDS attendant will have the following duties:

- On a daily basis, after the safety brief, prepare, and direct assembly of, the PDS required for the day's operation;
- Assisting EZ personnel as the process through the PDS, and assisting in tank changes for Levels A and B;
- Receiving and storing all equipment passed from the hot side of the hot line after ensuring items have been cleaned and decontaminated thoroughly;
- Retrieving and storing away reusable equipment that has been previously decontaminated, including respirators, gloves, boots and suits;
- Securing the PDS using the procedures outlined below; and
- Ensuring that once the PDS is secured, all respirators used on site are stored in a clean, protected environment for drying.

After assisting EZ personnel with decontamination at the end of the daily work period, the PDS attendant will secure the PDS using procedures that allow the attendant to simultaneously decontaminate as the PDS is secured. To do this, the PDS attendant will, with the aid of a buddy, initiate securing the PDS at the outer garment wash and work back conducting his own decontamination at the same time. This will be accomplished using the following general procedures:

- All reusable equipment will be removed from the PDS line and stored in the SZ;
- While wearing appropriate PPE, the PDS attendant will cross the hot line, and then, moving from dirtiest to cleanest, the decontamination solutions will be transferred to their respective storage containers;
- After removing any applicable tape secure the tape disposal container;
- Upon moving to the boot removal, boots will be removed while stepping across the hot line, and reaching back across the hot line, secure the boot disposal container;
- At the outer glove removal station, the attendant will remove outer gloves and secure the outer glove disposal container;
- At the outer garment removal station, the attendant will remove the outer garment, if applicable, and then secure the outer garment disposal container;

- At inner glove wash/rinse station, the attendant will wash the inner gloves and transfer the inner glove wash solution to its appropriate disposal container, then rinse inner gloves, dispose of rinse solution, and secure wash/rinse containers;
- At face piece removal station (for Level C PDS and above) the wash/rinse solutions and/or wipes will transferred to appropriate disposal containers and the station will then be secured; and
- At the inner glove removal station, the inner gloves will be removed and the container secured.

7.3 PPE USED BY THE PDS ATTENDANT

The PDS attendant will wear a level of PPE which will adequately protect them from the hazards associated with assisting site personnel through the PDS. If EZ personnel are wearing Level A or B, the PDS attendant will as a minimum wear Modified Level D, with the addition of a splash shield. If EZ personnel are wearing Level C or Modified Level D, the PDS attendant will wear Level D, with the addition of splash apron, gloves, and over boots. Refer to the Certification of Task Hazards Assessment for the PDS found in Section 5.0 of the SSHP for further information. PPE used by the PDS attendant will be disposed of as the attendant processes out of the PDS.

8.0 EMERGENCY PDS (EPDS)

As stated earlier, an EPDS will be set-up along side the PDS. If an emergency occurs inside the EZ resulting in personal injury or illness that prevents the affected individual from processing through the PDS, they will be processed out of the EZ through the Emergency PDS (EPDS). The function of the EPDS is to make available all the resources necessary to allow for the combined efforts of first aid and decontamination personnel. The EPDS will be set-up so as to allow for the rapid decontamination of an injured worker, removal of PPE, and safe transport of the injured worker across the Hot Line. The EPDS will be set-up as outlined in Figure 403-2 and will, as a minimum, include the following stations and supplies:

Station A: Drop cloth for positioning, one gallon of decontamination solution, five gallons water and a plastic sheet for emergency wrap of personnel to be medically evacuated if complete removal of PPE is not possible due to the nature and extent of injuries.

Station B: Porous stretcher for EZ side of the Hot Line.

Station C: Drop cloth for location of: first aid kit, eye wash kit, fire extinguisher and other emergency equipment.

Station D: Stretcher for the PDS side of the Hot Line.

9.0 ALTERNATE PDS

It is possible, due to site configuration, boundaries and/or wind direction, that an emergency could arise denying EZ personnel access to the main PDS without endangering their safety. To prepare for this contingency, one or more alternate PDS stations will be established prior to starting site activities. The alternate PDS will be used only as a last resort and will allow for the emergency decontamination of PPE prior to its removal. Suits, gloves, boots, etc. which are removed during emergency decontamination will be collected and containerized once the emergency situation is resolved. Supplies for the alternate PDS will be placed in the CRZ at the alternate exit from the EZ, and shall include:

- A minimum of two gallons of decontamination solution.
- One five-gallon can of water.
- One brush or sprayer.
- One shallow decontamination pan.

10.0 EQUIPMENT DECONTAMINATION

10.1 GENERAL PROCEDURES

Any equipment item or vehicle taken into the EZ may be contaminated and must be carefully inspected and decontaminated in the CRZ prior to leaving the site. Only clean water is to be used for decontamination of equipment and vehicles. It will be the responsibility of the SSHO to properly inspect, and approve for general cleanliness, all vehicles, heavy equipment and hand-held equipment being taken out of the EZ/CRZ. The frame and tires of all vehicles and heavy equipment leaving the CRZ must be thoroughly inspected and decontaminated. In order for a vehicle or piece of heavy equipment to pass inspection it must be in broom-clean condition, free of loose dirt or stabilized material on tailgates, axles, wheels, etc. Approval will be based on visual inspection of all exposed surfaces. Seats and flooring of equipment and vehicles that are used in the EZ will be covered to the extent possible with disposable polyethylene. Personnel assigned to vehicle decontamination will wear the protective equipment, clothing, and respiratory protection consistent with the established health and safety program as defined in the SSHP.

10.2 EQUIPMENT DECONTAMINATION PAD

If necessary, PIKA will utilize an equipment decontamination pad to be located at the entrance to the CRZ. This pad will be utilized to remove soil from all equipment leaving the work area. Decontamination procedures will consist of high-pressure washing of equipment to remove mud and/or dirt by steam cleaning. All equipment requiring maintenance or repair will be staged in the CRZ prior to servicing. Equipment wash water residue will be collected for disposal. The water will collected through the collection sump at the pad and transferred to storage containers.

11.0 WASTE DISPOSAL

All plastic bags that contain contaminated material resulting from the doffing of PPE will be securely taped closed, placed in an appropriate DOT approved container and properly disposed of IAW applicable Federal and state EPA regulations. After use, decontamination solutions will be drummed in an appropriate DOT approved container. Upon being filled, the drum contents will be sampled and analyzed to determine their contaminant content. If the contents are determined to be hazardous, they will be disposed of IAW applicable Federal and state EPA regulations.

FIGURE 403-3: PDS FOR LEVEL A AND LEVEL B WITH ENCAPSULATING SUIT

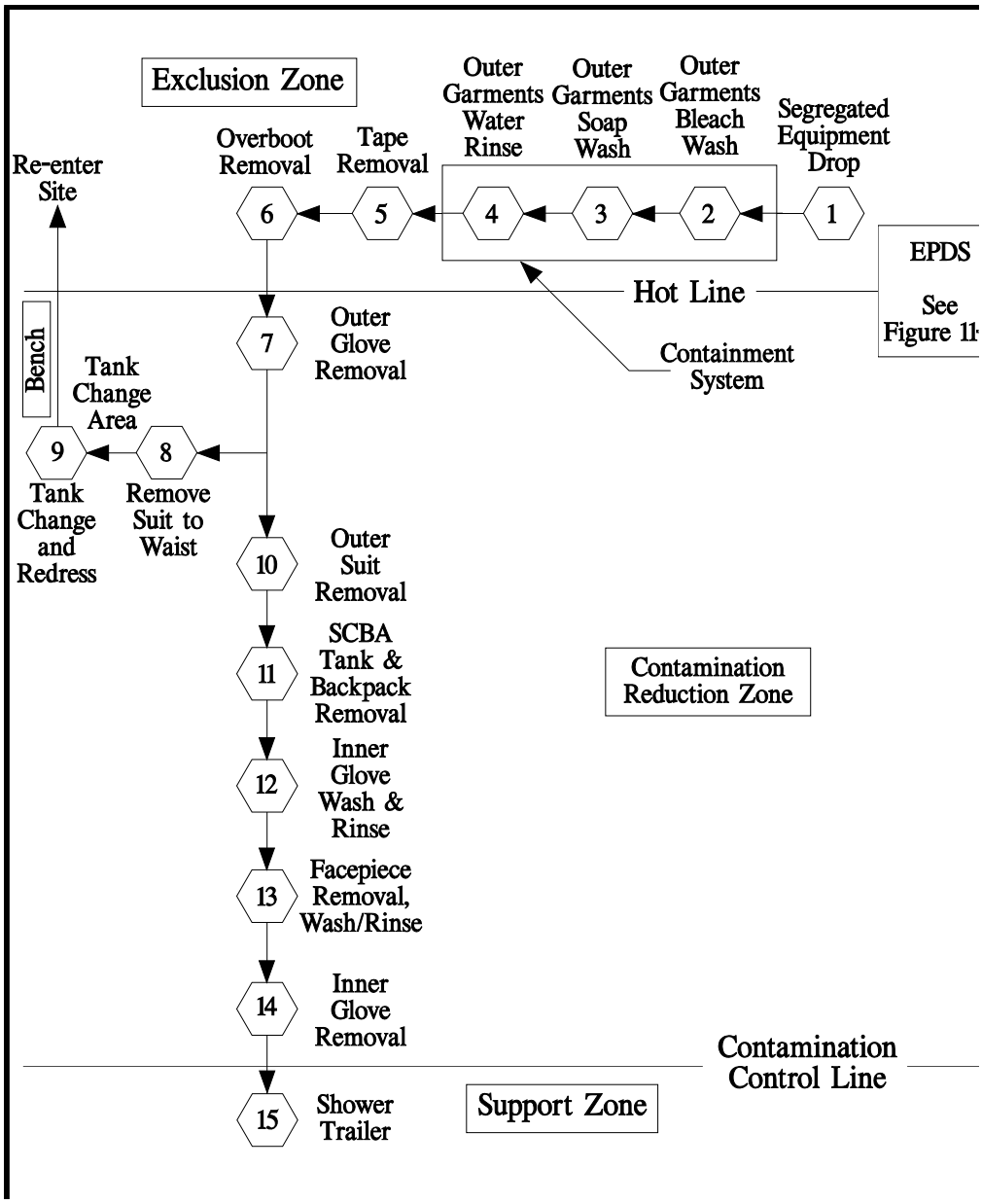


FIGURE 403-4: PDS FOR LEVEL B WITH NON-ENCAPSULATING SUIT

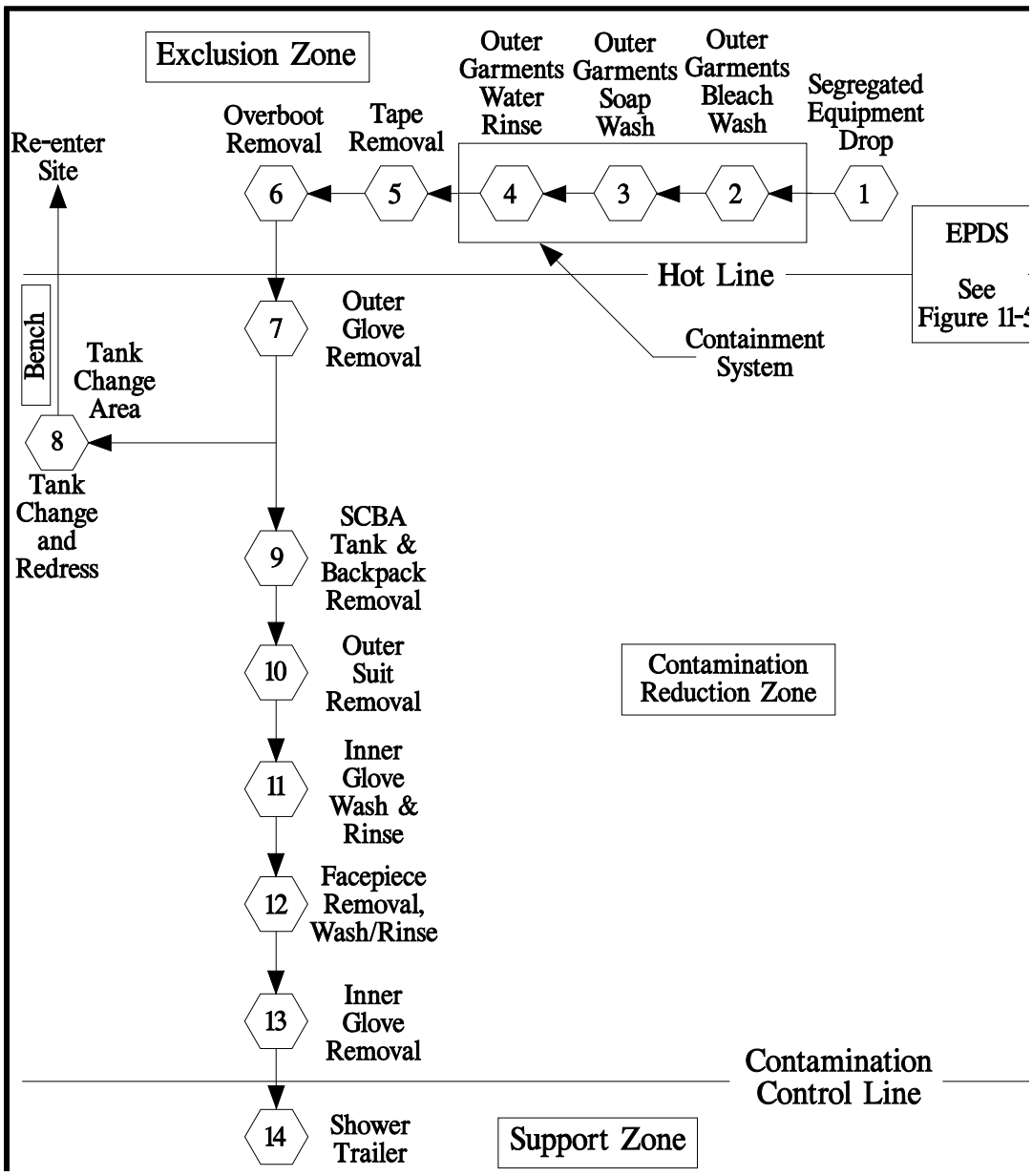


FIGURE 403-5: PDS FOR LEVEL C

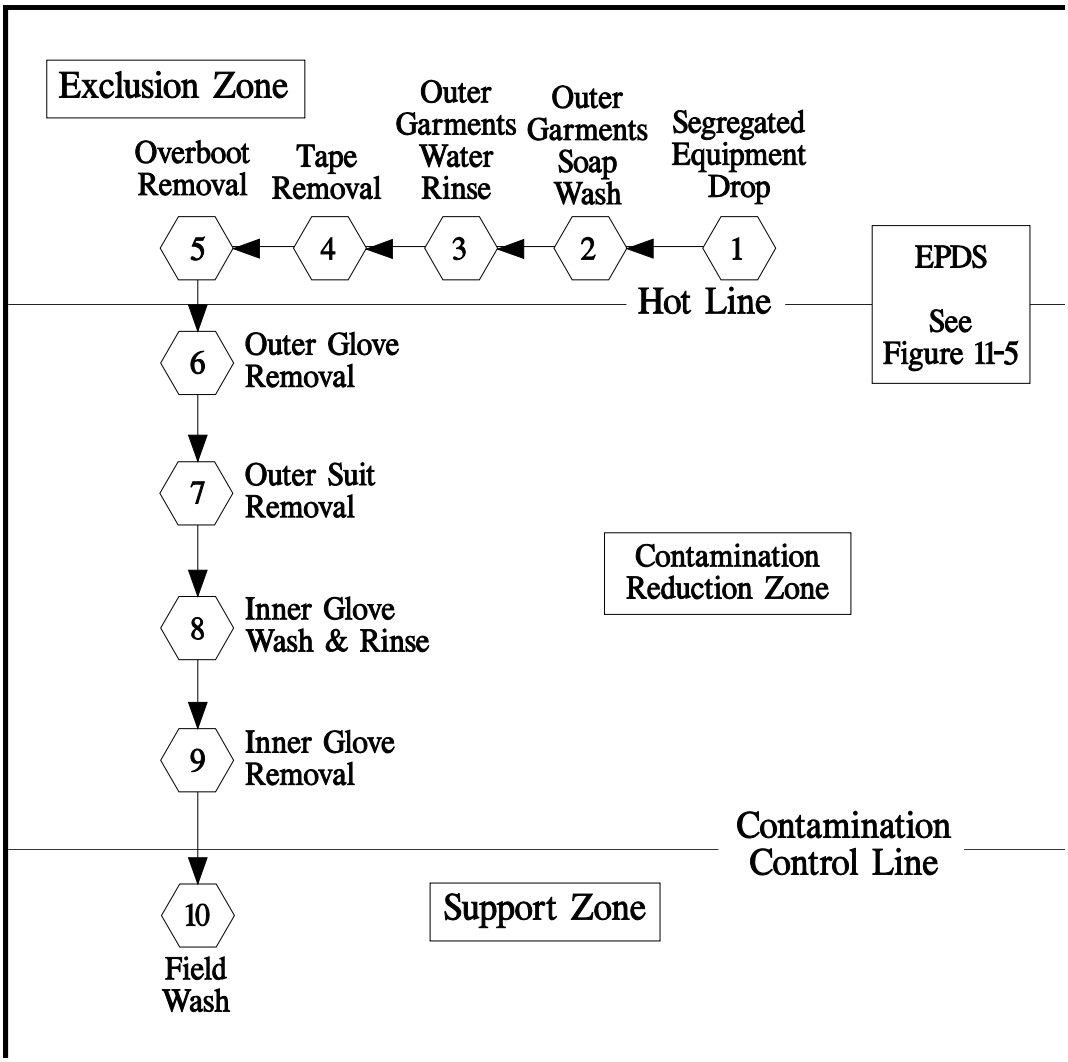
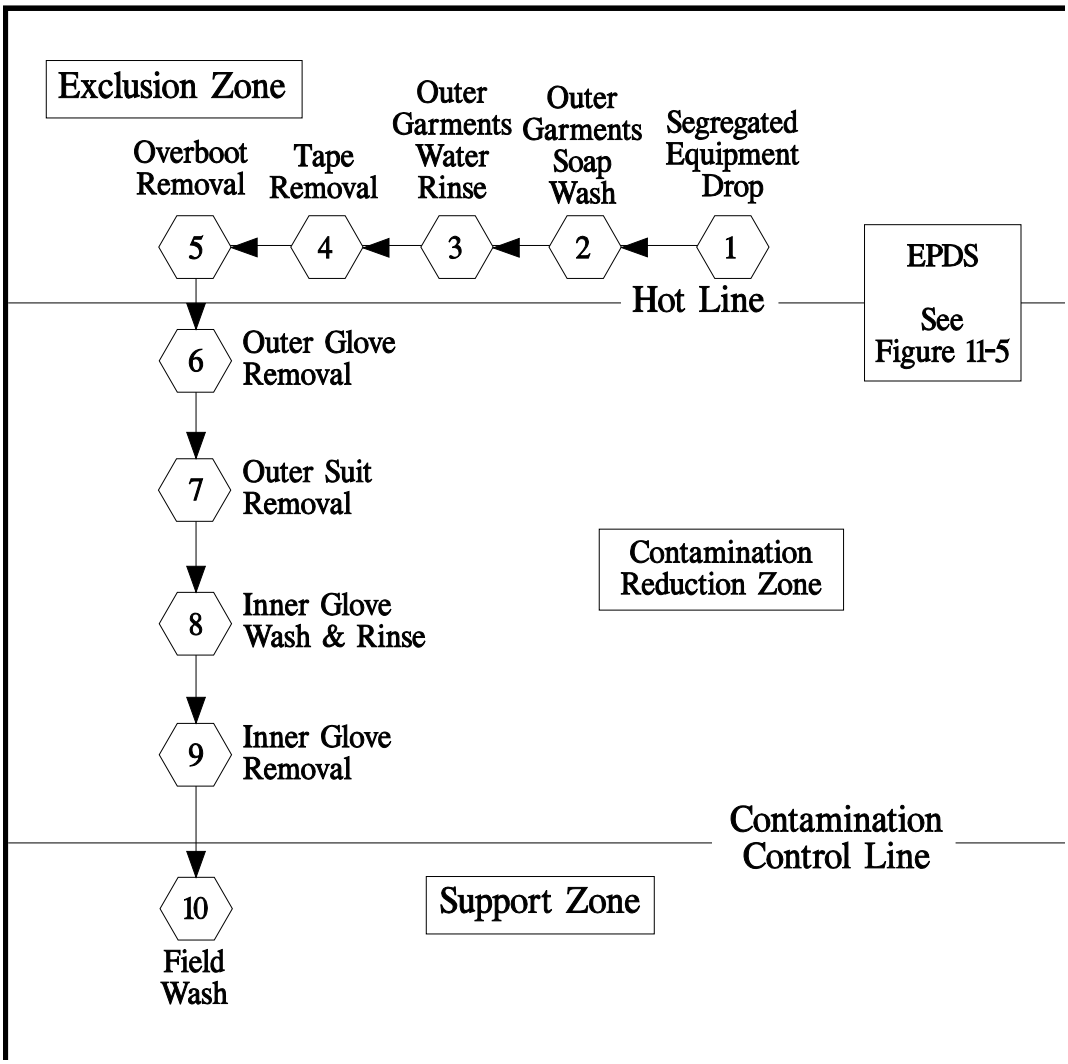


FIGURE 403-6: PDS FOR MODIFIED LEVEL D



1.0 SCOPE

This Environmental Safety and Health Procedure (ESHP) applies to all site personnel, including contractor and subcontractor personnel, and operations involved in the conduct of uncovering, inspecting or handling of drums and containers. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 2.0 of this ESHP for additional compliance issues. The purpose of this ESHP is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the handling of drums or containers.

2.0 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 the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed.

1. OSHA General Industry Standard 29 CFR Part 1910.120.
2. USACE EM 385-1-1, Section 28.H.

3.0 RESPONSIBILITIES

3.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the personnel and equipment resources needed to implement this ESHP. The PM will also determine if the requirements in this ESHP are relevant to the site and will incorporate this ESHP into site specific plans, procedures and training for sites where this ESHP is to be implemented.

3.2 SITE SUPERVISOR

The Site Supervisor (SS) will implement this ESHP for operations that involve site operations involving drum and container handling and removal. The SS will also discuss the relevant sections of this ESHP in the daily safety briefings. The SS will document information related to the daily implementation of this ESHP in appropriate site documentation logs and forms.

3.3 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA Corporate Environmental Safety and Health Program, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to the implementation of this ESHP and the protective measures used to safeguard site personnel.
4. Periodically auditing PIKA work sites to determine compliance with this ESHP.

3.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for assisting the SS and site personnel with the identification of safety and health hazards and the use of control techniques associated with this ESHP. The SSHO will assist the SS with the discussion of the requirements in this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will inspect site operations and conditions to make determine their initial and continued compliance with this ESHP and other regulatory guidelines.

4.0 PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in drum or container handling operations shall be familiar with the potential safety and health hazards associated with the conduct of this operation, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

4.1 SAFETY HAZARDS AND OPERATIONAL CONTROL TECHNIQUES

This ESHP is designed to provide site personnel with effective means of controlling the hazards encountered during the handling of drums and other waste containers encountered or generated during hazardous waste site operations. This ESHP also outlines the effective engineering controls, safe work practices, and personal protective equipment (PPE) to be used in drum/container handling. This ESHP shall be applicable to site operations where the handling of drums and containers is required during the conduct of site activities as outlined in this SSHP. These procedures apply to both hazardous waste drums/containers discovered on site, and drums/containers of waste generated during site activities.

4.2 GENERAL REQUIREMENTS

The following general requirements shall be followed or incorporated during the discovery, inspection, transportation and disposal of drums/containers of hazardous substances and waste:

1. Prior to handling drums or containers, all employees shall be warned of the potential physical and chemical hazards associated with the contents and the handling of the drums or containers.
2. Drums/containers used for the collection or transfer of waste materials shall meet the appropriate, DOT, OSHA, and EPA regulations for the wastes that they contain.
3. The SS and SSHO will coordinate to organize drum/container operations to minimize the amount of drum or container movement.
4. Unlabeled drums and containers located on site shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled.
5. Drums and containers that cannot be moved without rupture, leakage, or spillage shall be emptied into a sound, approved container using a device classified for the material being transferred.
6. Fire extinguishing equipment meeting the requirements of 29 CFR Part 1910, Subpart L, shall be on a hand and ready for use to control incipient fires.
7. Material handling equipment used to transfer drums and containers shall be selected, positioned and operated in such a manner as to minimize sources of ignition, related to the equipment, from igniting flammable gases and vapors.
8. Where an airline respirator system is used for any drum/container related activity, connections to the source of air supply shall be protected from contamination and the entire system shall be protected from physical damage.
9. The flow chart found in Figure 404-1 will be used as a guide to direct the course of drum/container handling, sampling, staging, bulking and shipment procedures outlined in this ESHP.

4.3 LOCATION AND REMOVAL OF BURIED DRUMS/CONTAINERS

Caution shall be used when buried drums or containers are to be located and removed so as to protect the safety and health of on site workers, the environment and the general public. Therefore, whenever site operations require the location and removal of buried drums/containers, the procedures listed below shall be followed:

1. A ground-penetrating system or other type of detection system or device shall be used to estimate the location and depth of buried drums or containers.
2. Soil or other material shall be removed with caution to prevent drum or container rupture.
3. When necessary, an observer will be stationed so as to assist the heavy equipment operator, and direct the operator in the movement of the bucket during removal of soil or covering material.
4. Excavation of soil to expose buried drums/containers shall be conducted IAW the provisions of ESHP-519 Excavation and Trenching Safety.

5. If an excavation must be entered by site personnel to facilitate soil removal, inspect the drum/container, rig the drum/container for lifting, or for any other reason, the SSHO shall evaluate the excavation to determine if conditions are safe for entry and to determine if the requirements of ESHP-504 Confined Space Entry must be implemented.

4.4 INSPECTION OF DRUMS AND CONTAINERS

Selection of drum handling, sampling and transportation procedures depends largely upon the contents and condition of the drum/container. Therefore, to the extent feasible, drums and containers shall be inspected, prior to any handling, to gain as much information as possible related to their integrity and contents. When assessing drum/container condition and integrity, the following items should be inspected and carefully documented:

1. Signs of structural deterioration, such as corrosion, rust or leaks.
2. Signs that the drum is under pressure, such as swelling or bulging.

When inspecting drums/containers to determine their possible contents, the following should be examined:

1. Symbols, words or other marks indicating the nature of its contents (e.g., radioactive, flammable, corrosive, etc.).
2. Symbols, words or other markings indicating that the contents may be discarded laboratory chemicals, reagents or other small size containers (< 5 gal. each) that are packaged together.
3. The configuration of the drumhead and the drum material (see Tables 404-1 and 404-2).

Table 404-1: Drum Configuration

Configuration	Information
Whole lid removable	Drum designed to contain solid materials.
Lid has a bung	Drum designed to contain liquids.
Drum contains a polyethylene or PVC liner	Drum may contain highly corrosive or volatile organic materials.

Table 404-2: Drum Hazards

Drum Material	Associated Hazards
Polyethylene or PVC-Lined Drums	Often contain strong acids or bases, or volatile organic materials.
Exotic Metal Drums (e.g. nickel, stainless steel, aluminum)	These drums are usually very expensive and are designed to contain extremely dangerous materials.
Single-walled Pressure Vessels	These containers have fittings for both product filling and placement of an inert gas, such as nitrogen. May contain reactive, flammable or explosive materials.

Laboratory Packs	Used for disposal of expired chemicals and process samples from laboratories, hospitals and other similar institutions. Individual containers inside are often packed in absorbent/protective material. Lab packs may contain a large variety of materials that may or may not be compatible when stored or mixed together, such as: flammable, shock-sensitive, highly corrosive, highly volatile, radioactive or extremely toxic materials

Drums that do not have exterior labeling indicating their contents must be assumed to contain hazardous materials, until characterized through sampling. Drums or containers that cannot be inspected before being moved because of storage conditions (i.e., buried beneath the earth, stacked behind other drums, stacked several tiers high in a pile, etc.) shall be moved to an accessible location and inspected prior to further handling.

4.5 OPENING DRUMS AND CONTAINERS

The act of opening a drum with unknown contents can present serious safety and health hazards. This activity requires management and site personnel to take the most conservative and protective means feasible to protect site personnel, the environment, and the general public. The guidelines listed below represent the minimum requirements to be followed during drum/container opening and may need to be amended based on updated site characterization data:

1. Employees not actually involved in opening drums or containers shall be kept a safe distance, and if possible upwind, from the drums or containers being opened.
2. If employees must work near or adjacent to drums or containers being opened, a suitable shield that does not interfere with the work operation shall be placed between the employee and the drums or containers being opened to protect the employee in case of accidental spill or explosion.
3. Controls for drum or container opening equipment, monitoring equipment, and fire suppression equipment shall be located behind the explosion-resistant barrier.
4. When there is a reasonable possibility of flammable atmospheres being present, monitoring shall be conducted to assess the atmosphere and material handling equipment and hand tools shall be of the type to prevent sources of ignition.
5. Drums and containers shall be opened in such a manner that excess interior pressure will be safely relieved, without the potential for worker exposure.
6. If pressure cannot be relieved from a remote location, appropriate shielding shall be placed between the worker and the drums or containers to reduce the risk of employee injury.
7. Whenever feasible, or if required by known hazards, remote container opening equipment (see Table 404-3) will be used, and the operation will be conducted in

a containment vessel designed to minimize the effects of a pressurized release or explosion.

8. Employees shall not stand upon or work from drums or containers.

4.6 HANDLING RADIOACTIVE WASTES

Drums and containers containing radioactive wastes shall not be handled until their hazard to personnel is properly assessed. This assessment of the hazards shall include determining the levels of radioactivity, the type of radioactive material expected and the potential for exposure during handling, sampling or transfer operations. If deemed appropriate by the CESHM, a Certified Health Physicist shall conduct the hazard assessment of radioactive waste drums/containers and exposure potential.

TABLE 404-3: DRUM/CONTAINER OPENING DEVICES

Remote Controlled Device	Use
Pneumatically powered impact wrench.	Designed to remove drum/container bungs.
Hydraulically or pneumatically operated drum or container pierce.	Puncture the top of the drum/container.
Backhoe bucket equipped with a non-sparking spike.	Puncture the top of the drum/container.
Pneumatically, hydraulically or electrically operated de-header.	Cuts off drum top, allowing full access to the contents, usually used on drums of solids.

4.7 HANDLING SHOCK SENSITIVE WASTES

Shock sensitive waste presents a serious threat to site workers due to the potential for explosion during drum/container opening, sampling or handling operations. As a minimum, the following special precautions shall be taken when drums and containers containing, or suspected of containing, shock-sensitive wastes are handled:

1. All non-essential employees shall be evacuated from the area prior to any operations, such as handling, opening, sampling or transfer.
2. Material handling equipment shall be provided with explosive containment devices or protective shields to protect equipment operators from exploding containers.
3. An employee alarm system capable of being perceived above surrounding light and noise conditions shall be used to signal the commencement and completion of shock sensitive waste handling activities.
4. Continuous communications (e.g., portable radios, hand signals or telephones, as appropriate) shall be maintained between the site personnel handling the shock sensitive drums/containers and the SSHO and site supervisor, located in the support zone, until such time as the handling operation is completed.
5. Communication equipment or methods that could cause shock sensitive materials to explode shall not be used.

6. Drums and containers containing packaged laboratory wastes shall be considered to contain shock sensitive or explosive materials until they have been characterized.

> ***Caution:*** *Shipping of shock sensitive wastes may be prohibited under U.S. Department of Transportation regulations. Employers and their shippers should refer to 49 CFR 173.21 and 173.50.*

4.8 HANDLING OF PRESSURIZED DRUMS/CONTAINERS

Pressurized drums/containers, as evidenced by bulging or swelling, are extremely dangerous and whenever possible, should not be moved until such time as the cause for excess pressure is determined and appropriate containment procedures have been implemented to protect employees from explosive relief of the material. To minimize the hazards associated with pressurized drums/containers, the following shall be observe and/or implemented:

1. If a pressurized drum/container must be moved, it will, whenever possible, be handled with a grappler unit designed for explosive containment.
2. Pressurized drums/containers shall be moved individually only as far as is needed to set them on solid ground where they can be further assessed.
3. Special engineering controls designed for splash/explosion containment shall be utilized when the pressure is released from the drum/container prior to sampling activities.
4. Overpack drums, first aid kits and fire extinguishers shall be staged near the area where pressurized drums are inspected and stored.

4.9 HANDLING LABORATORY WASTE PACKS

In addition to the requirements of paragraph 5.4 of this ESHP, the following precautions shall be taken, as a minimum in handling laboratory waste packs (lab packs):

1. Lab packs shall be opened only when necessary and then only by an individual knowledgeable in the inspection, classification, and segregation of the containers within the pack according to hazards of the wastes.
2. If crystalline material is noted on any container, the contents shall be handled as a shock-sensitive waste until the contents are identified.
3. Once a lab pack has been opened, a chemist or other person familiar with the identification and classification of waste chemicals shall inspect and segregate the containers inside.
4. Overpack drums, first aid kits and fire extinguishers shall be staged near the area where pressurized drums are inspected and stored.
5. Whenever possible, handle lab packs initially using a grappler unit designed for explosive containment.

4.10 SAMPLING OF DRUM/CONTAINER CONTENTS

Drum/container sampling shall be done in accordance with the sampling protocols and procedures outlined in the Work Plan (WP) or Site Safety and Health Plan (SSHP). The drum and container sampling protocols and procedures be written to meet the requirements of the Statement of Work (SOW) and any applicable EPA sampling protocols. Along with the requirements found in the WP or SSHP, the following shall be implemented, as applicable:

1. Whenever feasible, or necessary, drums/containers will be sampled in place, or moved a minimal distance to a sampling staging area.
2. All sampling and safety equipment shall be ready and available prior to initiating sampling activities.
3. Sampling personnel shall remain at a safe distance from the drum/container opening area while opening is being conducted, and shall enter the area only after opening operations are complete.
4. Whenever feasible, remote drum/container sampling equipment will be used to prevent site personnel from having to contact the drum/container.
5. Samplers shall not stand on or lean over the drum/container while sampling.

4.11 DRUM/CONTAINER STAGING

The staging of drums/containers is a critical element of the drum/container handling procedures. If staging is necessary due to the location or number of drums/containers, a staging ESHP shall be implemented which outlines the movement patterns and temporary staging areas to be used as drums/containers are processed. Prior to drum/container handling, the SSHO shall develop a site staging map (see Figure 404-2 for an example of a staging map) that will identify the location of the various staging areas around the site.

Along with the requirements outlined above, the following shall be implemented when drum/container staging is required:

1. Drum or container staging areas shall be kept to the minimum number necessary to identify and classify materials safely and prepare them for transport.
2. Staging areas shall be provided with adequate access and egress routes.
3. A system shall be developed for identifying/marking drums/containers as they are moved from one staging area to the next.
4. Drums/containers shall not be moved from one staging area to the next until all of the necessary tests/procedures for the staging area have been accomplished.

4.12 BULKING OF DRUM/CONTAINER CONTENTS

Bulking is the process where similar wastes from individual drums/containers are combined into larger containers to facilitate shipment and disposal activities. Since materials from a number of containers will be mixed together, it is imperative that the

materials be of a compatible nature. The mixing of incompatible materials can cause chemical reactions resulting in fire, explosion or the liberation of toxic and flammable gases/vapors. Therefore, the bulking of hazardous wastes shall be permitted only after the SSHO has consulted with the PIKA Certified Industrial Hygienist to determine which materials can be combined together.

4.13 SHIPPING AND TRANSPORTATION

All hazardous waste drums/containers to be shipped off site shall be handled according to the procedures specified below:

1. Drums and containers shall be identified and classified prior to packaging for shipment.
2. All hazardous waste shall be contained and/or packaged in DOT approved drums/containers.
3. All drums/containers shall be labeled IAW EPA and DOT requirements prior to shipping.
4. Site personnel shall use drum dollies, pallets and fork trucks, as appropriate, to facilitate the loading of drums/containers onto transport vehicles.
5. All required documentation, such as the EPA required Uniform Hazardous Waste Manifest (EPA Form 8700-22), shall be prepared and available to the transporter prior to loading.

4.14 TANK AND VAULT PROCEDURES

Tanks and vaults found on site require special consideration due to their size, configuration and the potential quantity of material that may be stored in them. The following shall be implemented to safely handle tanks and storage vaults found on site:

1. Tanks and vaults containing hazardous substances shall be sampled and handled in a manner similar to that for drums and containers, taking into consideration the size of the tank or vault.
2. Appropriate tank or vault entry will be conducted IAW procedures described in ESHP-504 Confined Space Entry whenever employees must enter a tank or vault.
3. All slings, chokers, cables, etc. used for lifting or securing tanks/vaults shall be inspected prior to use and the load/configuration capacity shall not be exceeded.

4.15 SPILL PREVENTION

Due to the potential for spills, which may result from handling deteriorated drums/containers, spill containment and collection equipment shall be located on site prior to initiating drum and container handling activities. The following shall apply when spills must be contained and cleaned up safely:

1. DOT specified salvage drums or containers and suitable quantities of proper absorbent shall be kept available and used in areas where spills, leaks, or ruptures may occur.

2. Where major spills may occur, spill containment procedures, which are part of the Emergency Response Plan found in the SSHP, shall be implemented to contain and isolate spilled materials.
3. If flammable or explosive materials could be spilled, spill clean-up materials shall be spark proof, and all ignition sources shall be removed or extinguished prior to personnel engaging in clean-up activities.

5.0 SAFETY AND PPE REQUIREMENTS

The following safety measures and personal protective equipment (PPE) shall be used in preventing or reducing exposures associated with drum and container handling operations.

1. Personnel will wear the type and level of PPE specified in the SSHP.
2. Personal and work area monitoring for radiological hazards, and toxic gases, vapors and dusts will be conducted as specified in the SSHP for drum and container operations.
3. Personnel entering tanks or vaults will wear the retrieval and safety equipment specified in ESHP-504 Confined Space Entry.
4. All provisions and requirements specified in other ESHPs that apply to drum and container-handling operations (i.e., excavation and trenching, heavy equipment operation, etc.) shall be followed.

6.0 AUDIT CRITERIA

The following items related to drum and container-handling operations will be audited to determine compliance with this ESHP:

- The Daily Operational and Safety Logs;
- The Documentation of Training form for the initial site hazard training;
- The Documentation of Training forms for the Daily Tailgate Safety Briefings; and
- The Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

None.

FIGURE 404-1: DRUM AND CONTAINER HANDLING FLOW CHART

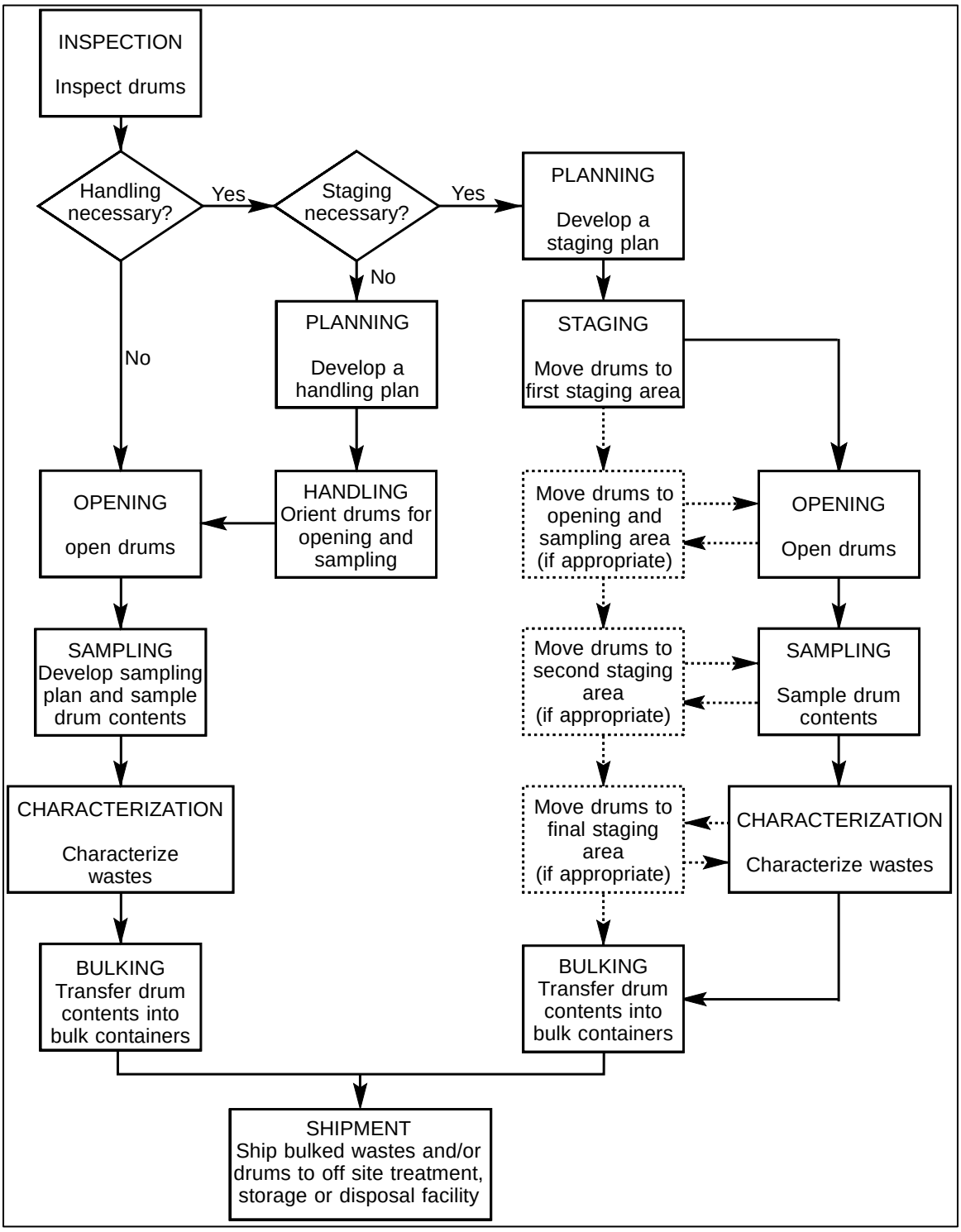
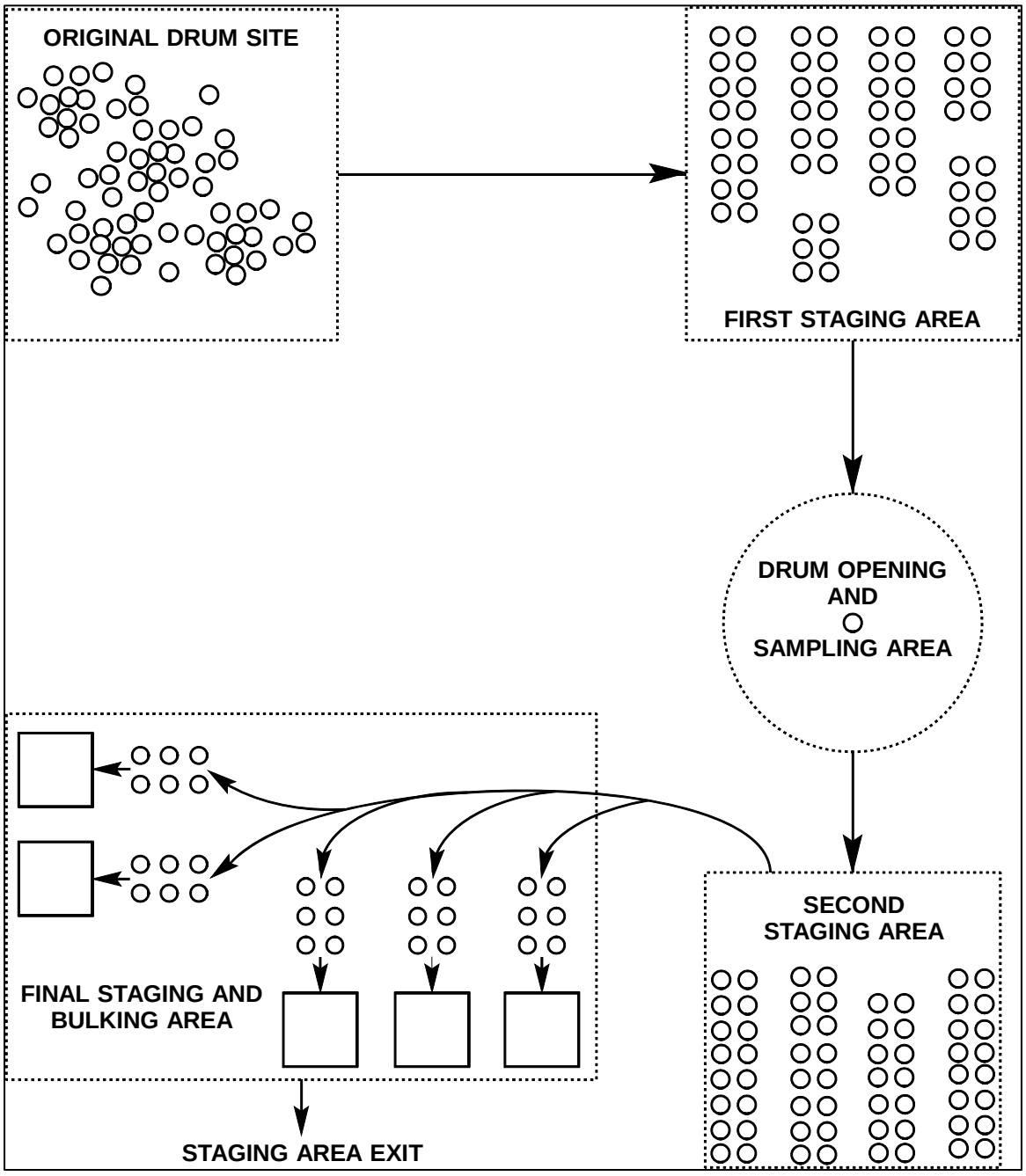


FIGURE 404-2: EXAMPLE SITE STAGING AREA MAP



1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide PIKA personnel with master copies of safety and health forms referenced in PIKA's Corporate Environmental, Safety and Health Program (CESHP) and ESHPs. The forms attached to this ESHP are numbered and are electronically locked as form templates. This will allow PIKA personnel to easily and effectively complete the fields they wish to type. However, to accommodate this format, many of the extra lines that previously were used for hand writing information have been removed.

2.0 SCOPE

This ESHP applies to PIKA projects where PIKA personnel are engaged in on-site activities that require the use of a specific form as outlined in the CESHP ESHPs. The forms in this ESHP are to be the only versions of the forms to be used. Revisions to the forms and the subsequent distribution of the revised edition will be made using PIKA's Document Control Program.

3.0 REFERENCES

No Federal, state or local regulations apply to this ESHP. However, the following PIKA policies and procedures are applicable to the implementation of this ESHP.

- PIKA CESHP.
- PIKA ESHP-525, Site Safety and Health Officer (SSHO) ESHP.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) is responsible for both quality and safety on projects to which they are assigned. As such, the PM will be responsible for ensuring that site management personnel utilizing these forms do so in a manner that effectively and efficiently captures required project data. Additionally, the PM will also make sure that the Site Supervisor (SS) is provided ample administrative supplies to allow for the effective storage, maintenance and archiving of project-related MEC forms.

4.2 SITE SUPERVISOR

The SS will implement this ESHP and determine that the Site Safety and Health Officer (SSHO) effectively utilizes the forms in this ESHP that apply to the work being conducted on the site. Where called upon by a form, the SS will review the form contents for completeness and accuracy and sign in the appropriate space provided.

4.3 SITE SAFETY AND HEALTH OFFICER

The SSHO will be responsible for completing ES&H forms relevant to the project and will properly use, complete, store, and maintain the ES&H forms that are relevant to

the project. On projects involving the Munitions and Explosives of Concern (MEC), the SSHO will assist the SS as needed in the preparation of the MEC-related forms at the completion of the project to allow for the effective archiving of the data.

5.0 PROCEDURES

No procedures are required of this ESHP.

6.0 AUDIT CRITERIA

Forms attached to this document may be considered auditable items if they are required by a PIKA ESHP that applies to on-site operations.

7.0 ATTACHMENTS

The following forms are attached to this ESHP.

ESHF-501.....Weekly Safety and Health Discussion Checklist
ESHF-502..... Daily Task and Safety Briefing Log
ESHF-503.....Safety Training Attendance Log
ESHF-504.....Safety Observer Report Form
ESHF-505..... Documentation of Hazard Communication Training Form
ESHF-506..... Daily Inspection and Weekly Audit Report Form
ESHF-507..... Vehicle Inspection Checklist and Report Form
ESHF-508..... Equipment Inspection Checklist and Report Form
ESHF-509.....Safety and Health Report Form
ESHF-510.....Site Safety and Health Plan Review Form
ESHF-511.....Three-day Supervised On-site Training Form
ESHF-512..... Certification of Task Hazard Assessment Acknowledgement Form
ESHF-513..... Certificate of Task Hazard Assessment Form
ESHF-514..... Accident / Injury / Near-Miss Report Form
ESHF-515.....Excavation and Trenching Notification Worksheet
ESHF-516.....Excavation and Trenching Inspection Checklist
ESHF-517.....Respiratory Protection Issue Log
ESHF-518.....Documentation of Qualitative Fit Testing Form
ESHF-519..... Respirator Fit Test Cards
ESHF-520.....Post BBP Exposure Evaluation and Follow-up Form
ESHF-521.....Hepatitis B Vaccine Declination Form
ESHF-522.....Permit-required Confined Space Entry Permit
ESHF-523.....Low-hazard Confined Space Entry Permit
ESHF-524.....Permit-required Confined Space Reclassification Certificate
ESHF-525..... Confined Space Entry / Exit Log
ESHF-526.....Site Visitors Entry and Exit Log
ESHF-527.....Heat Stress Monitoring Log
ESHF-528.....Chemical Inventory Report Form

ESHF-529.....Certificate of Activity Hazard Analysis Form
ESHF-530.....Personal Protective Equipment Training Form
ESHF-531.....Integrated Air Sampling Log and Report Form
ESHF-532.....Exclusion Zone Entry and Exit Form
ESHF-533.....Site Monitoring Form
ESHF-534.....Employee Safety Orientation Checklist Form

GENERAL SITE INFORMATION			
Contract No.:	Date:	Time:	Log No.:
Project Name and Location:			
Site Supervisor:	SSHO:		

Item	Discussion Issues				
1	**What are the tasks to be conducted this week?**				**Level of PPE**
2	**Heavy equipment to be used during the week's operations (Provide relevant information listed below)**				
	Manufacturer	**Type**	**Model Number**	**Special Attachments**	
3	**Expected weather conditions for the week (List for applicable days):**				
	Monday:				
	Tuesday:				
	Wednesday:				
	Thursday:				
	Friday:				
	Saturday:				
	Sunday:				
4	Number of personnel on the site - _____ New personnel mobilizing to the site this week. _____				
	Are any personnel demobilizing from the site? If so, please list: _____				

	The following are relevant to activities for this week (Discuss 'Yes' items in the comment section below):	**Yes**	**No**
5	Special physical, chemical, or biological hazards may be associated with the tasks being conducted.		
6	Changes to PPE are needed from that specified in SSHP.		
7	Additional PPE items or safety and health supplies will be needed this week.		
8	Deficiencies have been noted in equipment or vehicles (attach inspection/audit forms).		
9	Injuries, accidents or near misses that occurred last week on this or other sites (list in comments).		
10	Decontamination procedures for personnel or equipment are required and established.		
11	Training or medical surveillance will be required for site personnel.		
12	Site monitoring or sampling will be needed for airborne or physical hazards to be conducted this week.		
13	There have been specific safety or health concerns, comments, or questions from the client in the last week.		

	Compliance Issues (Discuss 'No' items in the comment section below)	Yes	No	NA
14	Proper communications are available on site and properly functioning			
15	Proper decontamination control is established and adequate			
16	Explosive operations and storage issues are being performed IAW project plans			
17	Are personnel adequately trained to perform specific task functions and certifications are on site			
18	Assigned levels of PPE are adequate for the tasks being performed			
19	Site control is being maintained in accordance with the site plans			
20	Flammable storage locations are established and approved fire protection is provided.			
21	Adequate first aid and emergency response supplies are on site and properly maintained.			
22	Emergency services are available and hospital routes have been checked recently.			

Comments (include the item number for each comment): _____

Signatures (Completed form may be emailed, but original with signatures is to be sent to PIKA S&H Manager):

SSHO Signature: _____ Site Supervisor Signature: _____

Corporate Reviewer: (Printed) _____ (Signature) _____ Date: _____

I. GENERAL PROJECT AND SITE INFORMATION			
Date:	Instructor(s):	Time:	Log No.:
Site Name & Location:			
Contract No.:		Contract No.:	
Site Supervisor or SUXOS:		SSHO:	

II. SAFETY AND HEALTH TOPICS COVERED

Tasks Being Conducted:

Applicable CTHA/AHA's Reviewed for Today's Tasks:

Additional Safety Concerns:

Permits Required: ☐ Safe Work Permit ☐ Excavation Permit ☐ Penetration Permit ☐ Other: _____
☐ Hot Work Permit ☐ Lift Plan ☐ Lockout / Tagout _____

Heavy Equipment to be Used Today:

Site Control and Buddy Procedures:

Sub Contractors Working On-site Today and Their Tasks:

Emergency Procedures:

Assembly Locations:

Scheduled Deliveries for Today:

III. DAILY SAFETY BRIEFING ATTENDEES		
Name (printed)	**Signature**	**Organization**

I certify that the personnel listed on this roster have received the safety and health training described above.

Site Safety and Health Officer

Sr. UXO Supervisor or Site Supervisor

Date:	Instructor(s):	Time:	Log No.:
Site Name & Location:			
Contract No.:		Task Order Number:	
Site Supervisor or SUXOS:		SSHO:	

I. TRAINING PROVIDED

☐ Initial Site Hazard Training ☐ Weekly Safety Training ☐ Other:

☐ Task/Hazard-specific Training (list task/hazard):

II. TRAINING TOPICS COVERED

Description of the S&H Topics Covered:

III. TRAINING COURSE ATTENDEES

Name (printed)	Signature	Organization

IV. TRAINING VERIFICATION

I certify that the personnel listed on this roster have received the safety and health training described above.

Site Safety and Health Officer

Sr. UXO Supervisor or Site Supervisor

Assigned Safety Observer:	Date:
PIKA Project #:	Report #:
Site Name and Location:	

Description Of Work Performed : _____

Slips, Trips, Falls: _____

Struck By/Against: _____

Strains/Sprains: _____

Fire/Explosion: _____

Burns, Chemical/Heat: _____

Exposure To Contaminants: _____

Unsafe Acts Observed: _____

Unsafe Conditions Observed: _____

Safe Behavior Observed and Recognized: _____

Other/Comments: _____

Signature of Safety Observer: _____

Safety Observer Reviewed By: (Supervisor): _____

I. SITE INFORMATION

Site Name:	Date:
Location:	Instructor:
Contract Number:	Delivery Order Number:

II. HAZARDOUS SUBSTANCES/PRODUCTS AND MSDS's REVIEWED

Initial	Hazardous Substance/Product	Initial	Hazardous Substance/Product

III. TRAINING ELEMENTS COVERED

Initial	Topic	Initial	Topic
	Requirements of 29 CFR 1910.1200		Target organs affected
	Elements of PIKA's HAZCOM Program		Physical hazards (fire, explosion, etc.)
	Local of Program, MSDS's & Inventory		Detection of and protection from exposure
	Hazardous substance operations/processes		Spill/emergency response
	Acute/chronic health hazards		Labeling requirements

IV. TRAINING COURSE ATTENDANTS

My signature indicates that I have received training in the above listed topics as they relate to the hazardous substances and products with which I work, and I am familiar with the requirements of the PIKA Hazard Communication Program.

Name (printed)	Signature	Company/Organization

GENERAL SITE INFORMATION			
CONTRACT NO.:	**DATE:**	**TIME:**	**LOG NO.:**
SITE NAME AND LOCATION:			
SITE SUPERVISOR:		**SSHO:**	

WEATHER CONDITIONS: _____

AREAS INSPECTED: (List by location, team, or task) _____

INSPECTION RESULTS

Item Description	Pass	Item Description	Pass
1. Personal Protective Equipment (PPE) per SSHP	Y / N	9. OE Detection Equipment Use/Calibration	Y / N
2. Work Practices Follow SSHP/WP	Y / N	10. Monitoring/Sampling Equip. Calibration/Use	Y / N
3. Site Control established per SSHP	Y / N	11. Heavy Equipment Insp./Maintenance/Use	Y / N
4. First Aid Kit(s)/Eyewash Station(s)	Y / N	12. Hand and Power Tool Insp./Maintenance/Use	Y / N
5. Fire Extinguisher(s)	Y / N	13. Site House Keeping & Sanitation	Y / N
6. Flammable Storage Areas	Y / N	14. Explosives / OE / Other Storage Areas	Y / N
7. MSDSs and Container Labeling per SSHP	Y / N	15. Other: (list)	Y / N
8. On- and Off-Site Communications	Y / N	16. Other: (list)	Y / N

SUMMARY OF DEFICIENCIES NOTED: (If Required) _____

CORRECTIVE ACTIONS RECOMMENDED: (If required) _____

RE-INSPECTION RESULTS: (If required) _____

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	_____ Site 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 PIKA Corporate Safety and Health Manager.

Site Name / Location: _____

Site Supervisor: _____ **Vehicle:** _____
(MAKE AND LICENSE PLATE #)

Date Inspected: _____ **Mileage:** _____ **Owner:** _____
(RENTAL, PIKA, GFE, CONTRACT)

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

1. DOCUMENTATION:	Pass	Fail	5. BRAKES:	Pass	Fail
Registration and License Plate			Hand/Emergency		
Insurance			Service		
Emergency Route Map & Phone #s					
2. TIRES:	**Pass**	**Fail**	**6. BELTS:**	**Pass**	**Fail**
Pressure			Proper tension		
Condition			Condition		
3. EQUIPMENT:	**Pass**	**Fail**	**7. GENERAL:**	**Pass**	**Fail**
Fire extinguishers			Windshield		
First Aid/CPR/Burn Kits			Windshield Wipers		
Bloodborne Pathogen Kit			Windows (Condition/Operation)		
Eyewash Kits t			Seat Belts		
Spare Tire			Steering		
Tire Changing Equipment			Horn		
Tie downs *			Gas Cap		
Chocks *			Mirrors		
Placards *			Door/Window Handles/Latches		
Other (list):			Cleanliness		
Other (list):			Exhaust System *		
4. FLUID LEVELS:	**Pass**	**Fail**	**8. LIGHTS:**	**Pass**	**Fail**
Oil			Headlights (high & low)		
Coolant			Brake Lights		
Brake			Parking		
Steering			Back-up		
Transmission			Turn Signals		
Windshield Wiper			Emergency Flashers		
Fluid Leaks			Interior Lights		
Last Oil Change					

(Notes: 1. Items marked with an * are required for explosive carriers and must be inspected prior to each use.
2. Vehicle inspection forms with failures are to have the deficiencies noted and copy of the form forwarded within two working days to the PIKA PM and the Corporate Safety and Health Manager.)

Description of Deficiencies: _____

_____

_____

_____

Corrective Actions to be Taken: _____

_____

_____

Inspection Conducted By: _____ _____
Name Printed Signature

Deficiencies Corrected By: _____ _____ Date: _____
Name Printed Signature

Site Name & Location:					
Contract No.:			**Task Order Number:**		
Site Supervisor or SUXOS:			**SSHO:**		
Log #:	**Date:**	**Time:**	**Odometer Reading:**	**Hour Meter Reading:**	**Fuel Level:**

Make/Description: _____ **Model:** _____ **Serial No.:** _____

Mark the "Pass" column to indicate that the item is present and in proper working condition. If required but absent or deficient check "Fail" and describe the deficiency and the required corrective action in the "Discrepancy/Comments" box. If an item does not apply to the equipment being inspected, enter "NA". All listed items must have a response.

Item	Pass	Fail	NA	Deficiency and Required Corrective Action
Service Brakes				
Emergency Brakes				
Parking Brake				
Brake Lights				
Back-up Alarms				
Horn				
Tires				
Spare Tire & Tire Changing Equip.				
Steering				
Seat Belt				
Operating Control				
Fire Extinguisher				
Head and Tail Lights				
Mirrors				
Windshield				
Windshield Wipers and Washers				
Coupling Devices				
Guards for Moving Parts				
Brake – Hydraulic				
Brake Fluid				
Hydraulic Oil				
Engine Oil and Coolant				
Roll Over Protection System				
Falling Object Protection System				
Other:				
Other:				
Other:				

Inspection conducted by: _____ _____
Name Printed Signature

Deficiencies corrected by: _____ Date: _____

Note: Forms with deficiencies are to be faxed to the PM and the Safety/Health Manager within two working days of inspection.

GENERAL SITE/EMPLOYEE INFORMATION

Site Name and Location:		
Employee Name:	SSN:	D.O.B.:
Site Supervisor:	Site Safety and Health Officer:	
Date of Incident	Approx. Time of Incident:	Date of Report:
Employee Job Title:	Task Being Conducted:	
PPE Being Worn at Time of Incident:		

DESCRIPTION/NATURE OF THE INCIDENT

Description of Incident (Use additional paper if needed): _____

_____

_____

_____

Investigation Conducted By: _____ _____

RESULTS OF INCIDENT INVESTIGATION

The reported incident (☐ was/☐ was not) a documented violation of safety or health policy, procedure or regulation.
Relevant Notes Related to the Incident: _____

_____

_____

_____

Type of Violation: (Check all that apply) ☐ Minor Violation ☐ Major Violation ☐ 1st Violation ☐ 2nd Violation ☐ 3rd Violation

Violation Involved: (Check all that apply) ☐ Fed Regulations ☐ PIKA CESHP ☐ PIKA ESHP ☐ SSHP ☐ Client Regulations ☐ Other (list): _____

Result of Incident: ☐ Near Miss ☐ Property Damage ☐ Personal Injury ☐ Vehicle/Equipment Damage
(Check all that apply ☐ Lost Work Time ☐ Limitation of Duties ☐ Other (If box checked, explain in detail)

_____

Had Employee Received Training/Briefings Related to the Requirements Listed Above ☐ Yes ☐ No

Required Medical Testing: ☐ Breath Alcohol Testing: (Time/Date _____/_____) Results: ☐ (+) ☐ (-)
☐ Drug Screen: (Time/Date _____/_____) Results: ☐ (+) ☐ (-)

Status at Time of Report: ☐ Returned to Work with Verbal Warning ☐ Returned to Work with Written Warning
☐ Suspended Pending Review ☐ Other: _____

Corrective Measures to be Implemented: _____

_____

_____

SIGNATURES

Employee Signature: _____ Date: _____

SSHO Signature: _____ Date: _____

Corrective Actions Completed By (Printed Name): _____
(Signature): _____ Date: _____

PIKA Corp. S&H Review By (Printed Name): _____
(Signature): _____ Date: _____

Site personnel shall sign this form after having read the SSHP, and will do so prior to being allowed to perform operations on site involving known or potential exposures to safety of health hazards.

EMPLOYEE STATEMENT

My signature below indicates that I have read the SSHP and have received answers to any questions that I had related to the SSHP. My signature further indicates my willingness to comply with the provisions and requirements of the SSHP.

Project Name/Location:			
Date:	Organization	Printed Name	Signature

Site Name & Location:	
Contract No.:	**Task Order Number:**
Site Manager or SUXOS:	**SSHO:**

The site personnel listed below have received Site Hazard Information Training as specified in 29 CFR 1910.120(i) and have participated in three-days of supervised on-site training as required by 29 CFR 1910.120(e)(3)(i). The Site Hazard Information Training included information related to the nature, level, and degree of exposure likely to result during participation in site operations. The 3-Day Training has included: a description of the site chain-of-command; use/care/maintenance of PPE; personnel and equipment decon procedures; safe work practices; medical/training requirements; and emergency response procedures.

Name (printed)	Signature	Organization	Date Training Started	Date Training Completed

Project Name & Location:	**Briefing Conducted By:**
Project Phase:	**Task Discussed:**
Site Supervisor / SUXOS:	**SSHO:**

Acknowledgement of Understanding

My signature below indicates that I have been briefed on the above Certification of Task Hazard Analysis (CTHA) Form for the above referenced task conducted as part of the referenced project phase. My signature also indicates that I understand the hazards associated with the task and the hazard control requirements specified in the CTHA form, and will comply with and adhere to the requirements specified in this briefing.

Date	Name (print)	Signature	Company

Task Name: **DATE:**

Task Description:

Hazard Identification: Items checked are known or anticipated site hazards, or may occur as a result of site operations.

[ ] Physical Exertion	[ ] Lifting hazards	[ ] Confined space
[ ] Heat Stress (Late Spring - Fall)	[ ] Slip, trip or fall (man lift entry/exit)	[ ] Hazardous plants
[ ] Cold Stress	[ ] High noise (>85 dBA)	[ ] Hazardous wildlife
[ ] Heavy equipment operations	[ ] Overhead hazards	[ ] UV radiation (strong sunlight)
[ ] Man lift operations	[ ] Underground utilities	[ ] Hand/Power Tool use
[ ] Fire hazards (underline)	[ ] Intrusive activity (underline)	[ ] Biological materials
• **Gasoline/Diesel use**	• Soil drilling	[ ] Skin contact w/ haz materials
• Explosives handling/storage	• Soil excavation	[ ] Ordnance and explosives
• Explosive gases/vapors	• Setting stakes/rods/monuments	[ ] Cut/Puncture from sharp objects

Degree of Hazard: Chemical Hazard: [ ] Low [ ] Serious [ ] Moderate [ ] Unknown Phys./Bio. Hazard: [ ] Low [ ] Serious [ ] Moderate [ ] Unknown

Engineering Controls (list):

Task-specific Training	[ ] 40-Hr HAZWOPER Training [ ] 8-Hr Refresher Training [ ] Initial Site/Task Hazard Training	[ ] PPE Training [ ] Heavy Equipment Operator [ ] Confined Space Training	[ ] Task-specific Training (see Comment section below) [ ] Other
Medical Examinations	[ ] Hazardous Waste Physical [ ] Respirator Assessment	[ ] Asbestos Worker [ ] Lead Abatement Worker	[ ] Task-specific tests List:
Monitoring and Sampling:	[ ] Real-Time Monitoring Hazard: Heat Stress, Noise	[ ] Integrated Air Sampling Contaminant – (List)	[ ] Perimeter Sampling Contaminant – (List)
Decontamination:	[ ] Heavy Equipment	[ ] Personnel	[ ] Equipment / Tools
Level of PPE	[ ] A [ ] C [ ] Modified [ ] B [ ] D	**Respiratory Protection**	[ ] ½ Face [ ] Full face [ ] None [ ] Cartridge (List):
Protective Clothing	[ ] Chemical Protective Clothing Type (List):	**Gloves (Specify inner/outer)**	[ ] Outer: Leather [ ] Inner:
Head/Face/Eye/Ear Protection	[ ] Safety glasses [ ] Ear plugs or ear muffs	[ ] Safety goggles [ ] Face shield	[ ] Hard hat [ ] Other:
Foot/Leg Protection	[ ] Work boots [ ] Steel-toed leather boots	[ ] Steel toe covers [ ] Snake leggings	[ ] Chemical over boots [ ] Kevlar™ Chaps

PPE Modifications Allowed/Required:

Specialized Equipment Required:

Specialized Inspections Required:

Comments / Recommendations:

Certification: The PPE and controls listed above for the specified task have been selected as a result of a task-specific hazard assessment conducted by individual identified below.

Printed Name: Drew Bryson, CIH, MPH **Signature:** _____

SECTION 1 - GENERAL SITE AND PERSONNEL INFORMATION

Employee Name:	SSN:		Case No.:
Job Title:	D.O.B.:	Sex:	Age:
Site Name and Location:			
Site Supervisor	Site Safety and Health Officer		
Date of Report:	Date of Incident:	Time of Incident:	
Task/Operation Being Conducted:			
PPE Worn:			

SECTION 2 - CONDITIONS AT TIME OF INCIDENT

Temperature: _____°F Relative Humidity: _____% Degree of Cloud Cover: _____%
Wind Speed: _____MPH Direction: _____ Other: _____

Type of Incident: ☐ Personal Injury ☐ Personal Illness ☐ Chemical Exposure ☐ Motor Vehicle ☐ Heavy Equipment ☐ Property Damage ☐ Near Miss

If chemical exposure, what material(s) was(were) involved: _____
What was the nature of exposure (contact, inhalation, etc.): _____

Other Individual(s) Involved: _____

SECTION 3 - PERSONAL INJURY/ILLNESS INFORMATION

Nature/Type of Injury/Illness (laceration, strain, etc.): _____

Cause of Injury/Illness: _____

Body Part(s) Affected: Primary: _____ Secondary: _____

Injury/Illness Required: ☐ On Site First Aid Treatment ☐ Emergency Room Treatment ☐ Hospitalization

Injury/Illness Resulted In: ☐ Loss of Work Time ☐ Restriction / Limitation of Duties ☐ Fatality ☐ Other: (Explain): _____

Status at Time of Report: ☐ Returned to Work: (Date: _____) ☐ Hospitalized: (Anticipated Stay: _____) ☐ Convalescing: (Anticipated Length of Convalescence: _____) ☐ Other: _____

On-site First Aid Treatment Given (use additional paper if needed): _____

Off-site Medical Treatment (attach documentation, including Physician statement): _____

SECTION 3 - MOTOR VEHICLE/HEAVY EQUIPMENT ACCIDENT INFORMATION

Type of Vehicle/Equipment	Type of Collision	Seat Belt Use
☐ Car/Van ☐ Van/Truck ☐ Heavy Equip. ☐ Other:	☐ Side Swipe ☐ Rear End ☐ Backing ☐ Head On ☐ Broadside ☐ Roll	Front Seat ☐ Yes ☐ No Back Seat ☐ Yes ☐ No

Property/Material/Items Involved

Name of Item	Owner	$ Amount of Damage

SECTION 4 - POST ACCIDENT/INJURY/ILLNESS REVIEW

Has the PIKA Home Office been notified? ☐ Yes ☐ No, If Yes, When? _____ By Whom? _____

Were operations conducted using approved PIKA ESHP or a SSHP?
☐ Yes Reference: _____
☐ No Explain: _____

Accident Description (Use additional paper if needed): _____

SSHO's Comments (use additional paper if needed): _____

Employee Comments (use additional paper if needed): _____

Corrective Actions Taken (use additional paper if needed): _____

Witnesses

Name	Organization	Phone Number

SECTION 5 - SIGNATURES

Employee Signature: _____ Date: _____

SSHO Signature: _____ Date: _____

Corrective Actions Completed By: _____ Date: _____

PIKA Corp. Review By: _____ Date: _____

GENERAL INFORMATION			
Contract No.:	Delivery/Task Order No.:	Client:	
Project Name and Location:			
City:	County:	State:	Date:
Site Conditions: _____			

Site Supervisor:	Excavation Supervisor:
Site Safety and Health Officer:	Registered Engineer:
Excavation Subcontractor:	Emergency Contact:

Project Description: _____

EXCAVATION / TRENCH INFORMATION

Purpose for Excavation:		
Excav. Start Date:	Est. Completion Date:	Excav./Trench Entry Allowed: ☐ Y ☐ N
Estimated Depth: __ max / ___ min	Estimated Width: ___ max / _____ min	Estimated Length: _____ max / ___ min
Anticipated Soil Type: ☐ A (clay, silty/sandy clay); ☐ B (crushed rock, silty/clay loam); ☐ C (granular gravel/sand; loamy sand)		
Utilities Expected: ☐ Yes ☐ No	Adjacent Structures ☐ Yes ☐ No	Surface Obstructions: ☐ Yes ☐ No

If 'Yes' To Any Of The Above, List: _____

Anticipated Protection Method(s): ☐ Sloping (Angle ____1); ☐Timber Shoring; ☐ Mechanical Shoring; ☐None Needed

Note: Data/drawings for protective systems will be designed and/or approved by a registered engineer and maintained on-site.

Potential Chemical Hazard Sources Nearby or Present at Site: ☐ Yes ☐ No If 'Yes', List Possible Contaminants: _____

Earth Moving Equipment To Be Used:

Registered Engineer: _____ Signature	Project Manager: _____ Signature
Phone No. ( ) _____	Phone No. ( ) _____

SAFETY AND HEALTH USE ONLY

PIKA Permit No.:	Date Issued:	Date Expires:
Issued By:	State/OSHA Notification Date:	District Office:
Contact:	Phone No.: ( )	Notified By:

GENERAL SITE INFORMATION		
Date:	Location:	Time:
Contract No.:	Delivery Order No.:	Competent Person:

Weather/Excavation Conditions: _____

PERSONNEL/EQUIPMENT PROTECTION PROCEDURE COMPLIANCE	Yes	No	NA
1. Excavation/trench has been reviewed by a competent person and safety requirements have been established?			
2. Underground utilities have been identified and located?			
3. Protection system (shoring, sloping, etc.) has been selected, installed, and monitored daily?			
4. Adjacent surfaces encumbrances have been removed or are adequately barricaded?			
5. Where employees are permitted to cross the excavation, are walkways/bridges provided?			
6. Ramps and bridges have been designed by a competent person?			
7. A safe means of egress have been provided within 25 feet of every employee?			
8. If mobile equipment must operate next to the excavation, are suitable barricades, flagging, stop logs, or berms provided to prevent encroachment on bank edges?			
9. Are employees exposed to overhead loads handled by lifting or excavating equipment?			
10. Atmospheric monitoring is being conducted where hazardous atmospheres could reasonably be expected?			
11. If the excavation or trench is classified as a confined space, is the appropriate rescue equipment readily available?			
12. If a water hazard is present, adequate precautions are in place to prevent flooding?			
13. If adjacent structures are undermined by the excavation, a suitable support system has been designed by a registered professional engineer and installed accordingly?			
14. Spoil is being stored at least two feet back from the edge, and personnel are being protected from falling objects/material?			
15. Daily inspections of the excavation, the adjacent areas, and the protective system are being conducted by a competent person?			
16. Is the excavation and trench checklist maintained on file?			
CALIFORNIA -ONLY			
1. Has CAL-OSHA been contacted and an excavation permit obtained and completed?			
2. Is the permit on file and accessible for review during an inspection?			

CORRECTIVE ACTIONS (If required): _____

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 / Inspector	Site Supervisor / Project Manager

Project Name and Location:			Issuing SSHO:	
Issued to: (Name)	Date/ Time	Respirator and Cartridge Type	Respirator Card Expiration Date:	Date/Time Returned

Employee Name:	SSN:	Age:
Job Title:	D.O.B.:	Sex:
Site Name and Location:		
Site Supervisor:	SSHO:	
This record represents a factual account of the Qualitative Fit-test(s) conducted on the named individual, and specifies the type of test which was conducted. This Fit-Test was conducted according to the qualitative fit test protocols in Appendix A of 29 CFR 1910.134.		

Name of Fit Tester:	Signature of Fit Tester:	
Fit Test Protocol ☐ Irritant Fume ☐ Saccharine	☐ Isoamyl Acetate ☐ Bitrex™	
Type of Mask:	Manufacturer:	
Model Number:	Size:	☐ Pass / ☐ Fail

Name of Fit Tester:	Signature of Fit Tester:	
Fit Test Protocol ☐ Irritant Fume ☐ Saccharine	☐ Isoamyl Acetate ☐ Bitrex™	
Type of Mask:	Manufacturer:	
Model Number:	Size:	☐ Pass / ☐ Fail

Name of Fit Tester:	Signature of Fit Tester:	
Fit Test Protocol ☐ Irritant Fume ☐ Saccharine	☐ Isoamyl Acetate ☐ Bitrex™	
Type of Mask:	Manufacturer:	
Model Number:	Size:	☐ Pass / ☐ Fail

Name of Fit Tester:	Signature of Fit Tester:	
Fit Test Protocol ☐ Irritant Fume ☐ Saccharine	☐ Isoamyl Acetate ☐ Bitrex™	
Type of Mask:	Manufacturer:	
Model Number:	Size:	☐ Pass / ☐ Fail

Comments:

____

____

____

____

____

PIKA International, Inc.
Respirator Fit Test Card

Name:		
Test Protocol	☐ Irritant Smoke ☐ Isoamyl Acetate	☐ Saccharine ☐ Bitrex™
Manufacturer:	Size:	☐ Pass
Type of Mask:	Model:	
Name of Fit Tester:		
Tester Signature		
Issue Date:		

PIKA International, Inc.
Respirator Fit Test Card

Name:		
Test Protocol	☐ Irritant Smoke ☐ Isoamyl Acetate	☐ Saccharine ☐ Bitrex™
Manufacturer:	Size:	☐ Pass
Type of Mask:	Model:	
Name of Fit Tester:		
Tester Signature		
Issue Date:		

PIKA International, Inc.
Respirator Fit Test Card

Name:		
Test Protocol	☐ Irritant Smoke ☐ Isoamyl Acetate	☐ Saccharine ☐ Bitrex™
Manufacturer:	Size:	☐ Pass
Type of Mask:	Model:	
Name of Fit Tester:		
Tester Signature		
Issue Date:		

PIKA International, Inc.
Respirator Fit Test Card

Name:		
Test Protocol	☐ Irritant Smoke ☐ Isoamyl Acetate	☐ Saccharine ☐ Bitrex™
Manufacturer:	Size:	☐ Pass
Type of Mask:	Model:	
Name of Fit Tester:		
Tester Signature		
Issue Date:		

PIKA International, Inc.
Respirator Fit Test Card

Name:		
Test Protocol	☐ Irritant Smoke ☐ Isoamyl Acetate	☐ Saccharine ☐ Bitrex™
Manufacturer:	Size:	☐ Pass
Type of Mask:	Model:	
Name of Fit Tester:		
Tester Signature		
Issue Date:		

PIKA International, Inc.
Respirator Fit Test Card

Name:		
Test Protocol	☐ Irritant Smoke ☐ Isoamyl Acetate	☐ Saccharine ☐ Bitrex™
Manufacturer:	Size:	☐ Pass
Type of Mask:	Model:	
Name of Fit Tester:		
Tester Signature		
Issue Date:		

PIKA International, Inc.
Respirator Fit Test Card

Name:		
Test Protocol	☐ Irritant Smoke ☐ Isoamyl Acetate	☐ Saccharine ☐ Bitrex™
Manufacturer:	Size:	☐ Pass
Type of Mask:	Model:	
Name of Fit Tester:		
Tester Signature		
Issue Date:		

PIKA International, Inc.
Respirator Fit Test Card

Name:		
Test Protocol	☐ Irritant Smoke ☐ Isoamyl Acetate	☐ Saccharine ☐ Bitrex™
Manufacturer:	Size:	☐ Pass
Type of Mask:	Model:	
Name of Fit Tester:		
Tester Signature		
Issue Date:		

PIKA International, Inc.
Respirator Fit Test Card

Name:		
Test Protocol	☐ Irritant Smoke ☐ Isoamyl Acetate	☐ Saccharine ☐ Bitrex™
Manufacturer:	Size:	☐ Pass
Type of Mask:	Model:	
Name of Fit Tester:		
Tester Signature		
Issue Date:		

PIKA International, Inc.
Respirator Fit Test Card

Name:		
Test Protocol	☐ Irritant Smoke ☐ Isoamyl Acetate	☐ Saccharine ☐ Bitrex™
Manufacturer:	Size:	☐ Pass
Type of Mask:	Model:	
Name of Fit Tester:		
Tester Signature		
Issue Date:		

I. Post-Exposure Information

A. Exposed Employee _____

B. Social Security No. _____

C. Location of Incident _____

D. Task/procedure involved _____

E. Date/Time of Incident _____

F. Was employee utilizing Personal Protective Equipment (PPE)? ☐ Yes ☐ No
If yes, check PPE being used at time of exposure:
- ☐ Gloves - Type _____
- ☐ Apron
- ☐ Mask
- ☐ Eye protection - Type _____
- ☐ Other

G. Part of body exposed _____

H. Supervisor's name _____

I. Description of Incident

_____
_____
_____
_____
_____

J. Source Individual:
- ☐ Known _____
- ☐ Unknown - Proceed as if source is known **positive**

II Post-Exposure for HIV

A. Consent/Refusal/Test Results of Source:

Name of Source:_____

- ☐ I hereby give consent for serological testing for HIV infection.
- ☐ I hereby refuse to give consent for serological testing for HIV infection.
- ☐ Source Unknown/Refuses Testing - Proceed as if **Positive**

Source Individual: _____ Date: _____
Signature

Serologic Test Result:
- ☐ Positive - Inform employee, test for HIV antibodies.
- ☐ Negative - Determine Risk of Source Individual

B. Risk of Source Individual:
- ☐ High Risk Activities (proceed as if **positive** result)
- ☐ Low Risk Activities (provide HIV testing if requested)

POST-EXPOSURE EVALUATION AND FOLLOW-UP (CONTINUED)

C. Consent/Refusal/Test Results of Exposed Employee:

☐ I hereby give consent to serological testing for HIV infection.
☐ I hereby refuse to give consent for serological testing for HIV infection.

Exposed Employee: _____ Date: _____
Signature

Test Results: ☐ Positive - Counsel employee per state/local laws
☐ Negative - Counsel employee, advise of need to retest.

Serologic Retest Results: 6 weeks: Date _____ ☐ Positive ☐ Negative
12 weeks: Date _____ ☐ Positive ☐ Negative
6 months: Date _____ ☐ Positive ☐ Negative

III. Post-Exposure for HBV

A. Consent/Refusal/Test Results of Source:

Name of Source:_____
☐ I hereby give consent for serological testing for HBV infection.
☐ I hereby refuse to give consent for serological testing for HBV infection
☐ Source Unknown/Refuses Testing - Proceed as if **Positive**

Exposed Employee: _____ Date: _____
Signature

Test Result: ☐ Positive - Continue with Section III B.
☐ Negative - No further action needed.

B. Test Exposed Employee for HBV infection.

Name of Exposed Employee _____

☐ I hereby give consent for serological testing for HBV infection.
☐ I hereby refuse to give consent for serological testing for HBV infection.

Source Individual: _____ Date: _____
Signature

Test Results: ☐ Negative - Consult as to the need for vaccination.
☐ Positive - Continue to Section III C.

C. Exposed Employee's Vaccination Status and Post-exposure Procedures

Unvaccinated Employee
☐ Offer HBIG and HB vaccine

Vaccinated Employee - Test for anti-HBs
☐ If adequate - No treatment
☐ If inadequate - Offer HB vaccine booster

POST-EXPOSURE EVALUATION AND FOLLOW-UP (CONTINUED)

IV. Comments

Completed by (name printed): _____

Completed by (signature): _____ Date: _____

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

Declining Employee's Name (printed) _____

Declining Employee's
Signature: _____ Date: _____

Witnessing Employee's Name (printed): _____

Witnessing Employee's
Signature: _____ Date: _____

Location/Description of Space:	Purpose of Entry:		
Potential Hazards:	Permit Duration:	Date:	To:
		Time:	To:
Authorized Attendants:	Authorized Entrants:		

SAFETY EQUIPMENT / REQUIREMENTS	Y	N	PERSONAL PROTECTIVE EQUIPMENT	Y	N
Area secured and signs posted			Self-contained breathing apparatus		
Pipe lines capped / blocked			Airline supplied respirator with escape bottle		
Pipe lines purged / flushed			Air purifying respirator: Type_____		
Lock out / Tag out			Five minute escape bottle		
Mechanical ventilation: Supply___ Exhaust____			Safety glasses / goggles (circle selection(s))		
Communication equipment: Type _____			Hard hat		
Tripod / Retrieval System			Ear plugs / muffs (circle selection(s))		
Fire extinguisher: Type _____			Chemical clothing: Type _____		
Ground fault circuit interrupter			Protective boots / gloves (circle selection(s))		
Lighting system			Chest harness and life line		
Other: _____			Other: _____		

TESTS TO BE PERFORMED

Contaminant Monitored	Acceptable Conditions	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____
% Oxygen	19.5 - 23.5						
%LEL/LFL	<10%						
H_2S	<10 ppm						
Carbon Monoxide	<35 ppm						
Other:_____							
Other:_____							
Tester's Initials							

CHECKLIST: ☐ Personnel trained ☐ Personnel medically approved ☐ Welding is expected ☐ Entrants/Attendants briefed

Emergency Contacts: Ambulance:_____ Fire:_____ Rescue:_____ Other:_____

Special Instructions: _____
_____

Site Safety and Health Officer: (name printed)	Site Safety and Health Officer: (name signed)	Date:
Permit Canceled By:	Reason for Cancellation:	Date Canceled:

CONFINED SPACE MONITORING LOG (cont.)

TESTS TO BE PERFORMED

Contaminant Monitored	Acceptable Conditions	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____
% Oxygen	19.5 - 23.5						
%LEL/LFL	<10%						
H_2S	<10 ppm						
Carbon Monoxide	<35 ppm						
Other:___________							
Other:___________							
Tester's Initials							

TESTS TO BE PERFORMED

Contaminant Monitored	Acceptable Conditions	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____
% Oxygen	19.5 - 23.5						
%LEL/LFL	<10%						
H_2S	<10 ppm						
Carbon Monoxide	<35 ppm						
Other:___________							
Other:___________							
Tester's Initials							

TESTS TO BE PERFORMED

Contaminant Monitored	Acceptable Conditions	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____
% Oxygen	19.5 - 23.5						
%LEL/LFL	<10%						
H_2S	<10 ppm						
Carbon Monoxide	<35 ppm						
Other:___________							
Other:___________							
Tester's Initials							

TESTS TO BE PERFORMED

Contaminant Monitored	Acceptable Conditions	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____
% Oxygen	19.5 - 23.5						
%LEL/LFL	<10%						
H_2S	<10 ppm						
Carbon Monoxide	<35 ppm						
Other:___________							
Other:___________							
Tester's Initials							

This certificate is to be used for confined spaces where the only hazard posed by the space is an actual or potential hazardous atmosphere that can be eliminated through the use of forced air ventilation. If any other type hazards exist, then the space must be upgraded to a permit-required confined space.

Location/Description of Space:	Purpose of Entry:		
Known or Potential Atmospheric Hazards:	Certification Duration	Date:	To:
		Time:	To:
	Site Safety and Health Officer:		

TESTS TO BE PERFORMED

Contaminant Monitored	Acceptable Conditions	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____
% Oxygen	19.5 - 23.5						
%LEL/LFL	<10%						
H_2S	<10 ppm						
Carbon Monoxide	<35 ppm						
Other:_____							
Other:_____							
Tester's Initials							

PRE-ENTRY CONDITIONS CHECKLIST	YES
Have the conditions that would make it unsafe to enter the space been removed?	
Is the only hazard posed by the confined space an actual or potential hazardous atmosphere?	
Are temporary barriers erected around the confined space entrance?	
Has the internal atmosphere been tested for oxygen content, flammability and toxicity?	
Are the results from the atmospheric testing acceptable and recorded of this certificate?	
Is forced air ventilation (if required) able to eliminate atmospheric hazards?	
Are entry personnel using proper personal protective equipment?	

Special Instructions:

The Confined Space Coordinator can only sign this certificate if all of the above mentioned checklist items are checked "Yes".

Site Safety and Health Officer: (name printed)	Site Safety and Health Officer: (name signed)	Date:
Certificate Canceled By:	Reason for Cancellation:	Date Canceled:

LOW-RISK CONFINED SPACE MONITORING LOG (cont.)

TESTS TO BE PERFORMED

Contaminant Monitored	Acceptable Conditions	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____
% Oxygen	19.5 - 23.5						
%LEL/LFL	<10%						
H_2S	<10 ppm						
Carbon Monoxide	<35 ppm						
Other:___________							
Other:___________							
Tester's Initials							

TESTS TO BE PERFORMED

Contaminant Monitored	Acceptable Conditions	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____
% Oxygen	19.5 - 23.5						
%LEL/LFL	<10%						
H_2S	<10 ppm						
Carbon Monoxide	<35 ppm						
Other:___________							
Other:___________							
Tester's Initials							

TESTS TO BE PERFORMED

Contaminant Monitored	Acceptable Conditions	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____
% Oxygen	19.5 - 23.5						
%LEL/LFL	<10%						
H_2S	<10 ppm						
Carbon Monoxide	<35 ppm						
Other:___________							
Other:___________							
Tester's Initials							

TESTS TO BE PERFORMED

Contaminant Monitored	Acceptable Conditions	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____	Result T_____ D_____
% Oxygen	19.5 - 23.5						
%LEL/LFL	<10%						
H_2S	<10 ppm						
Carbon Monoxide	<35 ppm						
Other:___________							
Other:___________							
Tester's Initials							

This certificate can only be used for reclassification of a permit-required confined space. Signature of the SSHO below certifies that this space is free of actual or potential atmospheric hazards and that other serious safety and health hazards have been eliminated. This certificate is to be posted at the entrance to the confined space prior to entry.

<table>
<tr><td>Location/Description of Space:</td><td colspan="3">Purpose of Entry:</td></tr>
<tr><td></td><td colspan="3"></td></tr>
<tr><td rowspan="2"></td><td rowspan="2">Certification Duration:</td><td>Date:</td><td>To:</td></tr>
<tr><td></td><td>Time:</td><td>To:</td></tr>
</table>

Site Supervisor (name printed):	Site Supervisor (name signed):	Date:
Site Safety and Health Officer (name printed):	Site Safety and Health Officer (name signed):	Date:
Certificate Canceled By:	Reason for Cancellation:	Date Canceled:

Note: Forced air ventilation may not be used as a means to eliminate actual or potential hazardous atmospheric conditions. If an atmospheric or other serious safety or health hazard arises during entry, personnel will immediately exit the space, this certificate will be canceled, and the space will be again be classified as a permit-required confined space.

Date:	Entrants Name:	Time In:	Attendants Initials:	Time Out:	Attendants Initials:

PROJECT NAME PROJECT LOCATION:					CONTRACT NO.:		
Date	Name	Company	Reason for Visit	Safety Briefing Given By	Time		PIKA Escort Req'd (Y / N)
					In	Out	

Site Name: _____ Location: _____

Site Supervisor/SUXOS: _____ Site Safety and Health Officer: _____

Date	Name	Start Time	Pulse Rate	Time	Pulse Rate	Time	Pulse Rate	Time	Pulse Rate	Time	Pulse Rate

Remarks and Observations:

Site Name/Location:	**Contract No.:**	**Delivery Order No.:**

Date	Product Name	Supplier's Name and Address	Hazardous Substances in the Product	Training Given	MSDS On-site

Date Prepared (MM-DD-YYYY):

Project: Job:

Prepared By: Reviewed By:

Risk Assessment Code (RAC):

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Recommended Protective Clothing and Equipment

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**

Job Steps	Hazards	Actions to eliminate or minimize hazards	EM-385-1-1 (para ref)

Date Prepared: (MM-DD-YYYY)
Project: Job:

Equipment To Be Used	Inspections Required	Training Required

Certification Of Activity Hazard Analysis

The signature below certifies that the above mentioned persons have assessed and reviewed this task to ascertain the potential hazards associated with its conduct, and to determine the control techniques and PPE which will be required to safeguard site personnel from the identified hazards.

Signature of Analyst:	Date:	Signature of Reviewer:	Date:

Name: _____ Last First MI	Employee No:	SSN:

Completion of the information below certifies that the employee listed above has successfully completed the required PPE training specified. This training has included instruction related to: why, when and what PPE is needed; how to don, doff, adjust and wear the PPE; limitations of the PPE; and care, maintenance, useful life and disposal of the PPE.

Date	Type of PPE	Site Where Trained	Date	Type of PPE	Site Where Trained
	Safety Glasses				
	Hard Hat				
	Ear Plugs: Type:				
	Ear Muffs: Type:				
	Leather Gloves				
	Leather Boots				
	Steel-toed Boots				
	Face Shield				
	Chaps				
	Snake Leggings				
	Toe Protectors				

Sampling Date:	Project Name/Location:	Sampled By:
Exposure During Un-sampled Time:	Personal Protective Equipment Used:	
Job Description:	Environmental Conditions:	

Pump No.	Sample No.	Sample Type	Employee Name	Employee ID/SSN	Calibration (lpm)			Time (Hr:Min)		Total Time (Min.)	Total Volume (L)	Analyte Sampled	Sample Result	Sample Conc.	Excur. Conc.	8-Hour TWA
					Begin	End	Ave.	Start	Stop							

Sample Type: B-Background; BZ-Breathing Zone(Personal); C-Clearance; CA-Clearance (Aggressive Sampling); E-Environmental; IA-Inside Work Area; OA-Outside Work Area

PROJECT NAME PROJECT LOCATION:					CONTRACT NO.:		
Date	Name	Company	Reason for EZ Entry	Safety Briefing Given By	Time		PIKA Escort Req'd (Y / N)
					In	Out	

Contaminant Monitored	Acceptable Conditions	Result		Result		Result		Result		Result		Result	
		Time	Date	Time	Date	Time	Date	Time	Date	Time	Date	Time	Date
% Oxygen	19.5 - 23.5												
%LEL/LFL	<10%												
H_2S	<10 ppm												
Carbon Monoxide	<35 ppm												
VOC's	*												
Mercury	0.05 mg/m^3												
Heat	**												
Other:													
Other:													
Other:													
Other:													
Other:													
Tester's Initials													

*To be determined by site and filed in by SSHO

**See ESHP-506 for guidelines determining Heat Stress

Site Name & Location:	
Contract No.:	Task Order Number:
Employee Name:	
Site Supervisor or SUXOS:	SSHO:
Date Orientation Started:	Date Orientation Completed:

During new employee orientation the following items will be discussed and reviewed with the employee prior to the employee being working on site. Each item will be initialed by the person conducting or supervising the review or discussion. If a given topic is not applicable to the employee's duties, write "NA" in the space and initial the "NA."

Initial	Training Topic
	General safety and health policies and procedures and pertinent provisions of any client specific safety and health documents.
	Requirements outlined in the site-specific APP and SSHP.
	Procedures for the PIKA Safety Observer Program.
	Requirements for the daily Task and Safety Briefings and Weekly Safety Meetings.
	Requirements and responsibilities for accident prevention and maintaining safe and healthful work environments.
	Employee and supervisor responsibilities for reporting all accidents.
	Provisions for medical facilities and emergency response, including emergency evacuation procedures, evacuation routes and assembly points.
	The location of emergency phone numbers, and medical facilities/treatment procedures.
	Procedures for reporting and correcting unsafe conditions or practices.
	Job hazards and the means to control/eliminate those hazards, including applicable AHA Forms and PPE requirements.
	Safe use of PPE including hand, eye, head, hearing, and respiratory protective devices applicable to the job.
	Requirements for the use of fall protection and ladder use and safety.
	Procedures regarding "Stop Work" authority.
	Applicable provisions of the hazard communication program and location of MSDSs.
	Identified confined spaces and their general entry requirements and restrictions.
	Procedures for immediately reporting all accidents to include injuries or property damage to the SSHO.
	Fire prevention and protection, to include the location of fire extinguishers and fire reporting procedures.
	Location of the job trailer, office trailer, vehicle parking areas, and designated smoking areas.
	Location of project bulletin board.
	Rules prohibiting the use or possession of intoxicants, drugs, guns, weapons, ammo on the job site.
	Rules prohibiting horseplay and other unsafe behavior.
	Good house keeping requirements for the job site and break areas.
	Local traffic regulations, permits, and speed limits.
	Safe clearance distances, use of safety vest, and safe procedures for working around heavy equipment.
	"Buddy" procedures and the need for looking out for others.
	Identification/control of toxic substances related to either on-site contamination or products used on-site.
	Requirement to maintain safety awareness at all times and to be responsible for your safety and the safety of those working around you.
	General Lockout/Tagout (LO/TO) procedures including identification of LO/TO devices.
	Employee requirement to notify the SSHO of any known medical problems or conditions that could affect their safety or which need to be known in the event of an emergency. , to include use of medications
	Employee requirement to notify the SSHO of medications being used that could affect employee's safety.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum requirements and procedures that are to be taken whenever a request to conduct a compliance inspection, audit or visit concerning safety, health or environmental matters is made by any government agency (e.g., OSHA, EPA, DOT, NRC, etc.) or other outside third party. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to all PIKA personnel, contractor and subcontractor, and operations controlled by PIKA. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with this ESHP.

- OSHA Construction Industry Standard 29 CFR 1926.3.
- OSHA General Industry Standard 29 CFR 1903.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the equipment that personnel that are required to conduct site operations in compliance with regulatory requirements to minimize the potential for injury or violation of regulations. In the event of an inspection by a regulatory agency, the PM will be informed by the Site Supervisor (SS) and the PM will coordinate with the SS to provide the inspector with the required resources for the inspection. The PM will also coordinate with PIKA Management to offer any written responses to violations or citations.

4.2 SITE SUPERVISOR

The SS will implement this ESHP when a request to conduct a compliance inspection, audit, or visit concerning safety, health or environmental matters is made by any government agency (e.g., OSHA, EPA, DOT, NRC, etc.) or other outside third party. The SS is also responsible for informing the PM of the inspection request by the third party

and for assisting the third party inspector as needed, within the bounds of this ESHP and safe site practices.

4.3 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring the safety and health of any third party inspectors that enter the site. The SSHO will be responsible for requesting and verifying any necessary training and medical surveillance documents that are required for the third party inspector to enter the site. If the inspection relates to safety or health, the SSHO will escort the inspector and document any non-compliance items noted by the inspector. The SSHO will also collect data similar to that collected by the inspector, such as written notes, photos, direct reading air samples, and breathing zone samples.

5.0 PROCEDURES

5.1 PRE-INSPECTION

Prior to agreeing to any request for an inspection by a third party, the following actions are to be taken in order to obtain company authorization:

1. Verify the inspector's credentials to determine that the inspector is a true representative of a government agency with authorization to inspect the project site. It is reasonable to ask the inspector to wait a few minutes while you contact corporate headquarters to obtain authorization.
2. Invite the inspector into the field office and cordially ask them to explain the purpose, nature, and extent (e.g. "focused" or "comprehensive") of the inspection. If it is due to a complaint, ask the inspector if an employee, an employee of another contractor, or an outside party not employed at the workplace filed the complaint.
3. Collect business cards and record the names, business affiliations and addresses of persons present.
4. Notify the PIKA Corporate Environmental Safety and Health Manager (CESHM) and the PM to explain the nature and purpose of the requested inspection.

5.2 INSPECTION

The third party inspector shall be in charge of inspections and questioning of persons. A representative of PIKA shall be given an opportunity to accompany the inspector during the physical inspection of any workplace for the purpose of aiding such inspection. The SS shall avoid disruptions of work in progress by informing the inspector of the day's schedule of activities and assist the inspector in conducting the investigation so as not to interfere unduly with the work. The SS, and when possible the SSHO, shall accompany the inspector on the inspection. The inspector has the authority to deny the right of accompaniment to any person whose conduct interferes with a fair and orderly investigation. Therefore, the PIKA representatives shall be cooperative and properly

introduce the inspector to those employees the inspector wishes to interview. The inspector may interview employees privately and may examine any machinery or equipment in the workplace. The inspector is also empowered to take pictures or samples and to utilize other reasonable investigative techniques.

The SS shall take notes of comments and items looked at by the inspector and shall take pictures from the same position as the inspector. The SS shall also observe areas, machinery, equipment and materials examined. If the inspector takes samples, the SS or SSHO shall endeavor to take concurrent samples if possible.

5.3 POST-INSPECTION

Conduct a post-inspection conference upon completion of the inspection and ask the inspector to advise you of any violations disclosed by the inspection and if the inspector intends to recommend any citations. If possible, the conference should be held with the CESHM and PM via telephone. Correct imminent danger conditions (e.g. life threatening or serious) immediately. With the exception of an imminent danger situation, seek PM approval if abatement of hazards incurs great expense or requires shutting down the job site. If it is decided to not abate the danger, the inspector is required to inform affected workers of the danger and to advise the employer that he will be seeking legal action to remove the danger or shut the job down until the danger is abated.

5.4 REPORTING

Prepare a written report incorporating the above information and forward to the CESHM and PM immediately upon conclusion of the inspection. Reporting of alleged violations, potential fines, corrective actions, and a schedule of anticipated events will be prepared by the CESHM and provided to the PIKA President and PM. Coordination of subsequent hearings, legal representation, and settlements will be prepared and delivered by the CESHM.

6.0 AUDIT CRITERIA

No audit criteria are associates with this ESHP.

7.0 ATTACHMENTS

No attachments are associated with this ESHP.

1.0 PURPOSE

The purpose of this Environmental Safety and Health Procedure (ESHP) is to provide site management personnel with the PIKA International, Inc. and Occupational Safety and Health Administration (OSHA) requirements for reporting and documenting work-related accidents and illnesses. This ESHP also outlines the requirements for posting of the OSHA 300 Log.

2.0 SCOPE

This ESHP applies to PIKA project sites where PIKA personnel are employed. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional compliance issues.

3.0 REFERENCES

The following OSHA standards directly apply to accident reporting and to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA 29 CFR Part 1904 Recording and Reporting Occupational Injuries and Illness.
- Army Regulation 385-40 with USACE Supplement 1.

4.0 DEFINITIONS

As used in this procedure, the following terms shall apply:

1. **Incident** – The failure of personnel, equipment or the work environment to react as planned, desired or within operational boundaries.

2. **Accident** – An unplanned and unwanted event that has caused personal injury, illness, environmental insult or property damage.

3. **Near Miss** – An incident that could have resulted in an accident but did not.

4. **First Aid** - For the purposes of Part 1904, "first aid" means one of the following listed below. For an injury to be classified as “first aid,” it must meet one of the following. No other procedures qualify as first aid according to the regulation.
   a. Using a nonprescription medication at nonprescription strength (for medications available in both prescription and non-prescription form, a recommendation by a physician or other licensed health care professional to

use a non-prescription medication at prescription strength is considered medical treatment for recordkeeping purposes).

b. Administering tetanus immunizations (other immunizations, such as Hepatitis B vaccine or rabies vaccine, are considered medical treatment).
c. Cleaning, flushing or soaking wounds on the surface of the skin.
d. Using wound coverings such as bandages, Band-Aids™, gauze pads, etc.; or using butterfly bandages or Steri-Strips™ (other wound closing devices such as sutures, staples, etc. are considered medical treatment).
e. Using hot or cold therapy.
f. Using any non-rigid means of support, such as elastic bandages, wraps, non-rigid back belts, etc. (devices with rigid stays or other systems designed to immobilize parts of the body are considered medical treatment for recordkeeping purposes).
g. Using temporary immobilization devices while transporting an accident victim (e.g., splints, slings, neck collars, back boards, etc.).
h. Drilling of a fingernail or toenail to relieve pressure, or draining fluid from a blister.
i. Using eye patches.
j. Removing foreign bodies from the eye using only irrigation or a cotton swab.
k. Removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs or other simple means.
l. Using finger guards.
m. Using massages (physical therapy or chiropractic treatment are considered medical treatment for recordkeeping purposes).
n. Drinking fluids for relief of heat stress.

2. **Medical Treatment** – Medical treatment means the management and care of a patient to combat disease or disorder. If a physician or other licensed health care professional recommends medical treatment, PIKA will encourage the injured or ill employee to follow that recommendation. However, the case must be recorded even if the injured or ill employee does not follow the physician or other licensed health care professional's recommendation. For the purposes of this ESHP, medical treatment does not include:
   a. Visits to a physician or other licensed health care professional solely for observation or counseling;
   b. The conduct of diagnostic procedures, such as x-rays and blood tests, including the administration of prescription medications used solely for diagnostic purposes (e.g., eye drops to dilate pupils); or
   c. "First aid" as defined above in definition 1.

3. **OSHA 300 Log** - The OSHA 300 form is called the Log of Work-Related Injuries and Illnesses (300 Log). This form was designed by OSHA and is used as an annual record of occupational injuries and illnesses. This form can be obtained from the PIKA Human Resource department.

4. **OSHA Form 300-A** – The 300-A form is the Summary of Work-Related Injuries and Illnesses, and is used for summarizing the 300 Log at the end of the year.

5. **OSHA Form 301** – The OSHA 301 form is called the Injury and Illness Incident Report. It is the form that must be completed for each reportable accident or illness.

6. **Recordable Incident** - An injury or illness meets the general recording criteria and is therefore to be recorded if it results in any of the following: death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid, or loss of consciousness. An injury or illness must also be considered a recordable case if it involves a significant injury or illness diagnosed by a physician or other licensed health care professional, even if it does not result in death, days away from work, restricted work or job transfer, medical treatment beyond first aid, or loss of consciousness.

5.0 RESPONSIBILITIES

5.1 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) shall be responsible for the overall management of this ESHP and its annual review. The CESHM will also be responsible for the review of forms completed in conjunction with this procedure and coordinating the complete and thorough investigation of recordable accidents and illnesses. Additionally, the CESHM will properly enter OSHA recordable accidents, injuries and illnesses on the OSHA 300 Log, and will complete and distribute the 300-A Form to the project offices for posting.

5.2 PROJECT MANAGER

The Project Manager shall be responsible for the availability of project resources needed to implement this ESHP, and for incorporating this ESHP into site-specific plans, procedures and training as needed. The PM will also be responsible for reporting incidents to the client as outlined below in this ESHP.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) will implement this ESHP supervise the completion and submission of any forms associated with this ESHP in accordance with (IAW) the guidelines in this ESHP. The SS will report accidents involving site personnel or

equipment to the PM and the CESHM within 24-hours. The SS will also be responsible for the investigation of the incident in coordination and consultation of the Site Safety and Health Officer (SSHO). The SS will review the PIKA Incident/Accident/Near-Miss Form (see ESHF-514) for completeness and will sign the form prior to its submission. The SS will post the Form 300-A at the project site during the annual posting period.

5.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will be responsible for the on-site implementation of this ESHP. As such, the SSHO will be responsible for the effective reporting of accidents involving PIKA personnel, contractors, equipment or property. The SSHO will also be responsible for assisting the SS in the investigation of incidents and accidents involving PIKA or subcontractor personnel or equipment. In conjunction with the SS, the SSHO complete the PIKA Incident/Accident/Near-Miss Form (ESHF-514).

6.0 PROCEDURES

6.1 OSHA RECORDABLE ACCIDENT REPORTING REQUIREMENTS

The basic requirements of the OSHA regulation 29 CFR 1904, Recording and Reporting Occupational Injuries and Illnesses, is to have employers record, certify and post data related to occupational injuries and illness experienced by the company's employees. To meet these requirements, PIKA shall implement the reporting and record keeping requirements listed in the paragraphs below.

1. The SS in conjunction with the SSHO will initiate immediate first aid, medical and emergency services as needed to care for immediate threats to human or environmental health as outlined in detail below in paragraph 6.2 of this ESHP.
2. The SSHO is to contact the CESHM (Cellular: 281-546-4862, Office: 865-482-1292, Home: 865-882-1020) within one hour for any accidents involving a fatality or hospitalization of three or more employees, or within 4-hours for accidents involving personal injury or illness, or property damage. The CESHM will be responsible for notifying government authorities and agencies if needed.
2. The Site Supervisor will be responsible for notifying the PM of the occurrence of an incident within the time periods mentioned above in Item 1.
3. The PM will be responsible for notifying the client representative of relevant incidents. Since PIKA works for various clients and agencies with differing reporting requirements it will be the responsibility of the PM to know the reporting requirements for the client and make verbal and written reports accordingly.
4. Immediately following an accident, the SS, in conjunction with the SSHO will initiate an accident investigation IAW the procedures in paragraph 6.2.3 of this ESHP. The SS and SSHO will input the required data in the PIKA ESHF-514 Form and will complete any additional client-required forms. Draft version of the forms

will be forwarded to the CESHM and PM within 24 hours of the incident, with final version being completed within six days.
5. The details within the Form 301 will be transferred to the 300 Log by the CESHM within seven days of the incident notification.
6. A separate OSHA 300 Log will be initiated and maintained for each PIKA project site that is expected to be in operation for one year or longer.
7. At the end of the calendar year, the CESHM will transfer data from the 300 Log to the Form 300-A to summarize the occupational injuries and illnesses for each establishment.
8. The 300-A Form will be posted at each job site where PIKA personnel are working during the posting period of February 1 to April 30.

6.2 IMMEDIATE RESPONSE

Upon notification of a work-related incident, the SS, in conjunction with the SSHO will respond to the scene and initiate the first aid, medical response or emergency notifications outlined in the project plans based upon the nature and degree of the incident/accident. The immediate response should include the following:

1. Gaining control of the scene, to include summoning medical attention or other emergency response services as quickly as possible after determining the extent of the incident and personnel injuries/illnesses.
2. Inspecting the scene for other hazards and eliminating them.
3. Perform CPR/First Aid as appropriate and secure injured employee until professional medical personnel arrives (if deemed necessary).
4. Keeping unauthorized and non-essential personnel to prevent removal of evidence or change of conditions.
5. Collecting and documenting the scene before changes are made, to include taking photos, making scaled sketches and recording measurements.
6. As needed, arrange for transportation of injured personnel to medical attention via either site vehicle resources or local ambulance service.
7. Dispose of biological waste (body fluids) and related waste accordingly. After injured personnel have been removed from the incident scene, surfaces contaminated by body fluids must be cleaned and disinfected in accordance with ESHP-508 Bloodborne Pathogen Control.

6.3 POST INCIDENT REPORTING AND PROCEDURES

Prompt notification is critical in order that necessary actions can be implemented within prescribed time frames.

1. The SSHO will complete a draft version of the PIKA Incident/Accident/Near-Miss Form (ESHF-514) and the OSHA 301 form and forward them to the CESHM and PM within 24-hours of the incident. This will include photos of the incident scene and any equipment involved.

2. The CESHM shall report incidents that result in a fatality or the hospitalization of three or more persons to the OSHA Area Director within eight hours after the incident occurs.
3. The CESHM, in conjunction with the PIKA Human Resource Department and the SS, shall arrange for employees who were directly involved in the incident to undergo drug testing in accordance with the company's Substance Abuse Program, within 24-hours of the incident.
4. Any employee(s) who may have been exposed to body fluids during the course of providing CPR/First Aid must notify the SS or SSHO as soon as possible to initiate exposure control procedures (see PIKA ESHP-508, Bloodborne Pathogen Control).
5. Inquiries from media (newspaper, TV, etc.) concerning work related incidents shall be referred to the PM or CESHM.

6.4 INCIDENT INVESTIGATION

Investigation of a work-related incident must be initiated immediately and should involve participation of the SS, the SSHO, injured persons, and any witnesses to the incident. The purpose of the investigation will be to determine the sequence of events leading to the accident, determine the how and why the accident occurred by identifying causes, to prevent similar accidents in the future by, and to identify corrective measures. The point of the incident investigation is not to place blame, but collect facts and data. The investigation will address the following:

The SS or SSHO, in consultation with the CESHM will perform the following:

1. Question personnel involved in order to reconstruct how the incident occurred.
2. Obtain written statements signed by employees who were directly involved in the incident and any eyewitnesses. Statements should contain only factual and applicable information.
3. If needed, take photographic images of the accident scene and the equipment or property involved.
4. The results from any air monitoring conducted during the emergency, and if applicable, results of environmental samples.
5. An assessment of the potential exposures received by site personnel and the surrounding public.

6.5 POST-EMERGENCY FOLLOW-UP

Before normal site activities can resume, the site and personnel must be prepared and equipped to handle another emergency. It is also imperative that Federal, state and local regulatory agencies be notified of the emergency. Therefore, the following activities must be conducted prior to restart of site activities:

1. Restock and clean equipment and supplies utilized or damaged in the emergency.
2. Determine the cause of the emergency and what preventative measures shall be taken to minimize the potential recurrence of the emergency.
3. The PIKA PM and CESHM, in conjunction with the SS and SSHO, shall conduct an emergency response critique to assess the effectiveness of the emergency response procedures and to identify any areas requiring improvement.
4. Review and revise, as needed, the site operational and emergency response procedures, and, if necessary, update the SSHP to reflect the new procedures.

7.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The PIKA Accident/Injury/Near-Miss Report Form (ESHF-514);
- The Form 301; and
- The 300 Logs for each establishment.

8.0 ATTACHMENTS

No attachments for this ESHP.

1.0 PURPOSE

This environmental safety & health procedure (ESHP) is designed to provide site personnel with information related to the recognition, prevention, and medical care of the most common biological hazards that may be encountered during on-site operations.

2.0 SCOPE

This ESHP applies to PIKA personnel, including subcontractor personnel, and operations involving the potential for exposure to biological hazards. This ESHP is not intended to contain information on the biological hazards that may be encountered on the various sites where PIKA personnel work. Rather it is intended to give general guidance on the most common biological hazards. Workers shall consult the project Site Safety and Health Plan (SSHP) for information regarding any additional biological hazards that may be encountered on site, and a listing of the biological hazards expected on site.

3.0 REFERENCES

With the exception of the Occupational Safety and Health Administration (OSHA) General Duty Clause found in paragraph 5(a)(1) of the original Occupational Safety and Health Act which states that employers are shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm, there are no Federally regulated references that govern the conduct of operations on sites with biological hazards. However, for sites where the U.S. Army Corps of Engineers (USACE) requirements are applied, the reference outlined below will be used:

- USACE EM 385-1-1, Section 06.D, Harmful Plants, Animals, And Insects.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the equipment that personnel will require to safely perform operations when biological hazards are present. The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

4.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to hazard identification and the protective measures applicable to this ESHP.
4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve personnel exposure to biological hazards. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel exposed to biological hazards during the course of site operations are fully trained as outlined in this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to assess their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 PROCEDURE

5.1 PERSONNEL TRAINING

All personnel, including contractor and subcontractor personnel, involved in operations where exposure to biological hazards exist, shall be given site-specific training related to the potential safety and health hazards associated with the biological hazards that may be encountered during site operations. Additionally, personnel will be trained in the safe work practices and control techniques to be used to reduce or eliminate the potential for exposure or the risks of exposure to biological hazards.

5.2 HAZARDS AND OPERATIONAL CONTROL TECHNIQUES

Biological hazards that are usually found on site include insects, hazardous plants, snakes, ticks, bees, hornets and wasps, biting insects, scorpions and on rare occasions, infectious waste. Employee awareness and the safe work practices outlined in the following paragraphs should reduce the risk associated with these hazards.

5.2.1 Hazardous Plants

During the conduct of site activities the number and variety of hazardous plants that may be encountered is large and extensive. The ailments associated with these plants range from mild hay fever to contact dermatitis, to carcinogenic affects. However, the plants that present the greatest degree of risk to site personnel (i.e., potential for contact vs. effect produced) are those that produce tissue injury and skin reactions.

5.2.1.1 Plants Causing Skin and Tissue Injury

Contact with splinters, thorns and sharp leaf edges is of special concern to site personnel, as is the contact with the pointed surfaces found on branches, limbs and small trunks left by site clearing and grubbing crews. This concern stems from the fact that punctures, cuts and even minor scrapes caused by accidental contact may result in non-infectious skin lesions, and the introduction of fungi or bacteria through the skin or eye. This is especially important in light of the fact that the warm moist environment created inside impermeable protective clothing is ideal for the propagation of fungal and bacterial infection. Personnel receiving any of the injuries listed above, even minor scrapes, should immediately report to the SSHO for initial injury evaluation and care.

5.2.1.2 Plants Causing Skin Reactions

In the United States, there are five different types of poison ivy, poison oak, and poison sumac (see Figure 503-1). Each type contains the exact same substance that causes the blistering, itchy rash most people get on contact with these plants. It is called toxicodendrol or urushiol, a sticky sap in the leaves and branches of the plants. When urushiols are exposed to the air, they quickly oxidize and turn a dark brown. This leads to a test for their presence. If a leaf is placed between two white sheets of paper and the leaf is crushed, the wet spots will turn brown in a matter of minutes. The urushiol producing plants are described below and graphically depicted in Figures 503-2 through 503-9.

1. Climbing Poison Ivy (Toxicodendron radicans) is the most widespread of the species. It is found in South Canada and throughout the eastern United States. "Radicans" means, "rooting" and refers to its aerial roots. Its many aerial roots give the vine great clinging power and the stems an almost fuzzy appearance. The vines grow almost straight up and do not twine around its support like most climbing vines. Climbing Poison Ivy can grow 10 to 20 feet high and occasionally completely envelop their support plant, thus taking on the appearance of a

poison ivy "tree." Poison Ivy has compound leaves. That is, each leaf is made up of distinct parts, called leaflets. With poison ivy, there is one leaflet at the end of the leaf stalk (or petiole) and two leaflets opposite each other below the first. This is called a trifoliate pattern, but there are occasionally 5 or 7 leaflet specimens. The two lower leaflets have very short stalks and are often shaped like mittens with a lobe on one side. The flowers, which appear in June, are five-pedaled, greenish-white sweet smelling blossoms that form between the stem and the base of the axillary petiole. The fruit (drupes) appear in July and are yellowish, spherical and about 1/4 inch in diameter. The leaves are glossy, bright green, alternate, compound (like the rest of the family) and are, naturally, highly variable in shape.

2. The Non-Climbing Poison Ivy (Toxicodendron rydbergii), is also called Rydberg Poison Ivy and was named after Per Axel Rydberg (1850-1931), an expert on Western flora. This plant was considered as a sub-species until the turn of the century. It survives in the more northerly climates of Canada than T. radicans. It is found in much of the western United States, east of the Cascades but is seldom found south of the New England area, although there are a few isolated colonies on the tops of some Appalachian peaks. In the central states, this species extends down into the panhandle and trans-pecos regions of Texas.
3. Eastern Poison Oak (Toxicodendron toxicarium) has the most "oak-looking" leaves of any of the species. It usually has multi-lobed leaves, no aerial roots on the stems, and fuzzy fruits and leaves. It loves sandy soils from southern New Jersey to Florida and extending west into Texas, Oklahoma and Kansas.
4. Western Poison Oak (Toxicodendron diversilobum) is quite variable, as are most of the species in this family. Even its name, diversilobum, refers to its diverse forms. It is occasionally lobed, often with many scallops on the edge of the leaf. Additionally, the undersides of poison oak leaves are typically covered with hair. Usually there are three leaflets but occasionally five leaflet forms are found. There are aerial roots extending from the main stem.
5. Poison Sumac (Toxicodendron vernix) is a water loving swamp tree. Growing from 6 to 20 feet in height, the Poison Sumac is found in the east from Quebec to Florida and westward along the coast to far-east Texas. It has pinnate compound leaves (leaflets on both sides of a common stalk) with from 5 to 13 smooth leaflets per stalk. It is also often mistaken for the Smooth Sumac, the Stag Horn Sumac, and Flame-Leaf Sumac. Like many of the look-alikes, poison sumac has tiny, sweet smelling flowers in the spring. It is brightly covered with red and yellow leaves in the fall, but only Poison Sumac has cream-colored berries. Also, with poison sumac, look for the fruit that grows between the leaf and the branch. Nonpoisonous sumac has fruit growing from the ends of its branches.

If a person is sensitized (allergic) to this sap (and more than 50% of people are), the rash breaks out after about 12-72 hours, but only on areas that directly contacted the resin. This is called rhus dermatitis. When you are exposed to urushiols, the reaction usually progresses in three stages. (1) A day or two after contact the infected area begins to itch and becomes red from the dilation of blood vessels. Swelling (lymph leaking from the blood vessels) also occurs. (2) Two days later, small blisters filled with lymph begin to appear. (3) Lastly large blisters burst and begin to ooze for about four days. Within 2 to 4 weeks, the skin begins to heal if the effected person has refrained from scratching the effected areas. Prevention of scratching is the hard part but it is very important. Secondary infections such as impetigo can occur.

There is a large misconception that the ooze from the blisters is infectious. The rash spreads only by spread of the invisible sap on the skin, not by leaking blister fluid from the rash itself. That blister fluid is a by-product of the body's immune system reaction to the toxin, and contains no poison ivy sap. The reason the rash often continues to break out in new areas beyond 72 hours is that people unknowingly continue to contact it from unwashed clothes (especially shoes and laces), equipment, etc. Anything that contacts the plant can carry active sap for months. The sap is so potent, it can be passed from object to object a dozen times just by light contact, with the toxins on last object still capable of causing an intense rash. Preventative measures that can prove effective for most site personnel are presented below.

1. Avoid contact with any poisonous plants on site, and keep a steady watch to identify, report and mark poisonous plants found on site.
2. Wash hands, face or other exposed areas at the beginning of each break period and at the end of each workday. Wash hands, face and other skin surfaces with the Oak/Ivy Cleanser provided on-site on a frequent basis. A degreasing soap such as Dawn™ dishwashing soap or degreasing soaps available from auto parts stores can also be used. These soaps are effective against the oil-based toxins, but can also be harsh on skin. Use of oil replenishing hand lotions can counter the effects of the soaps.
3. Avoid contacting tools and equipment with the poisonous plant, and wash any contaminated tools, equipment and clothing on a daily basis with a degreasing soap or other wash solution.
4. Barrier creams, detoxification/wash solutions and orally administered desensitization may prove effective and should be tried to find the best preventative solution.

Treatment for urushiol exposure should start as soon after exposure as possible. Urushiols can bind with the skin within 10 minutes. Oak/Ivy cleansers provided on site should be used frequently, especially before breaks and prior to leaving the site. A quick rinse with rubbing alcohol or even Clorox (mixed one part Clorox to 9 parts water)

should be followed by rinsing with cold water (warm water will spread the oils). Do not wipe exposed areas with a rag as this will spread the oils. Calamine lotion helps reduce the itch and absorbs the oils, and oral antihistamines can provide some relief from both the itching and swelling. Cortisone creams usually are not strong enough in the beginning but will help block the itch about two weeks into the rash. Jewelweed has also been shown to be an effective poison ivy cure as well as a natural plant remedy for poison oak, stinging nettle, acne, hives, insect bites and most skin irritations. Jewelweed extract instantly goes to work to cure poison ivy rash by counteracting the effects of urushiol, easing itch and promoting healing of blisters.

5.3 SNAKES

5.3.1 General Information

The potential for contact with poisonous snakes becomes a very real danger when site activities are conducted in warm weather on sites that are located in wooded grassy or rocky environments. Normally, if a person is approaching a snake, the noise created by the person is usually sufficient to frighten the snake away. However, during the warm months, extreme caution must be exercised when conducting site operations around areas where snakes might be found (i.e., rocks, bushes, logs, or in holes, crevices, and abandoned pipes). If poisonous snakes are identified on site, PIKA shall issue protective clothing, such as snake leggings, to site personnel.

The types of poisonous snakes that may be encountered during project activities varies significantly, dependent upon the geographic area where the project is being conducted. With the exception of the coral snake, the venomous snakes that may be encountered belong to the pit viper group, meaning they have large triangular shaped heads with sensor pits on both sides of the head between the eye and nostril. Pit vipers also have vertical (catlike) pupils. Brief descriptions of the most common snakes that may be encountered on site are presented below, with pictures of the snakes presented in Figures 503-10 through 503-16. Additional site-specific snake descriptions and photos will be included in each site-specific ESHP.

5.3.2 Eastern Diamondback

The Eastern diamondback (Figure 503-10) is one of the largest North American snakes, with a record length of 8 feet. However, they are usually 33 to 72 inches in length. The snake has a large head and a bulky body. It has a row of large dark diamonds with brown centers and cream borders down its back. The background color of the body ranges from olive, to brown, to almost black. The tail is usually a different shade, brownish or gray, and banded with dark rings. At the end of the tail is a well-developed rattle. The head has a light bordered dark stripe running diagonally through the eye. It is at home in the palmetto flatwoods and dry pinelands of the South. Their individual dispositions vary. Some snakes will permit close approach without making a sound,

whereas others, completely concealed, will rattle when dogs or persons are 20 or 30 feet away. Frequently they take refuge in burrows of mammals as well as holes beneath stumps, etc. Its range is the coastal lowlands from southeast North Carolina to extreme east Louisiana, and all of Florida.

5.3.3 Western Diamondback

The Western Diamondback Rattlesnake (Figure 503-11) ranges from central and western Texas, through southern New Mexico and Arizona, and into southern California. It also extends well into central Mexico. The Western Diamondback has a plump body, short tail, and a broad triangular head. It can reach lengths up to six feet and like pit vipers, it has a pit organ situated in an indentation of the upper jaw, between the nostril and eye. The western diamondback can be a yellowish gray, pale blue, or pinkish ground color. The diamond shapes down its length are dark with pale white borders. The tail is white with jet-black rings. The head markings include a pale oblique band from nostril to upper labials, and a similar but narrower band behind the eye. Western Diamondback Rattlesnakes inhabit dry, rocky, shrub-covered terrain where they can conceal themselves inside crevices in the rocks or in mouse holes, and prefer desert areas, temperate grasslands, and chaparrals.

5.3.4 Timber and Canebrake Rattlesnakes

The timber rattlesnake and canebrake rattlesnakes (Figure 503-12) are large snakes ranging from 30-45 inches in length. They exhibit sexual dimorphism; the males are larger, weighing around 2.0 lb. while the females weigh on an average 1.3 lb. There are two color morphs, black and yellow. The background color of the black morph is gray and the patterns are a rich, velvety black. The background color of the yellow morph is tan, the patterns are a sulfur yellow tinged brownish in patches. The snakes have transverse bands of color that vary geographically, and with the eastern, western, and southern types of timber rattlesnake they are easily recognized. It is typically found in temperate forests. In the north, timber rattlesnakes live in forested rocky hills. In the southern regions, the snakes are found in uninhabited swampy areas. Crevices in rocky cliffs usually facing south or large boulders piled together make up the hibernating dens.

5.3.5 Copperhead

The copperhead (Figure 503-13) has an average adult length of 22-36 inches, and is a stout-bodied snake. The head of the Northern Copperhead is a red, copper color with the rest of its body being pinkish to gray-brown with a dark chestnut colored hourglass shaped pattern. The hourglass pattern is narrow on the top of its back and wider on its sides. The underside, belly area, of the northern subspecies is dark. Southern Copperhead is similar to the northern copperhead but the coloration is paler and the cross bands fail to meet at the midline. Also the belly of the southern subspecies is light

in color. Broad-banded Copperheads have bright coloration with a sharp contrast between the pattern and the ground color. The cross bands are very broad at the midline and always meet. The belly is dark. Copperheads prefer terrestrial to semi-aquatic habitats, which include rocky-forested hillsides and various wetlands. They have also been known to occupy abandoned and rotting slab or sawdust piles. The copperhead is the cause of many snake bites yearly, but they are rarely fatal. Bites occur by accidentally stepping on or touching the snake, which tends to be well camouflaged with its surroundings.

5.3.6 Cottonmouth

The cottonmouth, also called a water moccasin, (Figure 503-14) has an average adult length of 20-48 inches with a heavy body. The back of the cottonmouth is dark olive or black, and the belly is paler. On young animals, the back is marked by bands with dark borders and paler centers. This pattern is usually lost in older individuals. The snout is always pale, and there is usually a dark vertical line by each nostril. The banding pattern in the young may be striking. The cottonmouth resides mainly in the southeastern United States. Cottonmouths are semi-aquatic and can be found near water and fields. They inhabit brackish waters and are commonly found in swamps, streams, marshes and drainage ditches in the southern lowlands of the United States. They also live at the edges of lakes, ponds and slow-moving streams and waters. They sun themselves on the branches, logs and stones at the edge of the water

5.3.7 Pigmy Rattlesnake

The pigmy rattlesnake (Figure 503-15) can be found in the southeastern portion of North America in the following states: North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Kentucky, Tennessee, Louisiana, Arkansas, Texas, Oklahoma, and Missouri. A tiny rattle and a skinny tail can characterize the pigmy rattlesnake. The tail rarely has more than a few rattles. This combined with the fact that the rattle is so small causes the sound of the rattle to be similar to the buzzing of an insect. The average size of this relatively small snake is 12-24 inches. The background color of the Pigmy Rattlesnake can vary greatly depending on the location and subspecies. The background color can vary from shades of gray, brown, or black, to even pinkish or reddish. In these species, a dark line runs vertically through the eye that looks similar to the eye of a cat. This line also extends down the side of the face. There is a series of dark, circular spots that mark the center of the back. Along the mid-body line, there is a thin reddish-orange stripe. Along each side of the body, you can find dark spots similar but smaller than the dorsal spots. Young pigmy rattlesnakes are characterized by a sulfur yellow tip on the tail, as well as a smaller size. The rest of the colorings and markings resemble those of the adult. It is found in a variety of habitats that include: rocky and partially wooded hillsides, pine woodlands, along riverbanks, and marshes. The one trait that these habitats must have in common is that they are in close

proximity to water, and are seldom found in dry habitats. Since the pigmy rattlesnake lives near water, it is a good swimmer. It can often be found in underground retreats and burrows. These burrows are not dug by the snakes, but by small mammals or by the golfer tortoise if it is native to the habitat

5.3.8 Eastern Massasauga

Eastern Massasauga (Figure 503-16) rattlesnake has a geographic range from the Great Lakes to Arizona. They are small, usually 20-30 inches length, occasionally up to 37 inches. The snake has a row of dark blotches on the back, and three rows of smaller blotches on each side of body. The background color is gray or brownish gray. The belly is black, marked with a white or yellow pattern. Some individuals are black and lack a pattern entirely. The massasauga rattlesnake inhabits marshes and swamps in temperate forests, rainforests and temperate grasslands. They sometimes wander into upland meadows and woods in the summer. The eastern massasauga rattlesnake is the only venomous snake in the state of Michigan.

5.3.9 Coral Snake

The coral snake (Figure 503-17) is classed with several Old World species like the neurotoxic cobras, kraits, and mambas. Most coral snakes are marked with a pattern of brightly colored rings or bands that are black, yellow, and red, with the red band touching the yellow band. Two species of coral snake are found in the United States: the Eastern coral snake, of the southeastern states; and the smaller Western coral snake, found from the southern parts of New Mexico and Arizona to northwestern Mexico. Both species have slender heads and bodies and tend to be secretive and nocturnal, spending much of their life underground in cracks and crevices. However, coral snakes can sometimes be seen after rains, on overcast days, and in the early morning or late evening. The Eastern coral snake is relatively large—often more than 24 inches in length—and lives in many habitats, including pine woods and hardwood forests. The Western coral snake is smaller, rarely reaching more than 20 in, and lives in dry habitats. When threatened, coral snakes usually curl their tails into a tight spiral and hold them upright. The grooved jaw, along with tiny hollow fixed fangs, assures that the coral has a poor delivery system for getting its venom into the victim. However, the coral snake does not have to "chew" its victim to inflict a painfully venomous bite, contrary to popular myth.

5.3.10 Protective Measures

As stated previously, PIKA will issue snake leggings for personnel entering an area where snakes may be encountered. However, it will also necessary for site personnel to exercise extreme caution when working in wooded and grassy areas. At no time should personnel place their hands in areas they cannot see, such as under rocks, fallen trees, dense brush, etc. Site personnel will immediately report to their team leader and the

SSHO any sighting or encounter with venomous snakes. The procedures to be followed in the event a snake bites someone are:

1. Do not cut "Xs" over the bite area, as this will intensify the effect of the venom.
2. Wash the bite with clean water and soap.
3. If a Pump Extractor, or other suitable venom extractor is available, use a cup size to adequately cover the fang punctures.
4. Do not apply a tourniquet since this will concentrate the venom and increase the amount of tissue damage in the immediate area.
5. If possible, kill the snake, bag it and transport it with the victim or try to positively identify the snake so proper selection of anti-venom can be made. If the snake is killed, use extreme caution since the head of a dead snake is still capable of biting and injecting venom.
6. Do not allow the victim to run for help since running increases the heart rate and will increase the spread of the venom throughout the body.
7. Keep the victim calm and immobile.
8. Have the victim hold the affected extremity lower than the heart while waiting for medical assistance.
9. If the bite is on the hand or arm, remove any rings, watches or tight clothing.
10. Transport the victim to medical attention immediately.
11. If a victim is unable to reach medical care within 30 minutes, a bandage, wrapped two to four inches above the bite, may help slow venom. The bandage should not cut off blood flow from a vein or artery. A good rule of thumb is to make the band loose enough that a finger can slip under it.

5.4 TICKS

5.4.1 General Hazard/Disease Information

The Center for Disease Control (CDC) has noted the increase of Lyme disease and Rocky Mountain Spotted Fever (RMSF) that are caused by bites from infected ticks that live in and near wooded areas, tall grass, and brush. Ticks are small, ranging from the size of a comma up to about one quarter inch. They are sometimes difficult to see. The tick season extends from spring through summer. When embedded in the skin, they may look like a freckle.

Lyme disease has occurred in 43 states, with the heaviest concentrations in the Northeast (Connecticut, Massachusetts, New Jersey, New York, Pennsylvania), the upper Midwest (Minnesota and Wisconsin), and along the northern California coast. It is caused by infection by the black-legged tick (Figure 503-18), deer ticks and the lone star ticks which have become infected with spirochetes.

RMSF has occurred in 36 states, with the heaviest concentrations in Oklahoma, North Carolina, South Carolina, and Virginia. It is caused by Rocky Mountain wood ticks, and dog ticks which have become infected with rickettsia.

The first symptoms of either disease are flu-like chills, fever, headache, dizziness, fatigue, stiff neck, and bone pain. If immediately treated by a physician, most individuals recover fully in a short period. If not treated, symptoms that are more serious can occur. If a site employee believes a tick has bitten them, or if any of the signs and symptoms noted above appears, the employee will contact the SSHO, who will authorize the employee to visit a physician for an examination and possible treatment.

5.4.2 Protective Measures

Standard field gear (work boots, socks and light-colored coveralls) provides good protection against tick bites, particularly if the joints are taped. However, even when wearing field gear, the following precautions should be taken when working in areas that might be infested with ticks:

1. When in the field, check yourself often for ticks, particularly on your lower legs, groin, armpits and areas covered with hair.
2. Site personnel should use a DEET containing (vapor-active) repellant on any exposed skin surfaces (except eyes and lips), and apply permethrin containing spray to field clothing (but not your skin). Personnel shall allow the permethrin to dry before using the treated clothing.
3. When walking in wooded areas, avoid contact with bushes, tall grass, or brush as much as possible.
4. Tuck pant legs into boot tops or tape pants to boot tops to avoid ticks from crawling up the pant leg (this may not be an option at sites where extreme heat stress is anticipated).
5. If dressed in Level D or Modified Level D, and no other head protection is required, wear a hat to prevent ticks from getting into the hair (again, use caution as this may enhance heat stress).
6. If you find a tick, remove it by pulling on it gently with tweezers, making sure to grasp the tick close to the head, and avoid squeezing the body.
7. If the tick resists, cover the tick with salad oil for about 15 minutes to help asphyxiate the tick and then remove it with tweezers.
8. Do not use matches, a lit cigarette, nail polish or any other type of chemical to "coax" the tick out.
9. Be sure and remove all parts of the tick's body, and disinfect the area with alcohol or a similar antiseptic after removal.
10. For several days to several weeks after removal of the tick, look for the signs of the onset of Lyme disease, such as a rash that looks like a bulls-eye or an

expanding red circle surrounding a light area, frequently seen with a small welt in the center.

11. Look for the signs of the onset of RMSF, such as an inflammation that is visible in the form of a rash comprised of many red spots under the skin, which appears three to 10 days after the tick bite.

5.5 BEES, HORNETS AND WASPS

Contact with stinging insects like bees, hornets and wasps may result in site personnel experiencing adverse health affects that range from being mildly uncomfortable to being life threatening. Therefore, stinging insects present a serious hazard to site personnel, and extreme caution must be exercised whenever site and weather conditions increase the risk of encountering stinging insects. Some of the factors related to stinging insects that increase the degree of risk associated with accidental contact are as follows:

1. The nests for these insects are frequently found in the type of remote wooded, grassy areas where many waste sites are located;
2. The nests are difficult to see and can be situated in trees, rocks, bushes or in the ground;
3. Accidental contact with these insects is highly probable, especially during warm weather conditions when the insects are most active;
4. If a site worker accidentally disturbs a nest, the worker may be inflicted with multiple stings, causing extreme pain and swelling which can leave the worker incapacitated and in need of medical attention;
5. Some people are hypersensitive to the toxins injected by a sting, and when stung, experience a violent and immediate allergic reaction resulting in a life-threatening condition known as anaphylactic shock;
6. Anaphylactic shock manifests itself very rapidly and is characterized by extreme swelling of the body, eyes, face, mouth and respiratory passages; and
7. The hypersensitivity needed to cause anaphylactic shock, can in some people, accumulate over time and exposure; therefore, even if someone has been stung previously, and has not experienced an allergic reaction, there is no guarantee that they will not have an allergic reaction if they get another sting.

With these things in mind and with the high probability of contact with stinging insects, site personnel shall comply with the following safe work practices:

1. If a worker knows that he is hypersensitive to bee, wasp or hornet stings, they must inform the SSHO of this condition prior to participation in site activities;
2. All site personnel will be watchful for the presence of stinging insects and their nests, and shall advise the SSHO if a stinging insect nest is located or suspected in the area;

3. Any nests located on site shall be flagged off and site personnel shall be notified of its presence;
4. If stung, site personnel shall immediately report to the SSHO to obtain treatment and to allow the SSHO to observe them for signs of allergic reaction; and
5. Site personnel with a known hypersensitivity to stinging insects shall be required to obtain emergency medications from their physician, such as epinephrine injectors, and will keep the medication on or near their person whenever they are working on site during seasons when bees, wasps or hornets may be present.

5.6 BITING INSECTS

5.6.1 General Information

Many types of biting insects such as mosquitoes, flies and fleas may be encountered on site. The use of insect repellents will be encouraged by the SSHO if deemed necessary. The biting insects of greatest concern are spiders, especially the black widow and the brown recluse. These are of special concern due to the significant adverse health effects that can be caused by their bite.

5.6.2 Black Widow Spider

The black widow (Figure 503-19) is a coal-black bulbous spider 3/4 to 1 2 inches in length, with a bright red hour-glass on the under side of the abdomen. The black widow is usually found in dark moist locations, especially under rocks, and rotting logs. They may even be found in outdoor toilets where they inhabit the underside of the seat. Victims of a black widow bite may exhibit the signs or symptoms listed below.

1. A sensation of pinprick or minor burning at the time of the bite.
2. Appearance of small punctures (but sometimes none are visible).
3. After 15 to 60 minutes, intense pain is felt at the site of the bite which spreads quickly, and is followed by profuse sweating, rigid abdominal muscles, muscle spasms, breathing difficulty, slurred speech, poor coordination, dilated pupils and generalized swelling of face and extremities.

5.6.3 Brown Recluse

The brown recluse (Figures 503-20 and 21) is brownish to tan in color, rather flat, 2 to 5/8 inches long with a dark brown "violin" shape on the underside. It may be found in trees, or in dark locations. Victims of a brown recluse bite may exhibit the signs or symptoms listed below.

1. Blistering at the site of the bite, followed by a local burning at the site 30 to 60 minutes after the bite.
2. Formation of a large, red, swollen, pustulating lesion with a bull's-eye appearance that may later become black due to tissue damage.

3. Systemic affects may include a generalized rash, joint pain, chills, fever, nausea and vomiting.
4. Pain may become severe after 8 hours, with the onset of tissue necrosis.

There is no effective first aid treatment for either of these bites. Except for very young, very old or weak victims, these spider bites are not considered life threatening, however medical treatment must be sought to reduce the extent of damage caused by the injected toxins. If either of these spiders are suspected, or known to be on site, the SSHO shall brief site personnel as to the identification and avoidance of the spiders. Site personnel should report to the SSHO if they locate either of these spiders on site, or notice any type of bite while involved in site activities.

5.7 SCORPIONS

Scorpions are basically night animals and contact with humans is usually in the form of a person disturbing a scorpion in its day-time hiding place, which may include gloves or boots/shoes left unattended over night. Scorpions are most commonly observed in the Gulf States and southwest, but are also seen in the south and southeast. In the United States, the most commonly encountered scorpion is the "bark scorpion" (Figure 503-22), referred to as such due to their preference for hiding under the loose bark of trees or in dead trees/logs. However, a wide variety of scorpions are present, to include the Southern Devil Scorpion (Figure 503-23). Scorpions are usually flat, straw to reddish brown in color, and range in size from 3/4 to 3 inches in length and are distinguishable by their long telson (tail) that ends in a curved stinger, and their pincher like claws. The scorpion venom of some species is capable of causing death in young or old people, and may cause severe adverse health affects in adults. The signs and symptoms typically associated with scorpion envenomation are highly variable depending upon the species involved, and may only involve localized pain/swelling. However, scorpion stings may cause any or all of the signs or symptoms listed below.

1. Prickling sensation at the time of the sting, followed quickly by severe pain.
2. The victim may experience restlessness, breathing difficulty, convulsion, muscle cramps, nausea/vomiting, fever, headache, dizziness, abdominal pain, hypertension, rapid heartbeat and profuse sweating.
3. Generalized weakness may be experienced for 24 hours or more following the sting.

There is no effective first aid treatment for scorpion stings, however, with very young and very old victims, or for severe envenomation, an attending physician may give polyvalent scorpion anti-venom. Due to the variation in signs/symptoms that may result, any victim of a scorpion sting should be transported to a medical facility for observation and treatment. If possible, capture the scorpion for later identification at the medical facility. If scorpions are suspected or known to be on site, the SSHO shall

brief the site personnel as to the identification and avoidance of the scorpions. As with other stinging insects, site personnel should report to the SSHO if they locate scorpions or notice any type of bite while involved in site activities.

5.8 ULTRAVIOLET RADIATION FROM SUNLIGHT

5.8.1 Skin Affects Resulting from Exposure

Personnel working outdoors in sunny environments risk exposure to ultraviolet (UV) radiation from sunlight. UV radiation produces chemical changes in the skin cells, which vary dependent upon the time of year, geographic location, hour of the day and personal susceptibility. Generally after initial exposure to sunlight, a reddening of the skin may occur, but normally does not appear for several hours after exposure. This reddening is associated with "sunburn" and may cause pain, discomfort and limit the capabilities of site personnel. If the exposure has been excessive, blistering and peeling of the outer layer of the skin may accompany the reddening of the skin. Another hazard associated with skin exposure to UV radiation from the sun is the production of skin cancer. Epidemiological studies have determined a positive association between excessive exposure to sunlight and skin cancer, with fair skinned people having the greatest risk.

5.8.2 Affects of Eye Exposure

Unprotected exposure to strong sunlight may cause photokeratitis (inflammation of the cornea), photoconjunctivitis (inflammation of the outer membrane of the eye), and in sensitive persons, the potential for cataracts increases and retinal damage may occur. Unprotected exposure to bright sunlight may cause acute physiological affects such as partial to complete closure of the eyelids (squinting), watering/tearing of the eyes and visual discomfort. These acute affects may impair personnel from performing assigned duties in an efficient, effective and safe manner and may interfere with the ability of site personnel to safely observe site operations.

5.8.3 UV Protective Measures

Upon exposure to hazardous levels of sunlight, the skin's self defense mechanism is activated. This mechanism involves a pigment in the skin, called melanin, which, upon exposure to the sun, rises to the surface of the skin giving it a tan coloration (suntan), and new melanin is produced in the lower regions of the skin. As moderate exposure increases, or continues, this process also continues and the color of the tan will, in most people, increase in darkness. The melanin in the skin absorbs UV radiation and acts as a protective layer over the skin regions below. This tanning will begin to fade if occasional exposure to sunlight is not continued. To further decrease the potential of receiving harmful exposures from the sun, the work practices listed below should be implemented during site activities where personnel exposures to hazardous levels of sunlight may occur:

1. Skin exposure to strong sunlight should be minimized through the use of clothing and exposure periods gradually increased during initial annual exposure;
2. Sunscreen lotions with a skin protection factor (SPF) rating of at least 30 should be applied to exposed areas of the skin prior to initiation of daily operations, and re-applied periodically throughout the day since sweating may remove or dilute the lotion and reduce its effectiveness;
3. When feasible, work areas should be shaded using tarpaulins or tents to protect workers from direct exposure to sunlight;
4. Mesh hats should be used to help shade and protect the eyes; and
5. For eye protection to bright sunlight, safety glasses with tinted lenses shall be used which meet the requirements of the American National Standards Institute (ANSI) Z80.3-1986 and Z87.1-1989 Standards.

5.9 INFECTIOUS HAZARDS

5.9.1 Medical Wastes

Due to the nature of typical hazardous waste sites, there exists the potential that medical waste could have been buried on site during past site operations. Current regulations provide strict guidelines on the disposal of medical and infectious waste and require infectious waste to be disposed of in clearly marked, red bags or containers. However, this is a relatively new regulatory requirement and past disposal operations may not have involved these types of well-marked containers. The hazards associated with medical and other infectious waste include:

1. Contact with contaminated sharps (needles, scalpels, etc.).
2. Exposure to blood or other body fluids.
3. Exposure to waste infected with viruses or bacteria.
4. Exposure to other types of biological hazards such as fungi, parasites, or experimental biological agents, etc.

To prevent possible exposure to infectious wastes, site personnel shall take the following precautions:

1. Site personnel shall remain constantly alert for signs of medical or infectious waste.
2. Site personnel report the presence of medical/biological waste to the SSHO immediately.
3. During excavations, an observer shall be positioned to observe the bucket and shall immediately notify the operator to halt excavation is suspect medical or biological waste is uncovered during the excavation.
4. If medical or biological waste is discovered, operations in the immediate area shall cease, site personnel shall evacuate the area, and the SS contacted immediately.

5.9.2 Hantavirus

5.9.2.1 Hazard Description

In June of 2002, the Center for Disease Control published a map of the United States indicating the number of cases of hantavirus pulmonary syndrome (HPS) by state of residence. This map is presented in Figure 503-24 of this ESHP. In the United States, deer mice (plus cotton rats and rice rats in the southeastern states and the white-footed mouse in the Northeast) are the rodents carrying hantaviruses that cause HPS. These rodents shed the virus in their urine, droppings and saliva. The virus is mainly transmitted to people when they breathe in air contaminated with the virus. This happens when fresh rodent urine, droppings or nesting materials are stirred up and dust, and possibly water droplets, containing the virus get into the air where they can be inhaled. There are several other ways rodents may spread hantavirus to people:

- If a rodent with the virus bites someone, the virus may be spread to that person—but this is very rare.
- Researchers believe that you may be able to get the virus if you touch something that has been contaminated with rodent urine, droppings or saliva, and then touch your nose or mouth.
- Researchers also suspect that if virus-infected rodent urine, droppings or saliva contaminates food that you eat, you could also become sick.

Transmission can happen any place that infected rodents have infested. Remember, the term "carrier rodent" means deer mice plus cotton rats and rice rats in the Southeast, and the white-footed mouse in the Northeast. Common house mice do not carry hantavirus. Therefore, any building where mice may have nested or been present could be potential sources of hantavirus infection.

5.9.2.2 Early Symptoms

Early symptoms include fatigue, fever and muscle aches, especially the large muscle groups—thighs, hips, back, sometimes shoulders. These symptoms are universal. There may also be headaches, dizziness, chills and/or abdominal problems, such as nausea, vomiting, diarrhea and abdominal pain. About half of HPS patients experience these symptoms.

Since there have been so few cases of HPS, it isn't quite clear what the "incubation time" is. However, on the basis of limited information, it appears that symptoms may develop between 1 and 5 weeks after exposure to potentially infected rodents and their droppings. Another important point to remember from the data that the CDC Special Pathogens Branch keeps on reported cases of HPS, it appears that many people who have become ill were in a situation where they didn't see rodents or rodent droppings. Other people have had frequent contact with rodents and their droppings before

becoming ill. This apparent inconsistency makes it very difficult to pin down the precise time when the virus was transmitted.

5.9.2.3 Late Symptoms

Four to 10 days after the initial phase of illness, the late symptoms of HPS appear. These include coughing and shortness of breath, with the sensation of having a tight band around the chest causing labored breathing as the lungs fill with fluid.

5.9.2.4 Prevention

To avoid risk of contracting the hantavirus, use a hose spray or spray bottle of dilute water/bleach solution (5:1) to wet down any work areas where there is evidence of infestation or mouse droppings. Then, while wearing protective clothing, boots, gloves, and a high efficiency particulate air (HEPA) filtered respirator (i.e., a N-100 or P-100 filter), wipe the sprayed surface clean. Personnel shall never clean droppings or dead mice with a blower, vacuum, or hand broom. Dispose of dead mice by dampening the body with the spray solution, picking it up with gloves, and placing it into a plastic bag. Additional precautions for those that may be occupationally exposed to the hantavirus include:

- Workers in potentially high-risk settings should be informed about the symptoms of the disease and be given detailed guidance on prevention measures.
- Workers who develop a febrile or respiratory illness within 45 days of the last potential exposure should immediately seek medical attention and inform the attending physician of the potential occupational risk of potential hantavirus infection. The PIKA CESHM will also be informed when the initial visit is conducted.
- Workers should wear a half-face air-purifying (or negative-pressure) respirator or PAPR equipped with HEPA filters when removing rodents from traps or handling rodents in the affected area.
- Workers should wear rubber or plastic gloves when handling rodents or handling traps containing rodents. Gloves should be washed and disinfected before removing them, as described above.
- Waste contaminated by rodent urine or feces should be disinfected with a commercial disinfectant or bleach solution. Dispose of dead rodents in plastic bags as described above.

5.9.3 Histoplasmosis

Histoplasmosis is an infectious disease of the lungs caused by a fungus called Histoplasma capsulatum. *H. capsulatum* grows in soils throughout the world. In the United States, the fungus is endemic and the proportion of people infected by *H. capsulatum* is higher in central and eastern states, especially along the valleys of the Ohio, Mississippi, and St. Lawrence rivers, and the Rio Grande. The Histoplasma

organism thrives in moderate temperatures and moist environments. Droppings from chickens, pigeons, starlings, blackbirds, and bats support its growth since it flourishes in nitrogen rich environs. Birds are not infected with it because of their high body temperatures, but they do carry it on their feathers, feet and beaks. Bats can be infected because they have a lower body temperature than birds and can excrete the organism in their droppings.

To multiply, Histoplasma capsulatum produces small spores called conidia. The conidia of Histoplasma capsulatum are only two millionths of a meter (microns, µm) in diameter. When these conidia are inhaled, they are small enough that they enter the lungs and start an infection. Many of these infections are easily overlooked because they either produce mild symptoms or none at all. However, histoplasmosis can be severe and produce an illness similar to tuberculosis.

Histoplasmosis primarily affects a person's lungs, and its symptoms vary greatly. The vast majority of infected people are asymptomatic (have no apparent ill effects), or they experience symptoms so mild they do not seek medical attention and may not even realize that their illness was histoplasmosis. If symptoms do occur, they will usually start within 3 to 17 days after exposure, with an average of 10 days. Histoplasmosis can appear as a mild, flu-like respiratory illness and has a combination of symptoms, including malaise (a general ill feeling), fever, chest pain, dry or nonproductive cough, headache, loss of appetite, shortness of breath, joint and muscle pains, chills, and hoarseness. A chest X-ray can reveal distinct markings on an infected person's lungs. Occupations that have an increased risk of infection include:

- Farmers and poultry keepers, especially when cleaning silos, chicken coops, pigeon roosts and bat-infested lofts.
- Gardeners and horticulturists using poultry manure as fertilizer.
- Construction and other workers in earth-moving operations.
- Workers in road construction, tree-clearing or landscaping.
- Workers clearing or dismantling contaminated buildings.
- Workers who monitor bird populations.
- Workers who have contact with bats or bat caves.

Chronic lung disease due to histoplasmosis resembles tuberculosis and can worsen over months or years. The most severe and rarest form of this disease is disseminated histoplasmosis, which involves spreading of the fungus to other organs outside the lungs. Disseminated histoplasmosis is fatal if untreated, but death can also occur in some patients even when medical treatment is received. People with weakened immune systems are at the greatest risk for developing severe and disseminated histoplasmosis.

Impaired vision and even blindness develop in some people because of a rare condition called "presumed ocular histoplasmosis." The factors causing this condition are poorly understood. Results of laboratory tests suggest that presumed ocular histoplasmosis is associated with hypersensitivity to *H. capsulatum* and not from direct exposure of the eyes to the microorganism. What delayed events convert the condition from asymptomatic to symptomatic are also unknown.

The best way to prevent exposure to *H. capsulatum* spores is to avoid situations where potentially contaminated material can become aerosolized and subsequently inhaled. A brief inhalation exposure to highly contaminated dust may be all that is needed to cause infection and subsequent development of histoplasmosis. Therefore, work practices and dust control measures that eliminate or reduce dust generation during the removal of bat or bird manure from a building will also reduce risks of infection and subsequent development of disease. For example, instead of shoveling or sweeping dry, dusty material, carefully wetting it with a water spray can reduce the amount of dust aerosolized during an activity. Adding a surfactant or wetting agent to the water might reduce further the amount of aerosolized dust. Once the material is wetted, it can be collected in double, heavy-duty plastic bags, a 55-gallon drum, or some other secure container for immediate disposal. An alternative method is use of an industrial vacuum cleaner with a high-efficiency filter to *bag* contaminated material. The removal of material that might be contaminated by *H. capsulatum* from a building and immediate waste disposal will eliminate any further risk that someone might be exposed to aerosolized spores. Use

Disinfectants have occasionally been used to treat contaminated soil and accumulations of bird and bat manure when removal was impractical or as a precaution before a removal process was started. Formaldehyde solutions are the only disinfectants proven to be effective for decontaminating soil containing *H. capsulatum*. However, because of the potentially serious health hazards associated with formaldehyde exposures, this method of disinfecting is not practical in most applications, and only persons who know how to apply it safely should handle formaldehyde solutions.

Persons working in contaminated areas should use protective clothing such as gloves and Tyvek coveralls. They should also use a respirator equipped with a high efficiency particulate air (HEPA) filter that is capable of filtering particles down to two microns in size. Such respirators are suitable, however, for major clean up operations of prolonged exposure, a powered air purifying or supplied air respirator may be necessary.

6.0 AUDIT CRITERIA

The following items related to operations will be audited to determine compliance with this ESHP:

- The Daily Task and Safety Briefing Log (ESHF-502);
- The Safety Training Attendance Log for the initial site hazard training (ESHF-503); and
- The Daily Inspection and Weekly Audit Report Form (ESHF-506).

7.0 ATTACHMENTS

No attachments are associated with this ESHP.

8.0 DOCUMENTATION

With the exception of documentation placed in the site logbooks, this ESHP requires no additional documentation.

Figure 503-1: Poison Ivy, Oak and Sumac Leaves and Ranges

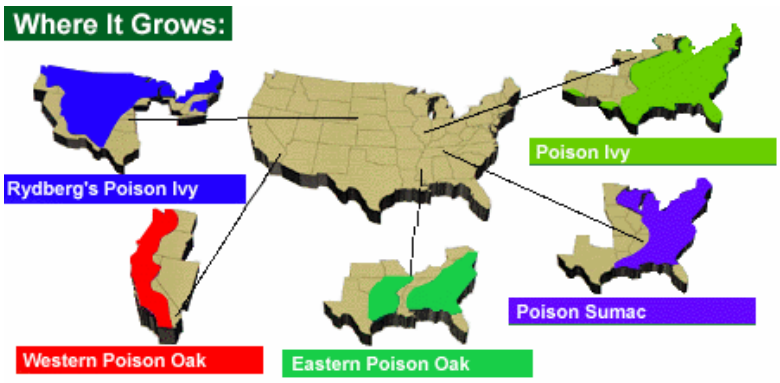


Figure 503-2

Figure 503-3

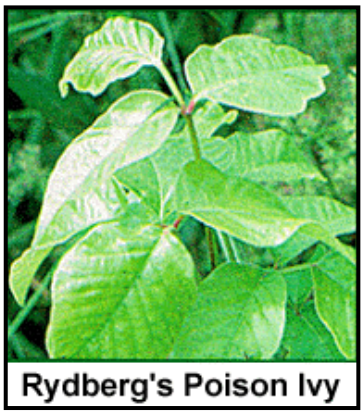


Figure 503-4

Figure 503-4

Figure 503-5

Figure 503-6 Poison Ivy Rootlets

Figure 503-7:
Poison Ivy Fall Colors

Figure 503-8:
Poison Oak Fall Colors

Figure 503-9:
Poison Ivy Berries

Figure 503-10: Eastern Diamondback

Figure 503-11: Western Diamondback

Figure 503-12: Canebrake (l) & Timber (r) Rattlesnakes

Figure 503-13: Copperhead

Figure 503-14: Cotton Mouth

Figure 503-15: Pigmy Rattlesnake

Figure 503-16: Eastern Massasauga

Figure 503-17: Coral Snake

Figure 503-18: Ticks

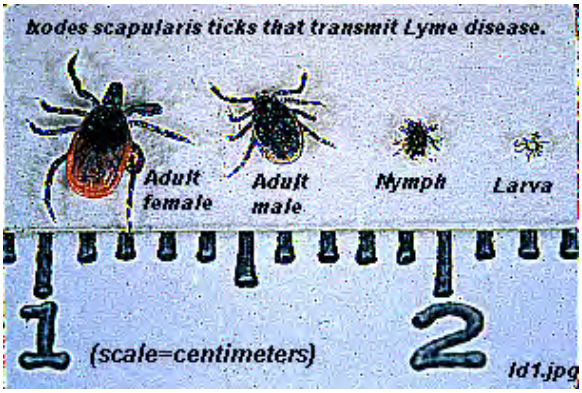


Figure 503-19: Black Widow Spider

Figure 503-20: Brown Recluse

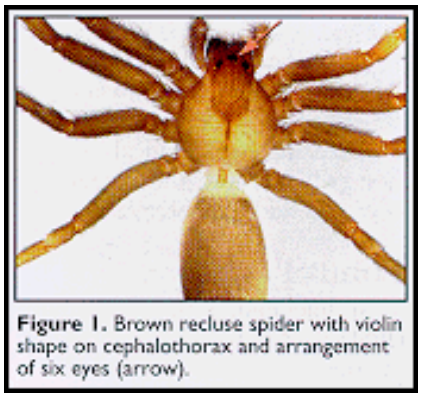


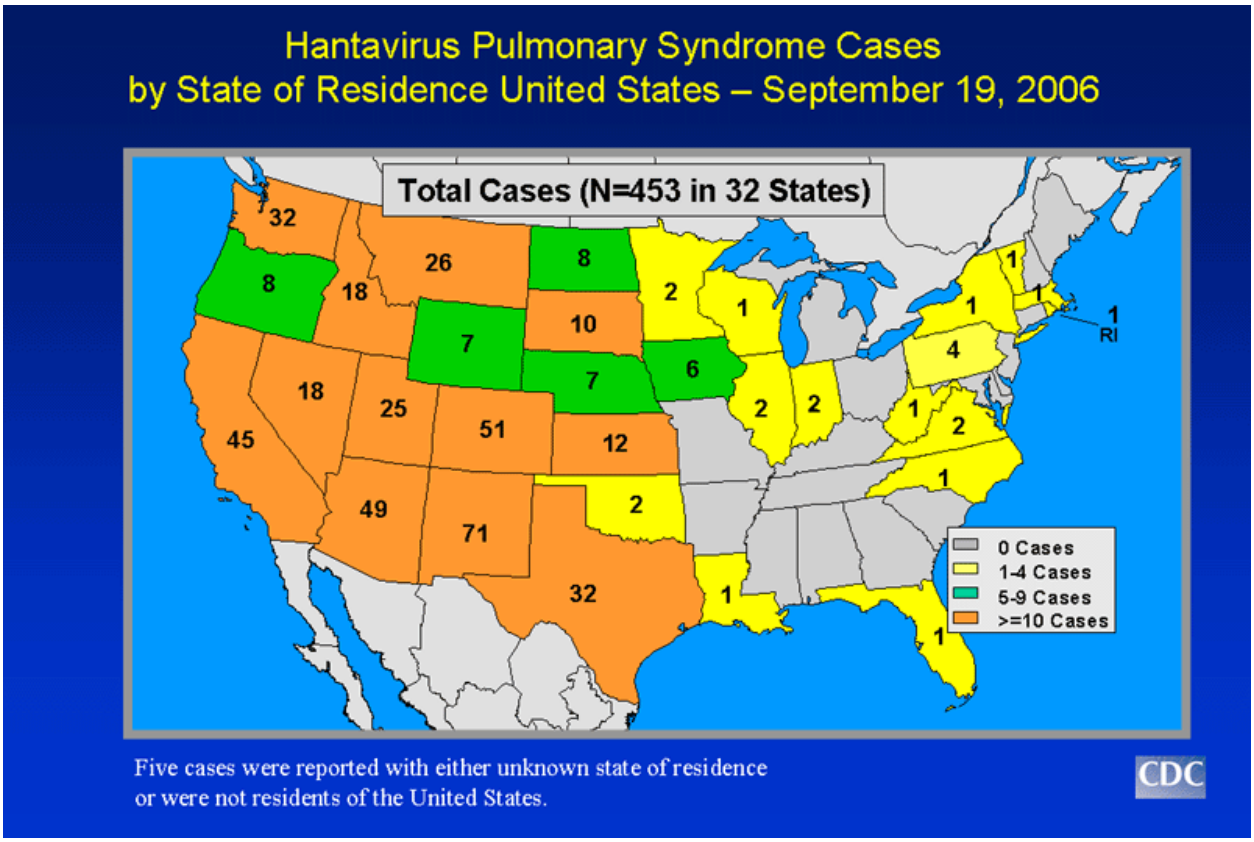
Figure 1. Brown recluse spider with violin shape on cephalothorax and arrangement of six eyes (arrow).

Figure 503-21: Brown Recluse

Figure 503-22: Bark Scorpion

Figure 503-23: Southern Devil Scorpion

Figure 503-24: Incident of Hantavirus Cases by State



1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the evaluation and entry into confined spaces. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP and an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to site personnel, to include subcontractor personnel, and operations involved with confined space entry. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REGULATORY REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with this ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to comply with the U.S. Army Corps of Engineers (USACE) requirements listed below.

- OSHA General Industry Standard 29 CFR Part 1910.146; and
- USACE EM 385-1-1, Section 6.I.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the equipment that personnel will require to safely perform confined space assessments and entry procedures. The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

4.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.

2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to hazard identification and the protective measures applicable to this ESHP.
4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve personnel exposure to confined space hazards. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel involved with confined space entry operations are fully trained and qualified as outlined in this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to assess their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in confined space operations shall be familiar with the potential safety and health hazards associated with the conduct of this operation, and with the safe work practices and control techniques to be used to reduce or eliminate these hazards.

5.1 PROCEDURE FOR CLASSIFICATION OF CONFINED SPACES

5.1.1 Work Area Evaluation

The SSHO shall evaluate the work area to determine if a confined space exists. Work areas shall be classified as a confined space if they meet the three following requirements:

1. The space is large enough and configured such that an employee can bodily enter the space and perform assigned tasks;
2. The space has limited or restricted means for entry or exit (for example; tanks, vessels, silos, storage bins, vaults and pits); and
3. The space is not designed for continuous employee occupancy.

Once a work area has been classified as a confined space, the space shall be posted with signs that include, but are not limited to, the following information:

Danger
Confined Space
Authorization Required For Entry

Barricades or flagging should also be used when applicable, in conjunction with the signs. Warnings of other specific hazards, such as high noise, should also be posted.

5.1.2 Classification of Confined Spaces

Once a workspace has been classified as a confined space, the SSHO shall consult with the CESHM to determine if the confined space is to be classified as either a non-permit or a permit-required confined space. If entry into the confined space is required to evaluate its hazards, this entry shall be conducted using the requirements of a permit-required confined space. The evaluation of the hazards in a confined space shall include, but not be limited to, a review of the following:

1. Potential oxygen deficient/enriched, toxic, or flammable atmospheres;
2. Physical, mechanical or biological hazards;
3. The possibility of liquids, gases, or solids being admitted during occupancy;
4. Past and current activities in the confined space which may adversely affect the atmosphere of the confined space;
5. Possible entry or exit hazards;
6. Physical characteristics, configuration, and location of the confined space; and
7. The size, depth and sloping of trenches and excavations.

Confined space shall be classified as being a non-permit confined space if it meets the following criteria:

1. The space does not contain any hazard capable of causing serious harm or death; and
2. The space does not contain or have the potential to contain a hazardous atmosphere.

A confined space shall be classified as being a permit-required confined space if the space contains one or more of the following characteristics:

1. A known or potentially hazardous atmosphere;
2. A material capable of causing engulfment of authorized entrants;
3. An internal configuration capable of entrapment or asphyxiation due to inwardly converging internal surfaces; or
4. Any other recognizable serious safety or health hazard.

5.1.3 Classification and Certification of Low-hazard Confined Spaces

When a confined space has been classified as a low-hazard confined space, the SSHO will complete the Low-Hazard Confined Space Entry Permit (ESHF-523) and post the permit at the space prior to entry. A permit-required confined space may be reclassified as a low-hazard confined space if the following conditions exist:

1. The only hazard involved is an actual or potential hazardous atmosphere;
2. Forced air ventilation alone will be sufficient to maintain the space as safe for entry;
3. Monitoring and inspection data are generated and documented which supports the atmospheric conditions stated in this ESHP; and
4. Entry into low-hazard confined spaces is conducted in accordance with the procedures outlined in Section 6.0 of this program.

5.2 PROCEDURES FOR ENTRY INTO LOW-HAZARD CONFINED SPACES

Prior to entry into a Low-Hazard Confined Space, the following safety and health precautions shall be conducted:

1. Any conditions that would make it unsafe to enter the space shall be removed or positively controlled prior to entry.
2. Temporary barriers shall be erected around the space or entrance to the space to prevent accidental falls.
3. Prior to entry, the air within the space will be monitored using calibrated direct-reading instruments. Monitoring shall be conducted using the procedures outlined in this ESHP.
4. The air monitoring results will be posted on the Low-Hazard Confined Space Entry Permit.
5. If required, forced air ventilation will be used to control atmospheric hazards to ensure that employees do not work a hazardous environment.
6. If ventilation is required, the procedures outlined in this ESHP will be used.
7. If a hazardous atmosphere is detected during entry, the following shall be conducted:
   a. All employees shall leave the space immediately;
   b. The space shall be evaluated to determine the source of the hazardous atmosphere;
   c. Control measures shall be implemented to protect the employees prior to any subsequent entries; and
   d. If adequate controls cannot be incorporated, the space shall be upgraded to permit-required and applicable procedures implemented prior to re-entry.
8. Employees entering the low hazard confined space shall wear appropriate PPE, such as hard hats, safety glasses, leather work boots and work gloves.

5.3 PROCEDURES FOR ENTRY INTO PERMIT-REQUIRED CONFINED SPACES

5.3.1 Confined Space Permit

The SSHO, with consultation from the CESHM, will complete a Permit-Required Confined Space Entry Permit (ESHF-522) prior to employee entry into the space. The SSHO will use the guidelines listed below for completion of each section of the Permit-Required Confined Space Entry Permit.

1. General Information

A. Location/Description of Space - Give a brief description of the space, including location, size, shape, depth etc.
B. Purpose of Entry - Briefly state the scope of work to be done inside the confined space (i.e. geotechnical inspection, environmental sampling, survey, excavation).
C. Potential Hazards - Give a description of expected physical and chemical hazards (i.e. potential IDLH (Immediately Dangerous to Life and Health) atmosphere, heat/cold stress, noise).
D. Permit Duration - Give the date and time (24 hour clock) the permit will expire.
E. Authorized Attendants - Give the name of employee who is qualified and will be stationed outside the space monitoring entrants and their activities.
F. Authorized Entrants - Give the names of employees who are properly trained and will or could enter the confined space during the duration of this permit.

2. Safety Equipment/Requirements

A. Area secure and signs posted - Mark yes when safe area around confined space entrance must be secured with flagging, barriers, and proper signs.
B. Pipe lines capped or blanked - Mark yes if pipelines between confined space and point of isolation may contain hazardous material which would require the capping or blanking of these lines before entry.
C. Pipelines purged or flushed - Mark yes if pipes inside the confined space must be purged with non-flammable gas prior to working on the pipe.
D. Lockout/tagout - Mark yes if outside energy sources (i.e., electrical, steam, etc.) exist which should be properly locked-out and de-energized before entry into confined space.
E. Mechanical ventilation - Mark yes if confined space atmosphere needs to be continuously ventilated during occupancy, and check the type of ventilation needed.
F. Communication equipment - Mark yes if normal verbal communication will not be possible due to configuration of confined space or background noise.
G. Tripod/retrieval system - Mark yes if a tripod or other means of retrieval are needed to assist with ingress/egress or with emergency rescue.

H. Fire extinguisher - Type - Mark yes if the potential for fire exists, and the appropriate type of extinguisher to be used.
I. Ground fault circuit interrupt - Mark yes if electrical tools will be used inside the confined space.
J. Lighting - Mark yes if extra illumination sources will be needed inside the confined space. NOTE - illumination source must be intrinsically safe if the if the potential for an explosive atmosphere exists.

3. Personal Protective Equipment (PPE) (See section 5.3.10)

A. Self contained breathing apparatus - When confined space atmospheric conditions are unknown or are potentially IDLH, mark yes for an SCBA (self-contained breathing apparatus) to be used during occupancy or if SCBA is needed on site for rescue purposes.
B. Airline supplied respirator w/ escape - When confined space atmospheres dictate the need for supplied air and physical characteristics of space limit the use of SCBAs, mark yes for supplied airline respirator.
C. Air purifying respirator (APR) - Type - When confined space atmospheric conditions present a health hazard but are not IDLH, mark yes for an air purifying respirator and state type of respirator and cartridge.
D. Five-minute escape air bottle - Mark yes for entrants to carry an escape air pack during occupancy of space. Required when wearing an APR.
E. Safety glasses or goggles - Mark yes if entrant(s) are to wear safety glasses or goggles, and circle the appropriate type.
F. Hardhat - Mark yes if entrant(s) are to wear a hard hat during confined space occupancy.
G. Ear plugs/muffs - Mark yes if high noise is present inside the confined space or may be generated by equipment used by the entrant(s), and circle the appropriate type.
H. Chemical clothing - Type - Mark yes if the potential for skin contact with hazardous material is possible and state type of chemical resistant clothing.
I. Protective boots/gloves - Mark yes if entrant(s) are to use protective boots or gloves to prevent contact with hazardous material or objects, and circle those that apply.
J. Chest harness and lifeline - Mark yes if entrant(s) are to wear a chest harness and lifeline during entry. NOTE - if tripod / retrieval system has been marked yes then this must also be marked yes.
K. Other - Indicate other protective equipment to be used during the confined space entry. Attach additional page if needed.

4. Tests to be Performed

A. Time/date - Person performing test must state the time and date that the test was performed.
B. % Oxygen - Always test for oxygen deficient/enriched atmospheres before testing for other contaminants. Testing for oxygen shall be conducted prior to entry into all permit-required confined spaces. The Permissible Exposure Limits (PELs) are 19.5% for oxygen deficient and 23.5% for oxygen enriched.
C. % of Lower Explosive Limit (LEL) - LEL monitoring shall always be performed during confined space operations. Monitoring equipment should be adjusted so that it will alarm if concentrations of explosive gas reach 10% of the LEL for that gas. At that point, operations will cease until conditions are evaluated.
D. Carbon monoxide (CO) - The space should be tested for the presence of carbon monoxide prior to entry. The PEL for CO is 35 ppm. The action level at which respiratory protection is required is half the PEL, 17.5 ppm.
E. Hydrogen sulfide (H_2S) - If there is a potential for H_2S inside the confined space, then the atmosphere must be tested prior to entry. The PEL for H_2S is 10 ppm. Again, the action level is half the PEL, 5 ppm.
F. Other - List other tests and the corresponding PELs which are to be conducted prior to entry.
G. Tester's initials - The person conducting the atmospheric testing must initial on the line corresponding to the test performed.

5. Checklist

A. All persons trained - Mark this box when all personnel documentation has been verified.
B. All persons medically approved - Mark this box when medical approval is verified.
C. Welding is expected - Mark this box if welding will be conducted during entry operations.
D. Entrants/Attendants briefed - Mark this box when all entrants and attendants have been briefed by the supervisor-in-charge.

6. Emergency Contacts

Put phone numbers for ambulance, fire, rescue or other important contacts here.

7. Special Instructions

List any special precautions or operational instructions here.

8. Signatures

A. Entry Supervisor - The Entry Supervisor authorizing the work being performed in the confined space prints and then signs his/her name. This permit is not to be signed until full compliance with the requirements of the permit has been achieved.
B. Permit Canceled By - The person terminating the permit prints their name.
C. Reason for Cancellation - State the reason the permit was terminated (end of operations, unauthorized condition in the space, etc.).
D. Date Canceled - List the date that the permit was terminated.

5.3.2 Authorized Personnel

Only authorized entrants, attendants and supervisors will conduct entry into a permit-required confined space. Authorized personnel will have received proper training in the hazards, procedures and equipment related to permit-required confined spaces.

5.3.3 Requirements for Atmospheric Monitoring

Prior to entry and periodically thereafter, as specified on the permit, air monitoring shall be conducted to assess potentially hazardous atmospheric conditions in the space. For the monitoring of the confined space atmosphere, the procedures listed in this ESHP, and any special procedures required by the CESHM will be followed.

5.3.4 Requirements for Ventilation

In confined spaces where atmospheric conditions in the space are unacceptable, the procedures presented in paragraph 5.4 of this ESHP shall be utilized.

5.3.5 Isolation of Physical Hazards

A confined space shall be isolated to prevent entry of materials and hazardous contaminants by:

1. Blanking or blinding of pipes, lines or ducts leading into the space;
2. Removal or misalignment of pipe, lines or duct sections;
3. Double block and bleed of pipes, lines or ducts; and
4. De-energizing and lockout/tagout of hazardous external and internal energy sources.

5.3.6 Electrical Equipment

Electrical equipment used in hazardous locations shall meet the appropriate requirements of Article 500 of the National Electrical Code (NFPA-70). To eliminate the potential for electrical shock, appropriate electrical equipment or systems shall be used. This would include protection such as ground-fault circuit-interrupters (GFCI), assured grounding systems, double insulated tools, separately derived systems, and low voltage systems. When temporary lighting is used in confined spaces, the following requirements shall be met:

1. All lighting shall be "spark proof" approved for use in Class I, Division I, Groups A, B, C, and D atmospheres if a known or potential flammable atmosphere exists;

2. Extension cords used for temporary lighting or other electrical equipment shall be equipped with connectors or switches approved for hazardous locations;
3. Temporary lighting shall be equipped with adequate guards to prevent accidental contact with bulbs;
4. Electrical cords shall be kept clear of working spaces, walkways or other locations in which they may be exposed to damage and present safety hazards to personnel; and
5. Temporary lighting and electrical cords shall be inspected regularly for signs of damage to insulation and wiring.

5.3.7 Communications

Entrants and attendants will maintain continuous communication at all times during confined space entry operations. If visual contact is not possible due to the configuration of the space, a radio communications system will be used. Communication equipment to be used in potentially flammable atmospheres will be approved by the manufacturer for use in that type of environment. Failure of radio communication systems will necessitate immediate evacuation of the entrants from the confined space.

5.3.8 Retrieval/Rescue Equipment Requirements

To facilitate non-entry rescues, a retrieval system will be set up prior to entry unless the retrieval equipment would increase the overall risk of entry or would not contribute to the timely rescue of the entrant. When used, retrieval equipment shall meet the following requirements:

1. Full body or chest harness;
2. Retrieval line will be attached to the center of the entrant's back near the shoulder level or above the entrant's head;
3. The other end of the retrieval line shall be attached to a manually operated lifting device or fixed point outside the space; and
4. A manually operated mechanical lifting device shall be available to retrieve personnel from a vertical type space of more than five (5) feet in depth.

If an entrant has been exposed to a hazardous substance during the confined space entry, a Material Safety Data Sheet (MSDS) or other written material related to the hazardous substances shall be made available to the medical facility providing care to exposed personnel.

5.3.9 Emergency Rescue

The authorized attendant shall immediately initiate the following steps when rescue of one or more entrants becomes necessary:

1. The authorized attendant shall notify the SSHO who will then be responsible for initiating the emergency response plan;

2. When possible, the authorized attendant shall initiate rescue operations from outside the confined space utilizing the winch and/or the retrieval lines attached to the authorized entrants;
3. **At no time** will the attendant enter the confined space to attempt rescue;
4. Upon arrival at the emergency site, the emergency rescue team will receive a situation report from the authorized attendant;
5. The emergency rescue team will enter the confined space wearing life-support equipment; and
6. The designated fire department, rescue squad, ambulance service and other rescue personnel to be used in an emergency shall be set forth in the confined space entry permit.

5.3.10 Personal Protective Equipment

All entrants shall wear the PPE set forth in the confined space entry permit when entering a confined space. The level of PPE shall be determined by the SSHO and will be based on the presence of known or potential hazards.

5.3.11 Cancellation or Termination of Entry Permits

Problems that arise during entry shall be noted on the permit so that appropriate revisions to the permit can be made. The canceled permit shall be filed on site and a copy given to the CESHM to allow review of the permit-required confined space program. Canceled permits shall be maintained for a minimum of one year after the termination of entry. The SSHO shall cancel the entry permit and terminate the entry when:

1. The operations specified in the entry permit have been completed; or
2. A prohibited condition in or near the space arises which increases the level of hazard in the space.

5.4 PROCEDURE FOR VENTILATION OF CONFINED SPACES

Before employees are permitted to enter a confined space, the space shall be mechanically ventilated if deemed necessary by the SSHO. Ventilation normally consists of a pre-entry purge of several air changes, followed by the continuous introduction of fresh air during occupancy. Ventilation shall be maintained during the occupancy if there is a potential for the atmospheric conditions of the confined space to drift out of the acceptable range. When necessary, the confined space shall be mechanically ventilated to prevent accumulation of:

1. Oxygen deficient or enriched atmospheres;
2. Flammable gases or vapors at concentrations above 10% of the LEL; and
3. Toxic contaminants in the atmosphere above the PEL.

If ventilation is required to control or eliminate atmospheric hazards, the following shall apply:

1. If the confined space is ventilated with an electrical air blower, it shall be used with a ground-fault circuit-interrupter, and be approved for use within a hazardous atmosphere.
2. Natural ventilation is preferred if it can achieve the same results as the mechanical ventilation.
3. Ventilation shall not be used as a means to justify reclassification of a permit-required confined space to a non-permit confined space.
4. Low-hazard confined spaces may be entered without the use of ventilation, based on the initial monitoring data, the potential for a hazardous atmosphere being created, and the task to be performed. Entry of this type will be at the discretion of the SSHO.
5. If a fuel powered ventilation system is used, the air intake and engine exhaust shall be placed so as to prevent exhaust fumes from entering the confined space.
6. Forced air ventilation shall be directed so as to ventilate the immediate areas where the employee is or will be working.
7. Ventilation of the confined space shall be continued until all employees have exited the space.

5.5 PROCEDURES FOR ATMOSPHERIC MONITORING

Before entry into a confined space, testing shall be conducted for hazardous atmospheres. Testing sequence should be oxygen, flammability and toxicity. Testing shall be conducted prior to and after ventilation is initiated. During occupancy, the frequency of testing shall be that which is set forth in the permit-required confined space entry permit (ESHF-522). Test equipment and results for each contaminant shall be listed on the permit-required confined space entry permit each time the space is monitored. When continuous monitoring is conducted, the results will be recorded prior to entry, after breaks of more than one hour, at the end of each workday and any time an atmospheric hazard exceeds the action level. Whenever possible, or when required by the hazards present, monitoring of the atmosphere in the confined spaces shall be conducted throughout the entire portion of the space to be occupied. Spaces that are deep, have odd shapes, or remote areas, may require that a probe or extension be added to the sampling equipment or occupants take sampling equipment into the confined space to test.

For spaces where monitoring of the entire work area is not feasible because the space is too large or part of a continuous system, conditions shall be continuously monitored in the work areas; and employees will carry emergency escape air packs.

5.6 ACCEPTABLE AIR SAMPLE LIMITS

The atmosphere of a confined space shall be within acceptable limits when the following conditions are maintained:

1. Oxygen - 19.5% to 23.5%;

2. Flammability - less than 10% of the LEL; and
3. Toxicity - less than one half of the recognized exposure limits. If tests show concentrations above the PEL are encountered during entry, the occupants shall exit the confined space immediately and the hazard shall be re-evaluated.

5.7 RECLASSIFICATION OF PERMIT-REQUIRED CONFINED SPACES

A space originally classified as a permit-required confined space may be reclassified as a non-permit confined space under the following conditions:

1. There are no actual or potential atmospheric hazards; and
2. All other hazards in the space are eliminated.

If entry into the space is required to inspect or eliminate the hazards, this entry shall be conducted IAW Section 5.3 of this ESHP. The basis for determining that the hazards are eliminated will be documented using the Permit-Required Confined Space Reclassification Certificate (ESHF-524) that will be completed by the SSHO and posted at the space prior to entry.

If a hazard arises within the space during entry after a space has been reclassified as a non-permit space, the employees will evacuate the space and the hazard/classification level re-evaluated. Control of atmospheric hazards using forced ventilation does not constitute elimination of the hazard and is not a valid method for reclassifying a permit-required confined space as a non-permit confined space.

5.8 SUBCONTRACTOR REQUIREMENTS

Subcontractors shall be responsible for complying with the requirements of this ESHP, as well as applicable OSHA regulations. Subcontractors performing entry into a permit-required confined space shall be informed by the SSHO of the nature and control methods for known or potential hazards present in the confined space. The SSHO shall be responsible for the coordination of subcontractor and PIKA personnel working together in a permit-required confined space, and shall de-brief subcontractor personnel at the conclusion of entry operations regarding hazards encountered or created and the applicability of the entry program requirements.

5.9 TRAINING OF ATTENDANTS, ENTRANTS AND SUPERVISORS

5.9.1 Training Schedule

Training shall be provided by PIKA for the entrants, attendants and the SSHO whenever:

1. An employee is first assigned duties related to confined space entry;
2. An employee's assigned duties are changed;
3. A change in the confined space operations or conditions occur about which the employee has not been previously trained; or

4. The SSHO or CESHM believes that there are deviations from the requirements of this program or there are deficiencies in an employee's knowledge or use of the procedures in this program.

5.9.2 General Training Requirements

Personnel responsible for supervising, planning, entering or participating in confined space entry and rescue shall be adequately trained in their functional duties prior to any confined space entry. The general training topics to be covered with all confined space entry personnel shall include:

1. An explanation of the general hazards associated with confined spaces;
2. A discussion of specific confined space hazards associated with the facility, location, or operation;
3. The reason for, proper use, and limitations of PPE and other safety equipment required for entry into confined spaces;
4. An explanation of the permit system and other procedural requirements for conducting confined space entry;
5. How to respond to emergencies;
6. Duties and responsibilities as a member of the confined space entry team; and
7. A description of how to recognize signs and symptoms of contaminant air exposure.

5.9.3 Specific Training for the SSHO

The SSHO shall receive the aforementioned general training, as well as additional training relating to the following topics:

1. Recognizing the effects of exposure to chemical hazards known to be in the confined space;
2. Use of air monitoring equipment and interpretation of results; and
3. Use and selection of PPE.

5.9.4 Specific Training for Attendants

Confined space attendants must be trained in the use of SCBA, the use of special rescue equipment, and the administration of First Aid, as follows:

1. SCBA
   A. Practical exercises; and
   B. Instruction in the use of SCBA.
2. Special Rescue Equipment
   A. Radio familiarization and operation;
   B. Lifelines and safety belts/harnesses; and
   C. Procedures for summoning the rescue team.
3. First Aid

A. Cardiopulmonary resuscitation techniques; and
B. Recognition of early symptoms of exposure to toxic material and/or oxygen deficiency.

6.0 AUDIT CRITERIA

The following items related to confined space entry will be audited to determine compliance with this ESHP:

- The Daily Task and Safety Briefing Logs (ESHF-502);
- Canceled Entry Permits (ESHF-522);
- Confined Space Entry / Exit Logs (ESHF-525);
- Confined Space Entry Training Certificate for entrants, attendants and supervisors;
- Documentation of Hazard Communication Training Form (ESHF-505);
- Documentation of Training form for the Daily Tailgate Safety Briefing (ESHF-503); and
- Daily Safety Inspection Checklist (ESHF-506).

7.0 ATTACHMENTS

No attachments associated with this ESHP.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving personnel exposure to high noise levels. This ESHP will be used in conjunction with the PIKA Hearing Conservation Program (HCP) contained in the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual. The HCP in the CESHP contains guidelines for the performance of audiometric hearing tests and the evaluation of standard threshold shifts.

2.0 SCOPE

This ESHP applies to site personnel, including contractor and subcontractor personnel, and operations involving noise exposure. This ESHP is not intended to contain all requirements needed for regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REGULATORY REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards and exposure limits published by the American Conference of Governmental Industrial Hygienist (ACGIH) directly apply to the conduct of operations associated with this ESHP.

- OSHA Construction Industry Standard 29 CFR Part 1926.59;
- OSHA General Industry Standard 29 CFR Part 1910.95; and
- American Conference of Governmental Industrial Hygienist, 2007 Threshold Limit Values and Biological Exposure Indices, 2007.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the equipment that personnel will require to safely work in high noise environments. The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

4.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The PIKA Corporate Environmental Safety and Health Manager shall be responsible for the management and implementation of the PIKA HCP. This program will be supported by the implementation of this ESHP and the data collected using this ESHP will be used to determine which employees will be included in the PIKA HCP. The CESHP will work

with each SSHO to determine which operations at each project site will be monitored for high noise levels and which personnel will be provided proper hearing protection devices.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve personnel exposure to high noise hazards. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel working high noise areas are fully trained and qualified as outlined in this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to assess their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in high noise operations shall be familiar with the potential safety and health hazards associated with the conduct of this operation, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

5.1 SAFETY AND HEALTH HAZARDS

The safety and health hazards associated with the conduct of operations in high noise environments may include the following:

- Physical trauma to the middle or inner ear, resulting in conductive hearing loss that may cause permanent damage, may heal naturally or may be repaired through surgical techniques;
- Onset of sensorineural hearing loss caused by the destruction of sound sensing nerves in the inner ear;
- Interference with voice communication and concentration;
- Interference with site personnel's ability to detect emergency alarms; and
- Increase in emotional and physiological stress.

5.2 NOISE EXPOSURE MONITORING

5.2.1 General Requirements

Noise exposure monitoring will be conducted to evaluate the potential for employee exposure to noise levels in excess of those outlined in Table 505-1. Employees will be given the opportunity to observe any noise measurements conducted, and will be informed if they have been exposed to noise at or above the OSHA Action Level. The purpose of workplace noise monitoring is to:

1. Collect data to identify noise areas where exposures exceed the OSHA Action Level;
2. Identify affected employees to be included in the PIKA HCP;
3. Enable proper selection of hearing protection; and
4. Provide data that will assist in the designing of engineering and work practice controls.

5.2.2 Noise Monitoring Procedure

The objective of noise monitoring is to identify those operations that may cause personnel to receive an excessive exposure to noise. Typical site operations which have a real potential for causing over-exposures are: drill rig operations; brush clearing operations, using gas powered weed eaters, chain saws or brush hogs; and soil excavation and moving operations, involving backhoe, front-end loaders and similar heavy equipment. Whenever sound-level or noise-dosimetry monitoring is conducted, the monitoring equipment will be used, calibrated and maintained IAW manufacturer's specifications. Sound level and noise dosimetry monitoring data will be recorded on the PIKA Site Monitoring form (ESHF-533).

Operations that have a potential for causing an over-exposure will be identified in the SSHP. When these operations are initiated, The SSHO will conduct sound level monitoring to determine if noise levels in the hearing zone meet or exceed 85 dBA. If an operation is identified which causes exposures greater than 85 dBA, the SSHO will conduct noise-dosimetry monitoring of the personnel working in the area. Continuous noise dosimetry will be conducted for at least 85% of the work shift duration and the SSHO will provide a description of the noise exposure potential for any non-monitored periods during the work shift. The microphone for the noise dosimeter will be positioned in the hearing zone nearest the noise source.

5.2.3 Repeated Exposure Monitoring

Sound-level and noise-dosimetry monitoring shall be repeated whenever a change in operations, equipment, or protective measures increases noise exposure such that additional employees may be exposed at or above the 85 dBA action level. Monitoring will also be repeated if existing noise protective measures are rendered ineffective.

5.3 OPERATIONAL CONTROL TECHNIQUES

5.3.1 Engineering Controls

Whenever feasible, engineering controls will be utilized to reduce personnel exposure to high noise levels. Typical engineering controls include: reduction in the speed or energy input for vibrating sources; installation of dampening devices to absorb vibration; isolation of site personnel from the noise source, or isolation of the noise source from the work area; and construction of sound absorbing physical barriers between the noise source and the site personnel.

5.3.2 Work Practice Controls

Work practice controls can also be used to reduce personnel exposures and may involve the use of the following: routine maintenance of machinery/equipment; and increasing the distance between personnel and the noise source. At no time is it acceptable to use worker rotation into and out of high noise areas as a method of reducing individual exposure.

5.3.3 Personal Protective Equipment

5.3.3.1 Use of Hearing Protection Devices

According to OSHA, hearing protectors shall be made available to personnel working in areas where the exposures to noise are, or may be, equal to or greater than the 85 dBA action level. As specified by OSHA (which is enforceable as law), hearing protectors will be required, and will be worn by personnel whose noise exposure exceeds the OSHA PELs listed in Table 505-1 of this ESHP. Also, any employees who have experienced a standard threshold shift, as identified by audiogram testing, must use hearing protectors when exposures are at or above the 85 dBA action level. However, to further reduce the potential for personnel experiencing hearing loss, PIKA has adopted the ACGIH TLVs as the limits for exposure. Therefore, hearing protection devices will be worn when the action level of 82 dBA is achieved.

TABLE 505-1. NOISE EXPOSURE LEVELS

DURATION PER DAY	OSHA PEL (dBA)	ACGIH TLV (dBA)
8 Hours	90	85
6 Hours	92	NA
4 Hours	95	88
3 Hours	97	NA
2 Hours	100	91
1.5 Hours	102	NA
1 Hour	105	94
½ Hour	110	97
¼ Hour	115	100
7.5 Minutes	NA	103

5.3.3.2 Attenuation of Hearing Protection Devices

All hearing protection devices shall be evaluated by the SSHO for attenuation using the Noise Reduction Rating (NRR) that appears on equipment packaging. Attenuation of hearing protection devices will be calculated using the procedures found in Appendix B of 29 CFR 1910.95. Hearing protector attenuation shall be adequate to reduce exposure to an 8-hour TWA of 85 dBA or less.

5.4 EMPLOYEE TRAINING

Personnel who are exposed to noise levels at or above the 85 dBA action level shall receive initial and annual training. The training shall, at a minimum, include the following:

1. The contents of the OSHA Occupational Noise Exposure Standard and the HCP;
2. The effects of noise on hearing;
3. The purpose, advantages, disadvantages, and attenuation of various hearing protectors;
4. Instructions on selection, fitting, use, and care of hearing protectors; and
5. The purpose of audiometric testing, and an explanation of the test procedures.

6.0 AUDIT CRITERIA

The following items related to operations involving high noise exposure will be audited to determine compliance with this ESHP:

- The Site Daily Operational, Safety and Monitoring Logs (ESHF-533);
- The Safety Training Attendance Log for the initial site hazard training (ESHF-503);
- The Daily Task and Safety Briefing Log (ESHF-502); and
- The Daily Inspection and Weekly Audit Report Form (ESHF-506).

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to operations conducted in hot environments. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA personnel, including subcontractor personnel, and operations involving personnel exposure to heat stress. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

There are no Occupational Safety and Health Administration (OSHA) standards that directly apply to the conduct of operations associated with this ESHP. However the references listed below contain relevant data regarding heat stress prevention.

1. American Conference of Governmental Industrial Hygienist, 2007 Threshold Limit Values and Biological Exposure Indices, 2007.
2. National Institute of Occupational Safety and Health (NIOSH) Occupational Safety and Health Guidance for Hazardous Waste Site Activities, U.S. Department of Health and Human Services, October 1985.

4.0 RESPONSIBILITIES

A. PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the equipment that personnel will require to safely perform operations in hot environments. The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

B. CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to visitor entry and protective measures.
4. Periodically auditing PIKA work sites to assess their compliance with this ESHP.

C. SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve personnel exposure to high temperatures and heat stress hazards. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel required to work in hot environments are fully trained and qualified as outlined in this ESHP.

D. SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards of high temperature exposures and the control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations, conditions and personnel to assess their compliance with this ESHP and the adequacy of the measures being taken to prevent heat stress and strain.

5.0 PROCEDURE

5.1 INTRODUCTION

Heat stress is one of the most common (and potentially serious) illnesses that can affect site personnel. The most common cause of heat stress during site activities is the use of PPE and its interference with the natural cooling mechanism. Impermeable PPE interferes with the evaporation of water vapor and causes the body to retain metabolic and environmentally induced heat. Other factors that may predispose a worker or increase susceptibility to heat stress include: environmental factors, to include temperature, humidity, and radiant heat; lack of physical fitness; lack of acclimatization to hot environments; degree of hydration; level of obesity; current health status (i.e., having an infection, chronic disease, diarrhea, etc.); alcohol or drug use; and the worker's age and sex. During activities conducted on PIKA project sites, hot environmental conditions can create serious safety and health threats to site workers. This ESHP addresses the potential hazards associated with heat stress and outlines the procedures for monitoring and controlling those hazards. For the remainder of this

ESHP, reference to "liquids" shall indicate water or an electrolyte replacement solution - not tea, coffee or carbonated drinks.

5.2 HEAT STRESS AND STRAIN

5.2.1 Heat Stress

Heat stress is the net heat load to which a worker may be exposed from the combined contributions of metabolic cost of work, environmental factors (i.e., air temperature, humidity, air movement, and radiant heat exchange), and clothing requirements. A mild or moderate heat stress may cause discomfort and may adversely affect performance and safety, but is not acutely harmful to health. As the heat stress approaches human tolerance limits, the risk of personnel experiencing acute heath affects increases.

5.2.2 Heat Strain

Heat strain is the overall physiological response resulting from heat stress. The physiological adjustments are dedicated to dissipating excess heat from the body. Acclimatization is the gradual physiological adaptation that improves an individual's ability to tolerate heat stress.

5.3 HEAT STRESS DISORDERS

5.3.1 Heat Rash

Heat rash is caused by continuous exposure to heat and humid air and is aggravated by wet chafing clothes. This condition can decrease a worker's ability to tolerate hot environments. Symptoms include a mild red rash, especially in areas of the body that sweat heavily. Treatments for heat rash include decreasing the amount of time in protective gear and use of powder, such as cornstarch or baby powder to help absorb moisture and decrease chafing. Personnel should maintain good personal hygiene standards and change into dry clothes if needed.

5.3.2 Heat Syncope (Fainting)

Heat syncope (fainting) occurs when blood flow to the brain is temporarily reduced resulting in unconsciousness. Heat syncope typically results from a combination of factors related to exposure to heat stress. First, heat stress causes the blood vessels in the skin area to dilate in order to increase blood flow to the skin where cooling of the blood should take place. This reduces blood flow to the brain that can result in loss of consciousness. Second, standing stationary for a long period in a hot environment may also allow for "pooling" of blood in the legs, thereby reducing the blood flow to the brain which again may cause fainting. Inadequate fluid replacement leading to dehydration may significantly contribute to this problem. Reduced blood flow to the brain results in faintness, dizziness, headache, nausea, vomiting, and possibly even fainting. Once the person has fainted, they will usually regain consciousness quickly. The fainted person should be laid down in a shaded area, feet elevated, and if conscious, give fluids, particularly an electrolyte replacement fluid. The effected person

should be allowed to rest until recovered and re-hydrated, and should not be allowed to engage in vigorous physical activity for the remainder of the day.

5.3.3 Heat Cramps

Heat cramps are caused by a rate of perspiration that is not balanced by adequate fluid and electrolyte intake. Heat cramps can be caused by both too much and too little salt, but the primary cause is lack of water replenishment. The occurrence of heat related cramps is an indication that heat exhaustion or heat stroke may occur soon. Symptoms include acute, painful spasms of voluntary muscles such as the back, abdomen and extremities. Treatments for heat cramps include removing the victim to a cool area, loosening restrictive clothing, and stretching and massaging affected muscles to increase blood flow to the area. The effected person should drink one to two cups of liquids immediately and then again every twenty minutes until recovered. Consultation with a physician is recommended if the condition does not improve. An electrolyte replacement solution should be taken along with water during break periods to replace lost electrolytes. Consumption of carbonated drinks will not be adequate and may aggravate the condition.

5.3.4 Heat Exhaustion

Heat exhaustion is a state of very definite weakness or exhaustion caused by excessive loss of fluids from the body. This condition leads to inadequate blood supply to working muscles and cardiac insufficiency. Fortunately, this condition responds readily to prompt treatment. Due to restriction in blood flow, this state of exhaustion can lead to muscle failure during times of physical stress. This can then lead to a personal injury accident. Additionally, if allowed to go untreated, heat exhaustion can quickly develop into heat stroke or cause heat syncope (fainting). Fainting can be very dangerous if the victim is operating machinery, and the victim may be injured when he or she faints. Symptoms of heat exhaustion include pale or flushed, clammy, moist skin, profuse perspiration, and extreme weakness. The body temperature is normal or slightly elevated, the pulse is weak and rapid, and breathing is shallow. The individual may have a headache, be dizzy, or be nauseated. Treatment will include removal of the individual to a cool, air-conditioned place; increased hydration; elevating the feet; and rest. The effected person should drink one to two cups of liquids immediately, and every twenty minutes thereafter until recovered. If the signs and symptoms of heat exhaustion do not subside or become more severe, immediately seek medical attention for the affected person.

5.3.5 Heat Stroke

Heat stroke is an acute and dangerous condition caused by the failure of the body's heat regulating mechanisms. This failure causes the perspiration system to stop working correctly, and the body core temperature can rise very rapidly to a point (105+°F) where brain damage and death can result if the person is not cooled quickly. Symptoms include the victim having hot skin that may or may not be red and dry.

Wetness may remain on the individual from sweat produced earlier before entering heat stroke. The person may be nauseated, dizzy, confused, delirious, unconscious, or comatose with extremely high body temperatures and rapid respiratory and pulse rates. Treatment for a heat stroke victim should concentrate on cooling the person's body immediately. If the body temperature is not brought down quickly, permanent brain damage or death may result. The victim should be cooled as soon as possible by either sponging or immersing the victim in very cool water to reduce the core temperature to a safe level (<102° F). If conscious, the victim should be given cool liquids to drink. The victim should remain under observation and immediate medical attention should be sought. Do not give the victim caffeine or alcoholic beverages.

5.4 EVALUATION OF HEAT STRAIN AND STRESS

Assessment of both heat stress and heat strain can be used for evaluating the risk of worker safety and health. The decision-making process depicted in Figure 506-1 will be used for this evaluation. The guidance provided in Figure 506-1 represents conditions under which it is believed that nearly all adequately hydrated, un-medicated, healthy workers may be repeatedly exposed without adverse health effects. This guidance is not a fine line between safe and dangerous heat exposure levels, rather it is to be used in conjunction with the procedures in this ESHP to provide adequate protection of site personnel working in high heat environments.

5.4.1 Heat Stress Evaluation

The effective use of Figure 506-1 requires an initial decision about whether heat stress in expected. For this ESHP, heat stress evaluation will be initiated when ambient temperatures are expected to exceed 78.8°F for acclimatized workers, 72.5°F for unacclimatized workers and 70.0°F for workers using impermeable or semi-impermeable clothing. Once it has been decided that a heat stress evaluation must be made, Steps 1 through 8 outlined below should be initiated and followed until the "Continue Work" statement in the flowchart is reached.

5.4.1.1 STEP 1: Does clothing allow air or water vapor movement?

The heat stress control procedures addressed by this ESHP were developed for a traditional work uniform of a long sleeve shirt and pants. If impermeable or semi-impermeable clothing (i.e., Tyvek, Saranex, or other chemical resistant clothing), or heavy outer garments (i.e., Kevlar chaps or a welding apron and gloves ensemble) are worn that significantly impede evaporation of perspiration, then the answer to Step 1 is NO. The next step in the flowchart to be used will be Step 5. If the answer to Step 1 is YES, an evaluation of the clothing must be made. Table 506-1 below presents modifications to be made to the Wet-bulb, Dry Globe (WBGT) monitoring results if clothing other than the traditional work uniform is worn. The values in Table 506-1 will be added to the WBGT monitoring conducted in Step 2

FIGURE 506-1: HEAT STRESS EVALUATION FLOWCHART

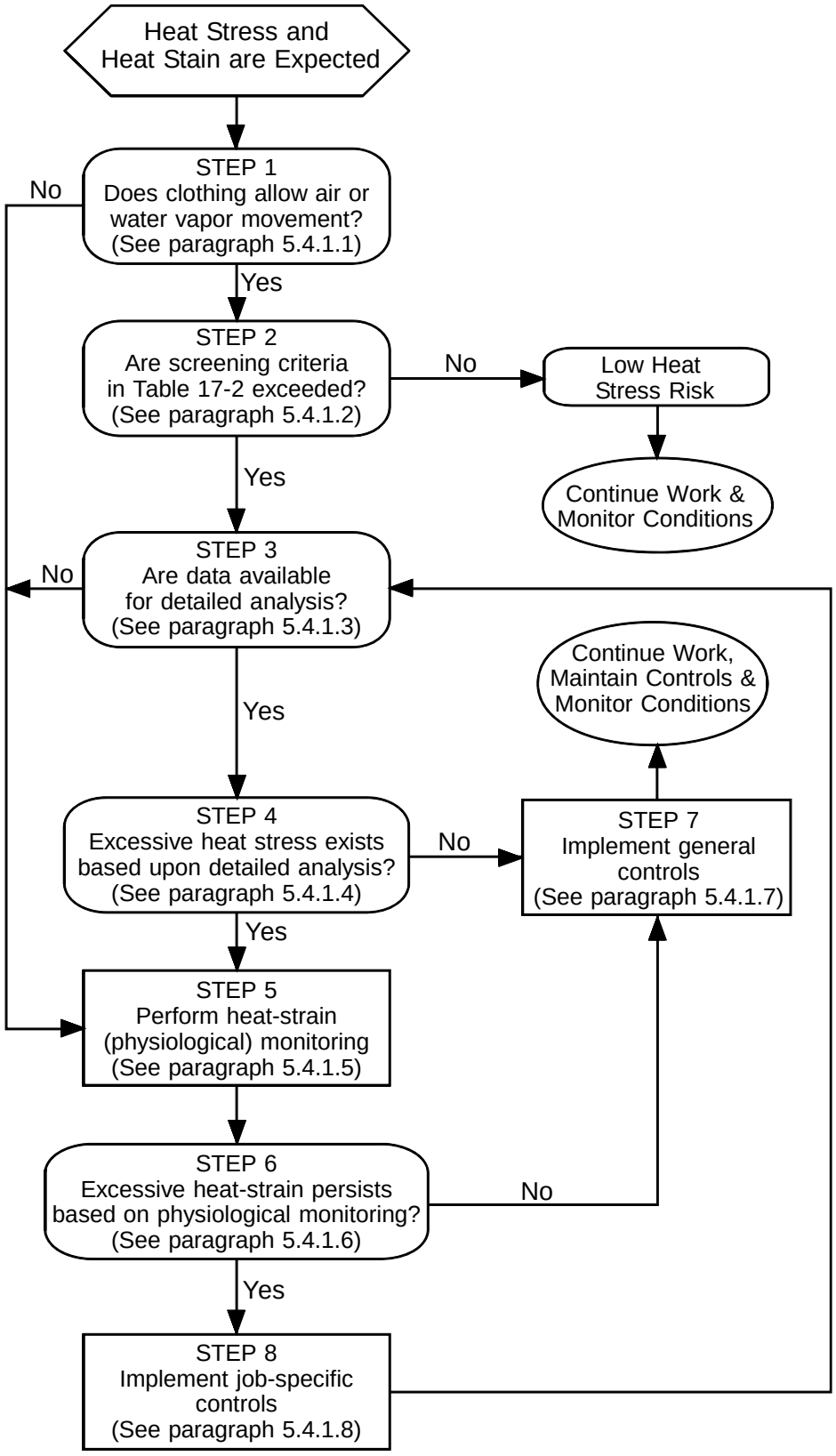


TABLE 506-1: ADDITIONS TO MEASURED WBGT VALUES FOR CLOTHING

Clothing Type	WBGT Addition	
	°F	°C
Summer work uniform	0.0	0.0
Cloth (woven material) overalls	6.3	3.5
Double-cloth overalls	9.0	5.0

5.4.1.2 STEP 2 - Are screening criteria in Table 506-2 exceeded?

To answer this question, WBGT monitoring must be performed. WBGT monitoring provides a useful, first-order index of the environmental contribution to heat stress as influenced by air temperature, humidity, and radiant heat. Because WBGT monitoring is only an index of the environment, the screening criteria are adjusted for workload demands, level of acclimatization, and clothing. Table 506-2 provides WBGT criteria that can be used as a screening tool to assess the potential for adverse health affects. For clothing presented in Table 506-1, the WBGT screening limits in Table 506-2 can be used when the clothing adjustment factors are added to the environmental WBGT measurement. The acclimatization factor presented in Table 506-2 refers to the worker's level of acclimatization. Acclimatization is the process whereby workers become accustomed to working in hot environments. While some sources indicate that acclimatization can occur within six working days, full heat acclimatization may require up to three weeks of physical activity under heat stress conditions, and a noticeable loss of acclimatization occurs after four days without exposure. During the initial three weeks of heat stress exposure, the unacclimatized portion of Table 506-2 will be used for screening. Further information related to acclimatization is presented in paragraph 5.4.1.7 of this ESHP.

TABLE 506-2: SCREENING CRITERIA FOR HEAT STRESS EXPOSURE

Work Demands*	Acclimatized (WBGT Values in °F)				Unacclimatized (WBGT Values in °F)			
	Light	Moderate	Heavy	Very Heavy	Light	Moderate	Heavy	Very Heavy
100% Work	85.1	81.5	78.8		81.5	77.0	72.5	
75% Work – 25% Rest/hr	86.9	83.3	81.5		84.2	79.7	76.1	
50% Work – 50% Rest/hr	88.7	85.1	83.3	81.5	86.0	82.4	79.7	77.0
25% Work – 75% Rest/hr	90.5	87.8	86.0	85.1	87.8	84.2	82.4	79.7

Notes:

1. WBGT values represent thresholds near the upper limit of the metabolic rate categories.
2. If work and rest environments are different, hourly time-weighted averages (TWAs) should be calculated and used. TWAs for work rates should also be used when the work demands vary within the hour.

3. Values in the table are applied by reference to the "Work-Rest Regiment" section of the *Documentation* and assume 8-hour workdays in a 5-day workweek with conventional breaks, as discussed in the *Documentation.* When workdays are extended, consult the "Application of the TLV" section of the *Documentation.*
4. Because of the physiological strain associated with Very Heavy Work among less fit workers regardless of the WBGT, criteria values are not provided for continuous work and for up to 25% rest in an hour. For these conditions, the screening criteria are not recommended, and a detailed analysis and /or physiological monitoring should be used.
5. Use of semi or totally impermeable clothing require monitoring IAW the Physiological Heat Stress Monitoring found in paragraph 5.4.1.5 of this ESHP.
6. Source: ACGIH. 2003 Threshold Limit Values and Biological Exposure Indices. Cincinnati, OH.

While the WBGT is primarily a measurement of environmental factors, increases in metabolic workload will have a significant impact on determining if the screening criteria in Table 506-2 are exceeded. As work demand increases, the criteria values in Table 506-2 are decreased to minimize the potential for workers to experience a core body temperature that exceeds 100.4°F (38°C). Therefore, correct assessments of work demand and work rest cycles are of equal importance to assessing heat stress and conducting WBGT screening. Table 506-3 provides broad guidance for selecting the work demand category to be used in Table 506-2. Work breaks (either natural breaks associated with work production or scheduled breaks) are associated with on-site activities and must be assessed. When determining if the screening criteria in Table 506-2 are exceeded, it is critical to use the appropriate work/rest allocation and metabolic rate category as provided in Table 506-3.

TABLE 506-3: EXAMPLES OF WORK CATEGORY ACTIVITIES

Categories	Example Activities
Resting	Sitting quietly
	Sitting with moderate air movements
Light	Sitting with moderate arm and leg movements
	Standing with light work at machine or bench while using mostly arms
	Using a table saw
	Standing with light or moderate work a machine or bench with some walking
Moderate	Scrubbing in a standing position
	Walking about with moderate lifting or pushing
	Walking on level at 3.5 miles/hour carrying 6.5 pound weight load
Heavy	Carpenter sawing by hand
	Shoveling dry sand
	Heavy assembly work on a non-continuous basis
	Intermittent heavy lifting with pushing or pulling (e.g., pick & shovel work)
Very Heavy	Continuous shoveling of wet sand

To conduct the WBGT monitoring, the SSHO shall use a real-time direct reading WBGT monitor with data logger. After estimating the workload and rest period regiment, the WBGT (outdoors) value will be compared to the values expressed in Table 506-2 to determine if the screening limits are being exceeded. The SSHO will follow the manufacturer's directions related to the proper operation of the monitor and will place the monitor in the location where the personnel are working. If project teams are conducting similar operations in areas with differing heat stress environments (i.e., one team is working in a shaded forest area and another team is working in an open field), WBGT monitoring will first be conducted in the area with the greatest heat stress potential. The screening results of this monitoring will initially be applied to both teams until separate data can be collected and assessed for each area. If the monitoring results are different for the two areas, the heat stress management procedures will be applied separately to both areas, and the continued monitoring prescribed by this ESHP will be conducted alternately in the high and lower exposure areas.

If the on-site WBGT monitoring indicates that the screening criteria of Table 506-2 are not exceeded for the level of work, level of acclimatization and clothing experienced, then the answer to Step 2 is NO and the "Continue Work" level can be reached. However, continued monitoring of conditions will be needed to determine if, and when, screening criteria are exceeded. If the on-site WBGT monitoring indicates that the screening criteria have been exceeded, then the answer to Step 2 is YES and Step 3 must be used.

5.4.1.3 STEP 3: Are data available for a detailed analysis?

This step is the introductory step into the detailed analysis that should be conducted to fully assess the heat-related hazards. While Table 506-2 provides screening data, it is possible for a condition to exist where the screening limits are exceeded but the condition does not present an unacceptable exposure. The only way to determine if this is the case is to first conduct a detailed analysis that includes a TWA of the WBGT and metabolic rate. The second level of detailed analysis is to follow a rational model of heat stress. While the rationale rational model method (versus the empirically derived WBGT thresholds) is computationally more difficult, it allows for a greater understanding of the sources of heat stress and is a means to appreciate the benefits of any modifications that can be made to limit the exposure. Unfortunately, due to the wide variations in the tasks performed by on-site personnel and the significant variations to environmental factors experienced on site (i.e., temperature, humidity, and radiant load from the sun) the use of a detailed rational model is typically not applicable to PIKA's on-site operations. Additionally, the daily application of a rational model is beyond the scope of this ESHP. In the event that the nature of site operations and conditions allow for the application of a rational model, the CESHM will conduct the analysis and make recommendations for control to the SSHO. This determination will be made by the CESHM during the development of the SSHP and will be incorporated into

the SSHP. Therefore, unless directed otherwise in the SSHP, the answer to Step 3 is NO, and according to the flowchart in Figure 506-1, Step 4 is to be skipped and Step 5 is used next.

5.4.1.4 STEP 4: Excessive heat strain exists based upon a detailed analysis?
As stated previously in Step 3, determining the degree of heat strain based upon a detailed analysis using a rational model is not typically applicable to on-site operations. However, if site conditions and tasks allow for the collection of sufficient data, the CESHM will conduct the detailed analysis and determine if corrective measures are required.

5.4.1.5 STEP 5: Perform heat strain (physiological) monitoring.
Since WBGT monitoring approximates environmental elements, it cannot fully account for the interactions between a person, workload, and the environment. The risk and severity of excessive heat strain will vary widely among personnel, even under identical heat stress conditions, and may vary for an individual on a day-to-day basis. To determine the heat strain effects of excessive heat stress, measurement of physiological factors can be used to assess the level of heat strain, to determine when applicable controls are to be implemented, to assess the effectiveness of the controls, and to control exposures to avert heat stress illnesses. In accordance with the flowchart in Figure 506-1, monitoring physiological signs or symptoms of heat strain will be conducted whenever one of the conditions listed below occur.

1. Personnel are working in impermeable or semi-impermeable clothing.
2. Personnel are wearing protective clothing that restricts the evaporation of perspiration.
3. WBGT screening limits are exceeded and a detailed analysis is not possible.

For surveillance purposes, a pattern of workers exceeding the physiological monitoring limits is indicative of a need to control exposures. In cases of individual personnel exceeding the physiological monitoring limits, exposure to heat is to be ceased until recovery is complete for each episode where the individual exceeded the monitoring limits. Excessive heat strain may be marked by one or more of the measures listed below, and an individual's exposure to heat stress should be discontinued when any of the following occur:

1. An individual's recovery heart rate at one minute after a peak work effort is greater than 110 bpm; or
2. Sustained (several minutes) heart rate is in excess of 180 beats per minute (bpm) minus the individual's age (180 – age), for individuals with normal cardiac performance; or
3. An individual's body core temperature is greater than 101.3°F (38.5°C) for acclimatized workers, or greater than 100.4°F (38°C) for unacclimatized workers; or

4. An individual experiences symptoms of sudden and severe fatigue, nausea, dizziness or lightheadedness.

An individual may be at greater risk if profuse sweating is sustained over several hours, or weight loss over a shift is greater than 1.5% of body weight. If a worker exhibits signs of being disoriented or confused, or suffers inexplicable irritability, malaise (a vague feeling of physical discomfort or uneasiness, as felt early in an illness), or flu-like symptoms, the worker should be removed from work to rest in a cool location with good air circulation and kept under skilled observation. Immediate emergency care may be necessary. If sweating stops and the skin becomes red, hot and dry, immediate emergency care will be required. Of significant importance to heat stress management is to **never ignore anyone's signs or symptoms of heat-related disorders**.

The procedures for implementing the physiological monitoring specified above are presented in paragraph 5.5. Each team leader will be responsible for ensuring that the physiological monitoring specified is conducted and documented as specified in paragraph 5.7, and the SSHO will assess each team's compliance with the physiological monitoring and documentation requirements. Additionally, the SSHO will review each days heat stress monitoring results to determine if heat strain is being controlled by the general controls and physiological monitoring (i.e., no or only a few incidents occur where the heat strain limits of the physiological monitoring are exceeded). If the SSHO determines that the physiological heat strain limits are being exceeded on a regular basis by the work group, the CESHM will be notified and job-specific controls as discussed in Step 8 will be determined by the CESHM in consultation with the SS and SSHO.

5.4.1.6 STEP 6: Excessive heat strain exists based on physiological monitoring.
Once physiological monitoring is initiated, and from this point on, the general controls listed in Step 7 are to be implemented. These controls will be used whenever the WBGT screening limits are exceeded regardless of whether a detailed analysis is applicable or not. If the physiological monitoring indicates that excessive heat strain for the work group does not exist for the workers, then the NO answer can be used to achieve the "Continue Work" statement in the Figure 506-1 flowchart. In reaching the "Continue Work" statement, the general controls discussed in Step 7 are to be implemented in conjunction with continued monitoring of environmental indices (WBGT). However, if the physiological monitoring indicates that excessive heat strain exists for more than a few individuals, then the YES branch must be taken and job-specific controls as discussed in Step 8 must be implemented to control exposure to excessive heat stress.

5.4.1.7 STEP 7: Implement general controls.

5.4.1.7.1 Minimum Preventative Measures

The general controls listed below are an integral element of an effective heat stress management program. The Team Leader will be responsible for the effective implementation of these controls, and the SSHO will monitor their implementation.

1. Prior to each workday, the SSHO shall casually observe the site personnel to determine if anyone exhibits factors that will make them more susceptible to heat strain. Workers exhibiting factors that make them susceptible to heat stress will be closely monitored by the responsible Team Leader and the SSHO.
2. Personnel will be given accurate verbal instructions related to their role in the prevention of heat-related illnesses/injuries. This will include initial heat stress training as outlined in paragraph 5.6 of this ESHP, and daily reminders during the daily tailgate safety briefings.
3. Site workers will be given time to acclimatize to working in hot environments. Acclimatization usually takes approximately six workdays, but can take up to three weeks, and allows the worker's body to become adjusted to working in hot environments. This process involves a gradual increase of the workload. The recommended acclimatization schedule suggests starting workers at 70 percent of the anticipated workload and increasing each day by ten percent each week.
4. Personnel will be encouraged to drink small amounts (approximately 8 ounces) of cool liquids every 20 minutes. To facilitate continued hydration, and when justified by the ambient heat stress conditions, the CESHM will specify that site personnel will be provided with hydration backpacks.
5. Workers will be encouraged to drink a minimum of sixteen ounces of liquids prior to start of work in the morning, after lunch and prior to leaving the site at the conclusion of the day's activities. Disposable four- to twelve-ounce cups and cool liquids shall be provided on site by PIKA. Acceptable liquids will include water and an electrolyte replacement solution, with the intake of each being equally divided. Liquids containing caffeine are to be avoided.
6. When ambient conditions and site workload requirements dictate, as determined by the SSHO, workers will be encouraged to drink a minimum of 16 to 32 ounces of liquids during each planned work break.
7. Personnel will be permitted to self-limit exposures and will be encouraged to observe co-workers to detect signs or symptoms of heat strain.
8. Personnel who take medications that could have an adverse effect on normal cardiovascular, blood pressure, body temperature regulation, renal, or sweat gland functions; and any individual with recent intake of excessive alcohol will be monitored closely by their respective Team Leader and counseled by the SSHO to closely monitor themselves for heat strain signs and symptoms.
9. Personnel will be encouraged to maintain a healthy lifestyle, to include exercise, weight control, not smoking, healthy diet, and maintaining electrolyte balance.

10. Personnel returning to work after an absence from hot exposures will be allowed to re-acclimatize to working in the hot environment.

5.4.1.7.2 Additional Preventative Controls

If feasible, PIKA may provide one or more sheltered rest areas where personnel can seek refuge from radiant heat load presented by the sun. If a sheltered rest area is located within an exclusion zone (EZ), personnel will undergo a minimum decontamination prior to entry into the sheltered rest area. This abbreviated decontamination will include the steps outlined below unless otherwise directed in the SSHP, and personnel will re-don PPE IAW the procedures listed in the SSHP.

1. Soapy water wash and clean water rinse of any outer chemical resistant gloves, boots, or chemical resistant suits.
2. Removal of outer and inner chemical resistant gloves or leather work gloves.
3. Washing of exposed hands, face and neck, using handi-/baby wipes.

5.4.1.7.3 Evaluation of Controls

If the general and additional controls listed in this paragraph are effective at reducing the degree of heat strain experienced by site personnel, then the "Continue Work" statement of the flowchart is achieved. However, once the "Continue Work" criteria are met, WBGT monitoring of environmental factors as well as any other heat strain control measures being used will be continued as dictated by the ambient weather conditions. If the controls in this Step do not prove effective at reducing heat strain then Step 6 of the flowchart must be re-entered and a NO answer to Step 6 used. This will require contacting the CESHM so that an assessment and assignment of job-specific controls can be made by the CESHM.

5.4.1.8 STEP 8: Implement job-specific controls.

If heat stress conditions are not controlled by the general controls outlined in Step 7 and heat strain disorders are not controlled by the physiological monitoring, job-specific controls will be required to protect personnel from heat stress exposure. Selection of appropriate job-specific controls will be made by the CESHM after being advised of the site conditions by the SSHO. The CESHM's selection of job-specific controls will be made in conjunction with the SSHO and the SS, and will be based upon their feasibility and applicability. Once job-specific controls are selected and implemented, they will be assessed on a daily basis by the SSHO to determine both their effectiveness and continued need. However, job-specific controls will only be suspended with the approval of the CESHM. Proper application of job-specific controls, along with continued WBGT screening and physiological monitoring, will allow for the "Continue Work" criteria of the flowchart to be met and will allow personnel to continue work on-site without experiencing adverse heat strain effects.

1. Engineering controls will be assessed to determine their feasibility toward site operations. The engineering controls to be assessed will be those that can

possibly reduce metabolic rate, shield personnel from radiant heat, provide enhanced air movement and water vapor evaporation, or enhance recovery. An example of this would be to provide air-conditioned rest facilities where the air temperature can be controlled to between 72 and 76°F.

2. Administrative controls may be implemented that reduce exposure time, increase recovery time, and/or limit physical strain.
3. Personal protection devices, such as cooling vests or suits, may be used to enhance the body's ability to transfer heat from the core and reduce water loss through perspiration.

5.5 PHYSIOLOGICAL MONITORING PROCEDURES

When physiological monitoring as prescribed by Steps 1, 3 or 5 is required, the procedures outlined below will be used to assess personal heat strain. Initially physiological monitoring shall be conducted at the minimum frequency specified by Table 506-4. However, this frequency may need to be increased dependant upon whether an individual exceeds one or more of the monitoring limits prescribed above in Step 5. Since the primary purpose of physiological monitoring is to determine when a worker's heat strain reaches unacceptable levels, it is essential to determine when additional control measures may be required. Whenever physiological monitoring limits are exceeded, the effected individual is at increased risk of heat stress-related disorders. If an individual's physiological monitoring results only periodically exceed the limits, the modifications to work and rest periods prescribed in paragraphs 5.5.1.1 and 5.5.1.2 will be used.

The minimum prescribed order in which the physiological monitoring is to be implemented is presented below, however, this order may be modified by the SSHO if site conditions and workload dictate the need.

1. Heart rate to be taken one minute after a peak work effort (usually taken at the beginning of rest cycles but may be taken more frequently if directed by Table 506-4).
2. Heart rate monitoring to determine if the individuals sustained heart rate (over several minutes) exceeds 180 bpm minus the individual's age.
3. Body core temperature

Monitoring of an individuals wellness (i.e., onset of sudden severe fatigue, nausea, dizziness, or lightheadedness) will be an on-going event conducted by the individual, the Team Leader and team personnel. Additionally, if personnel experience profuse sweating sustained over several hours, the effected individuals will be cautioned about their increased susceptibility, and they may require monitoring of their body weight loss IAW the procedures of paragraph 5.5.1.4 to maintain adequate hydration. The need for monitoring body water loss will be determined by the SSHO, and will be based upon observation of the sweat loss experienced by site personnel during their work cycle.

TABLE 506-4: SUGGESTED FREQUENCY OF PHYSIOLOGICAL MONITORING

ADJUSTED TEMPERATURE [b]	NORMAL WORK ENSEMBLE	IMPERMEABLE ENSEMBLE
90°F or above	After each 45 minutes of work	After each 15 minutes of work
87.5° - 90°F	After each 60 minutes of work	After each 30 minutes of work
82.5° - 87.5°F	After each 90 minutes of work	After each 60 minutes of work
77.5° - 82.5°F	After each 120 minutes of work	After each 90 minutes of work
72.5° - 77.5°	After each 150 minutes of work	After each 120 minutes of work

Notes:

1. Calculate the adjusted air temperature (AT_{adj}) by using this equation: $AT_{adj} = AT_{meas} + (13 \times \%$ sunshine) where : AT_{meas} is the measured air temperature. AT_{meas} should be measured with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100% sunshine = no cloud cover and a sharp, distinct shadow. 0% sunshine = no shadows. Use decimal expression of % sunshine)
2. For normal work ensemble consisting of cotton coveralls or other cotton clothing with long sleeves and pants.
3. Source: NIOSH/OSHA/USCG/EPA. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. DHHS (NIOSH) 85-115. Cincinnati, OH.

5.5.1 Heart Rate Monitoring

5.5.1.1 At Rest Pulse/Heart Rate Monitoring

The worker's baseline heart rate per minute will be recorded prior to initiation of site activities by measuring the radial pulse rate (PR). One minute after a peak work period, usually at the beginning of a rest period, or at a frequency prescribed by Table 506-4, the resting PR should be measured. Taking the radial (wrist) PR is the preferred method, however the carotid (neck) PR may be taken if a worker has difficulty finding the radial pulse. One minute after halting work performance, the measured PR should not exceed 110 bpm. If the PR is higher than 110 bpm, the worker will continue resting and hydrating until they have fully recovered and their resting PR has dropped below 110 bpm. Additionally, the next work period will be shortened by one third (33%).

5.5.1.2 Sustained Heart Rate Monitoring

Sustained heart rate monitoring should be conducted on an as needed basis and will be extremely critical if the individual's resting heart rate has exceeded 110 bpm as prescribed above. Once an individual's resting heart rate has exceeded the 110 bpm resting rate, the sustained heart rate monitoring will be periodically conducted throughout the next work shift. The frequency of monitoring the sustained heart rate will be determined by the SSHO and Team Leader, but will at a minimum meet the requirements of Table 506-4. Once the individual's sustained heart rate is observed over the sustained heart rate limit (i.e., 180 – the individual's age), the heart rate will be taken again at one minute intervals for two more minutes to determine if it is being sustained. If it is being sustained, the worker will retire to the rest area, remain at rest and continue hydration until the individual's sustained heart rate drops below the

prescribed limit (i.e., 180 – age). Once the individual returns to work, their heart rate will again be periodically checked throughout the remainder of the workday by the Team Leader.

5.5.1.3 Oral Temperature Monitoring

If an individual, or the majority of the team, experience problems with maintaining heart rates below the prescribed limits, oral temperature (OT) monitoring will be conducted. The worker's OT will be taken and recorded prior to initiation of site activities using a clinical thermometer placed under the tongue. The OT must be taken prior to consumption of cool liquids and will be done at the end of each work period or at a frequency determined by Table 506-4. Whenever an individual's OT exceeds 101.3°F (38.5°C) for acclimatized workers, or 100.4°F (38°C) for unacclimatized workers, the individual will report to the rest area, rest and hydrate for a period of at least 15 minutes. The OT will be taken again at the end of the 15 minutes and if the worker's OT is below the prescribed limit, the worker will be allowed to return to work. Once the worker returns to working, the frequency of OT monitoring will be at a minimum equal to the prescribed frequency determined by Table 506-4, and will continue for the duration of the workday. If a worker's OT exceeds the prescribed limits and the worker is using impermeable clothing, the worker shall not be allowed to return to work in impermeable or semi-permeable PPE for the remainder of that workday.

5.5.1.4 Body Weight Loss

If expected site conditions and workload cause site personnel to experience profuse sweating sustained over several hours, the SSHO shall monitor the workers fluid loss by weighing each worker prior to, and again at the conclusion of, each days site activities. Weight loss monitoring will be used to assess if site personnel are maintaining a proper level of hydration throughout the day by determining if the total amount of water weight loss is less than 1.5% of the employee's body weight. Body weights will be taken with the workers wearing undergarments only. If it is determined that personnel are not properly maintaining their hydration (i.e., weight loss is greater than 1.5% at the end of the day), body weights will also be taken prior to the lunch break. This will be continued until the weight loss at the end of the day is less than 1.5% for a period of at least three consecutive days. Calculation of the water weight loss, and assessing the effectiveness of hydration shall be conducted as follows:

1. Take the worker's weight in the morning before starting work (W_{start}) and record the weight.
2. Take the worker's weight again at the end of the day (W_{ending}) after site activities have been halted for the day, and again record the ending weight.
3. If the W_{ending} is greater than W_{start} no further calculations are needed since the individual has not lost weight during the day.
4. If W_{ending} is less than W_{start}, subtract the W_{ending} from W_{start} to obtain the weight lost (W_{lost}) for a given work period: (W_{start} - W_{ending} = W_{lost}).

5. Multiply the starting weight by 1.5% to obtain the permissible weight loss (W_{perm}): (W_{start} x 0.015 = W_{perm}).
6. Compare W_{lost} to the W_{perm}, if W_{lost} is less than or equal to W_{perm}, then the level of hydration during the measured period has been adequate, but if W_{lost} is greater than W_{perm}, then hydration should be increased during the next work period.

5.5.2 Evaluating the Effectiveness of Physiological Monitoring

Since the degree of heat strain experienced by a worker may vary significantly on a daily basis (depending upon environmental and personal factors), modifications to a worker's work rate, rest rate or monitoring frequencies for one day do not necessarily need to be carried over to the next work day. Rather, at the beginning of the next workday, the initial requirements for monitoring frequencies and work/rest periods as described in paragraphs 5.5.1.1 and 5.5.1.2 will again be used. Only after an individual has exceeded one of the physiological monitoring limits will the prescribed modifications be initiated and continued to the end of the workday. However, it is essential to the continued wellness of site personnel to evaluate the effectiveness of the physiological controls. Therefore, the SSHO will notify the CESHM if any one of the conditions listed below occur:

1. A pattern of exceeding the physiological monitoring limits is established for one individual that indicates that the physiological monitoring limits are being exceeded at least once per day for more than three consecutive days.
2. A pattern of exceeding the physiological monitoring limits is established for a majority of the team that indicates that the physiological monitoring limits are being exceeded by over half the team members on a daily basis for more than three consecutive days.

5.6 HEAT STRESS TRAINING

Training is the key to good work practices. NIOSH (1986) states that a good heat stress training program should include the components listed below. Therefore, PIKA will provide personnel who work in hot environments with the training prescribed in this paragraph.

1. Knowledge of the hazards of heat stress.
2. Recognition of predisposing factors, danger signs, and symptoms.
3. Awareness of first-aid procedures for, and the potential health effects of, heat stroke.
4. Employee responsibilities in avoiding heat stress.
5. Dangers of using drugs, including therapeutic ones, and alcohol in hot work environments.
6. Use of protective clothing and equipment.
7. Purpose and coverage of environmental and medical surveillance programs.

5.7 HEAT STRESS DOCUMENTATION

The SSHO shall be responsible for the proper documentation of heat stress related information. This will include training sessions and WBGT and physiological monitoring data. Training sessions shall be documented using the PIKA Documentation of Training Form (ESHF-506). Pulse rate monitoring data will be recorded on the Heat Stress Monitoring Log (ESHF-527), with the environmental conditions, WBGT, OT and/or water loss calculations being recorded in the Site Safety Log, and/or Site Monitoring Log (ESHF-533).

6.0 AUDIT CRITERIA

The following items related to operations conducted in hot or cold environments will be audited to determine compliance with this ESHP:

- The Daily Task and Safety Briefing Log (ESHF-502);
- The Heat Stress Monitoring Log (ESHF-527); and
- The Daily Safety Inspection Checklist (ESHF-506).

7.0 ATTACHMENTS

No attachments are associated with this ESHP.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations in cold temperatures. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA personnel, including subcontractor personnel, and operations involving working in cold environments. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

There are no Occupational Safety and Health Administration (OSHA) standards that directly apply to the conduct of operations associated with this ESHP. However the references listed below contain relevant data regarding cold stress prevention.

- American Conference of Governmental Industrial Hygienist (ACGIH) 2007 Threshold Limit Values (TLVs) and Biological Exposure Indices
- USACE EM 385-1-1, Section 06.J.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the equipment that personnel will require to safely perform operations in cold environments. The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

4.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to visitor entry and protective measures.
4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve personnel exposure to cold temperatures and cold stress hazards. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel who are required to work in cold environments are fully trained and qualified as outlined in this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards of cold exposures and the control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations, conditions and personnel to assess their compliance with this ESHP and the adequacy of the measures being taken to prevent cold stress.

5.0 PROCEDURES

All personnel, including contractor and subcontractor personnel, involved in site operations shall be familiar with the potential safety and health hazards associated with the conduct of operations in cold environments, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

5.1 INTRODUCTION

During activities conducted on PIKA project sites, cold and/or windy environmental conditions can create serious safety and health threats to site workers. This ESHP addresses the potential hazards associated with cold stress, and outlines the procedures for monitoring and controlling those hazards.

5.2 COLD STRESS HAZARDS

The affects experienced by site personnel when working in cold environments depend upon many environmental and personal factors, such as ambient air temperature, wind speed, duration of exposure, type of protective clothing and equipment worn, type of work conducted, level of physical effort, and health status of the worker. In cold environments, overexposure can cause significant stress on the body that can lead to serious, and potentially permanent injury. Cold may affect exposed body surfaces and extremities, or may affect the deeper body tissues and body core. Presented below is information about the most common cold stress disorders, their signs, symptoms, affects, and control techniques.

5.2.1 Cold Stress Disorders

5.2.1.1 Immersion Foot or Trench Foot

These two cold injuries occur as a result of exposure to cool or cold weather and persistent dampness or immersion in water. Immersion foot usually results from prolonged exposure when air temperatures are above freezing, whereas trench foot normally occurs from shorter exposure at temperatures near freezing. The symptoms for each disorder are similar and include tingling, itching, swelling, pain and/or numbness, lack of sweating, and blisters.

5.2.1.2 Frostbite

Frostbite occurs when there is actual freezing of the water contained in the body tissues. This usually occurs when temperatures are below freezing, but excessive wind can result in frostbite even when ambient temperatures are above freezing. Frostbite can occur from several types of cold exposure, such as: exposure of bare skin to cold and wind; exposure to extremely cold ambient temperatures; skin contact with rapidly evaporative liquids (gasoline, alcohol or cleaning solvents) at temperatures below 39.2ºF; or from skin contact with metallic objects whose temperatures are below freezing. The extremities are usually affected first since the body's initial response to cold stress is to decrease the heat loss from the blood by decreasing the blood flow to the extremities. The tissue damage caused by frostbite can be superficial, near the surface of the skin, or extend deep into body tissues that can cause severe tissue damage. During the initial stages of frostbite, the skin may have a prickly or tingling sensation and will later become numb with cold. The appearance of the affected skin may range from superficial redness, to white, hard, frozen-looking tissues.

5.2.1.3 Hypothermia

Hypothermia results when the body looses heat faster than it can be produced. When this occurs, the blood vessels in the skin and extremities constrict, reducing the flow of warm blood to those areas which have a high surface area to volume relation. This reduction in blood flow reduces heat loss and usually affects the peripheral extremities

first. Ears, fingers and toes begin to experience chilling, pain and then numbness due to loss of both blood flow and heat. Shivering begins as the body's core temperature begins to drop, and the body uses the shivering to compensate and create metabolic heat. Shivering is often the first sign of hypothermia. The pain and numbness in the extremities is an indication that the heat loss is increasing, but when shivering becomes severe and uncontrollable, the heat loss in the body core has become extreme. Further heat loss produces speech difficulty, reduced mental alertness, forgetfulness, loss of manual dexterity, collapse, unconsciousness and finally death.

5.2.2 Treatment of Cold Stress Disorders

The intent of cold stress treatment is to bring the deep body core temperature back to its normal temperature of about 98.6ºF. Work performed in cold environments should be discontinued temporarily for any worker who exhibits the signs or symptoms associated with hypothermia or frost bite. Workers exhibiting cold stress symptoms should be brought to a warm area and allowed to rest and warm-up. If a worker's clothing becomes wet, which reduces its insulation affect, it should be removed and replaced by dry clothing, or allowed to dry before resuming work. Warm, sweet, non-alcohol, decaffeinated drinks (not coffee) or soup should be given to increase the body core temperature, and re-warming should be gradual.

For frostbite, the victim should be sheltered from the wind and cold and given warm drinks. If the frostbite is superficial, the frozen area(s) should be covered with extra clothing or blankets, or warmed against the body. Do not use direct heat, and do not pour hot water over or rub the affected area. Warming should be gentle and gradual. Failure to do this could lead to bleeding in the tissues and increase the possibility of infection. If the frostbite is deep, (i.e. the affected area is frozen and hard to the touch), immediate medical attention should be obtained. The safe thawing of deep frostbite is beyond the expertise and facilities found on site.

5.2.3 Prevention of Cold Stress Disorders

5.2.3.1 Cold Stress Monitoring

Guidance for the monitoring of cold stress is provided by the ACGIH in the Threshold Limit Values and Biological Exposure Indices booklet (latest edition). In order to comply with the cold stress TLV, the following monitoring schedule will be implemented:

1. A suitable thermometer for measuring ambient temperatures shall be available on sites when the air temperature is below 60.8ºF;
2. Whenever the air temperature onsite falls below 30.2ºF, the temperature shall be measured and recorded at least once every two hours, unless sudden drops in the temperature are expected or noted, then it will be recorded once each hour;
3. Whenever the air temperature on site falls below 30.2ºF, the wind speed shall be measured and recorded together with the air temperature;

4. The equivalent wind chill temperature shall be obtained from Table 507-1, and recorded, in cases when air speed measurements are required;
5. The SSHO shall utilize the applicable TLV limits listed in Table 507-2 to determine if elevated control measures must be implemented during site activities.

5.2.3.2 Controls Implemented by Site Personnel

During work in cold environments, the SSHO will use the tailgate safety briefing to inform site personnel of the temperature and wind conditions anticipated for the day's site activities. The SSHO will also advise site personnel of the general practices, listed below, which should be utilized in the prevention and control of cold stress. Wear adequate, appropriately layered clothing, including a water repellant outer layer if precipitation is forecasted;

1. Use layered clothing which should include, an innermost layer (such as cotton or silk) to trap heat and absorb perspiration, an insulating layer of wool or synthetic fiberfill (such as polypropylene), a layer of work weight clothing, and an outer protective layer designed to retain heat and be wind/water proof (such as nylon, or Gortex®);
2. Wear gloves, socks and a hat that are synthetic or wool insulated;
3. Remove outer layers of clothing during breaks in heated shelters to prevent inner layers from getting wet with perspiration;
4. Cover exposed skin and use a wind breaker in windy, cold conditions;
5. Eat well-balanced meals and maintain adequate intake of non-alcohol, de-caffeinated fluids;
6. Seek shelter in a warm protected area when signs and symptoms of cold stress become evident;
7. Protect clothing from getting wet with perspiration during site activities by monitoring and moderating the level of physical activity, and if necessary, removing excessive layers of clothing; and
8. If the potential exists for clothing to become wet during site operations, site personnel should report to work with an extra set of work and insulated clothing.

TABLE 507-1: EQUIVALENT CHILL TEMPERATURE

Estimated Wind Speed (in mph)	Actual Temperature Reading (ıF)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (ıF)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133

30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
Wind speeds greater than 40 mph have little additional effect	LITTLE DANGER In < 1 hr with dry skin. Maximum danger of false sense of security				INCREASING DANGER Danger from freezing of exposed flesh within one minute			GREAT DANGER Flesh may freeze within 30 seconds				
	Trench foot and immersion foot may occur at any point on this chart.											

TABLE 507-2: ACGIH COLD STRESS TLVS

TLV Temp.	Working Conditions or Task to be Performed	Required Control Measures
< 60.8ºF	Any site or work condition	Thermometer required on site.
	Fine work performed continuously for more than 10-20 min.	Special provisions for keeping the hands warm, i.e., radiant heaters, warm air jets, etc.
	Tasks with sedentary work load	Gloves are to be used by workers.
< 39.2ºF	Site with windy conditions	Reduce cooling effect of wind by using shields or an easily removable wind breaker.
	Task where exposed areas of the body cannot be protected from cold or frostbite	Auxiliary heating units are to be supplied.
	Tasks where clothing may become wet with either perspiration or water	Provisions shall be made to allow site personnel to change into dry clothes.
	Workers handling evaporative liquids	Special precautions needed to prevent clothing from becoming soaked with liquid.
	Tasks with light work load	Gloves are to be used by workers.
. 35.6ºF	Workers who become emersed in water or whose clothing becomes wet	Treatment for hypothermia and immediate change of dry clothing provided.
< 30.2ºF	Any task	Air temperature and wind speed (if over 5 mph) recorded at least every 4 hours; cover metal handles with insulating material.
< 19.4ºF Air	Tasks with moderate work	Gloves to be used by workers.
< 19.4ºF ECT	Any task	Heated warming shelters with warm drinks will be made available for breaks. Record ECT along with air temperature readings. Warn personnel not to contact unprotected metal parts with bare skin.
< 10.4ºF ECT	Any task	Buddy system enforced, protect from wind to greatest extent possible, acclimatize workers, moderate workload to prevent perspiration, and conduct worker cold stress training.
< -11.2ºF or < 0ºF with 5 mph wind	Personnel who routinely work at this temperature	Personnel are to be medically certified as suitable for this level of exposure.
. -25.6ºF ECT	Any level of work or type of task	No unprotected skin exposure.

ECT - Equivalent Chill Temperature

Air - Ambient air temperature

5.2.3.3 Controls To Be Implemented On Site

In addition to the personal control methods listed above, the following measures will be provided to assist site personnel in preventing and abating cold stress:

1. If the effective chill temperature (ECT) is expected to be less than 19.4ºF, a heated shelter will be provided both in the SZ, and when permissible, in the EZ to allow personnel to take warming breaks IAW the specified work/rest schedule;
2. Warm drinks, such as hot cocoa, hot cider, hot herbal teas, warm broths or decaffeinated coffee or hot tea will be provided in the warming shelters;
3. If the ECT is less than 19.4ºF or if the calm air temperature is less than 20ºF, a minimum work/rest regiment of one 10-minute break every hour, with a 30-minute lunch break will be implemented; and
4. For temperatures above 20ºF, calm air temperature or above the ECT of 19.4ºF the normal work/rest schedule of one 15-minute break in the morning and afternoon, with a 30-minute lunch break will be used as the standard, but site personnel will still be encouraged to take more frequent breaks if they begin to experience significant signs or symptoms of cold stress.

When permitted by site conditions and contamination levels, personnel utilizing shelters inside the EZ will under go an abbreviated decontamination prior to entry. Upon leaving the warming shelter, EZ personnel will re-don chemical resistant inner and outer gloves, IAW the PPE donning procedures listed in the SSHP. The abbreviated decontamination will include:

1. Soapy water wash and clean water rinse of outer chemical resistant gloves, boots, and if needed suits;
2. Removal of outer and inner chemical resistant gloves; and
3. Washing of exposed hands, face and neck, using handy/baby wipes.

5.2.3.4 Additional Work/Rest Cycles

To date, there are no Federal or USACE mandated regulations related to work/rest schedules for cold stress. The work/rest cycle outlined in paragraph 5.2.3.3 is a recommended routine, but may not be adequate for the actual cold weather conditions that may be encountered. The ACGIH has published a work/rest schedule, which is provided in Table 507-3 of this ESHP. However, this table only applies to, and should be implemented for, temperatures below –4ºF. Therefore, for temperatures above –4ºF, workers shall be encouraged to utilize the work rest schedule listed above or to seek shelter in a warm area especially if they exhibit cold stress symptoms such as heavy shivering, frost-nip, the feeling of excessive fatigue, drowsiness, irritability or euphoria.

TABLE 507-3: TLV WORK/REST SCHEDULE FOR 4-HOUR WORK SHIFT *

Air Temp.	No Wind		5 MPH Wind		10 MPH Wind		15 MPH Wind		20 MPH Wind	
°F Approx.	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
-4 to -8	Normal	1	Normal	1	Normal	1	Normal	1	Normal	1
-9 to -13	Normal	1	Normal	1	Normal	1	Normal	1	75 min.	2
-14 to -18	Normal	1	Normal	1	Normal	1	75 min.	2	55 min.	3
-15 to -19	Normal	1	Normal	1	75 min.	2	55 min.	3	40 min.	4
-20 to -24	Normal	1	75 min.	2	55 min.	3	40 min.	4	30 min.	5
-25 to -29	75 min.	2	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease	
-30 to -34	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease			
-35 to -39	40 min.	4	30 min.	5	Non-emergency work should cease					
-40 to -44	30 min.	5	Non-emergency work should cease							
-45 & Below	Non-emergency work should cease									

1. Schedule applies to any 4-hour work period with moderate to heavy work activity, with warm-up cycle in a warm location and with an extended break in a warm location (e.g. lunch) at the end of the 4-hours. For light-to-moderate work: apply the schedule one step lower.
2. The following is suggested as a guide for estimating wind velocity if other, more accurate means are not available: 5 mph - light flag moves; 10 mph - light flag fully extended; 15 mph - raises newspaper sheet; 20 mph - blowing and drifting snow.
3. This table applies only to acclimatized workers with appropriate dry clothing for winter work.
4. Adapted from the Threshold Limit Values and biological Exposure Indices, American Conference of Governmental Industrial Hygienist, Cincinnati, OH.

5.2.4 Cold Stress Documentation

The SSHO shall be responsible for recording cold stress related information. This will include training sessions, environmental conditions, and environmental monitoring data. Training sessions shall be documented using the PIKA Training Log (ESHF-502). Environmental conditions and monitoring data will be recorded in the Safety Log, and/or Site Monitoring Log (ESHF-533).

6.0 SAFETY AND PPE REQUIREMENTS

The following safety measures and personal protective equipment (PPE) shall be used in preventing or reducing exposures associated with drum and container handling operations.

1. Personnel will wear the type and level of PPE specified in the SSHP or APP;
2. Personal and work area monitoring for cold and cold stress will be conducted as specified in the this ESHP for site operations;
3. Provisions and requirements specified in other ESHPs that apply site operations (i.e., excavation and trenching, heavy equipment operation, etc.) shall be followed.

7.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The Daily Task and Safety Briefing Log (ESHF-502);
- The Documentation of Hazard Communication Training Form (ESHF-505);
- The Safety Training Attendance Log (ESHF-503); and
- The Daily Safety Inspection Checklist (ESHF-507).

8.0 ATTACHMENTS

No attachments are associated with this ESHP.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures for controlling employee exposure to bloodborne pathogens. This ESHP will be used in conjunction with the PIKA Environmental Corporate Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA personnel, including subcontractor personnel, and operations where personnel may be exposed to bloodborne hazards. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with this ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA General Industry Standard 29 CFR Part 1910.1030.
- USACE EM 385-1-1, Section 03, Medical and First Aid Requirements.

4.0 DEFINITIONS

Blood - means human blood, human blood components, and products made from human blood.

Bloodborne Pathogens (BBP) - means pathogenic microorganisms that are present in human blood and can cause disease in humans. Examples of theses pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

Contaminated - means the presence or the reasonably anticipated presence of blood or other potentially infectious materials on the surface of an item.

Contaminated Clothing - clothing, whether personal or company provided, which has been soiled with blood or other potentially infectious materials.

Contaminated Sharps - any object which is contaminated with blood or other potentially infectious materials that can penetrate the skin including, needles, tweezers, broken glass, etc.

Decontamination - the use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens from the surface of an item to the point where the surface of the item is rendered safe for handling, use, or disposal.

Exposure Incident - a specific incident that results from the performance of an employee's occupational responsibilities that involves eye, mouth, other mucous membrane, broken skin, or parenteral contact with blood or other potentially infectious materials.

Hand Washing Facilities – a facility providing an adequate supply of running potable water, soap and single use towels or hot air drying machines.

Licensed Healthcare Professional - is a person whose legally permitted scope of practice allows him or her to independently perform the activities required by this program for Hepatitis B Vaccination and Post-exposure Evaluation and Follow-up.

HBV - hepatitis B virus responsible for causing Hepatitis.

HIV - human immunodeficiency virus responsible for Auto Immunodeficiency Syndrome (AIDS).

Occupational Exposure - reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

Potentially Infectious Materials - any body fluid that is visibly contaminated with blood, and body fluids in situations where it is difficult or impossible to differentiate between body fluids.

Parenteral - means piercing mucous membranes or the skin barrier through such events as needle sticks, human bites, cuts, and abrasions.

Personal Protective Equipment (PPE) - specialized clothing or equipment worn by an employee for protection against a hazard. PPE applicable to this program shall be considered appropriate only if it does not permit blood or other infectious fluids to reach employee's clothing, skin, eyes, mouth, or other mucous membranes under normal working conditions.

Regulated Waste - means liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.

Source Individual - means any individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to the employee.

Sterilize - means the use of a physical or chemical procedure to destroy microbial life including highly resistant bacterial endospores.

Universal Precautions - means an approach to infection control, in which human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

Work Practice Controls - means controls that reduce the likelihood of exposure by altering the manner in which a task is performed.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the adequate first aid and BBP supplies equipment. The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

5.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) shall be responsible for the implementation of the Bloodborne Pathogen Exposure Control Program contained in the PIKA Corporate Environmental Safety and Health Program, and for monitoring the implementation of this ESHP. To this effect, the CESHM is responsible for the following:

1. Conducting a review of PIKA job classifications to determine which will have a reasonably anticipated potential for an occupational exposure and completing the exposure determination forms;
2. Verifying during site audits that Universal Precautions are implemented and appropriate PPE is available for job classifications involving occupational exposure;
3. Developing procedures for the decontamination of items or surfaces contaminated with blood or infectious body fluids;
4. Providing guidance to project personnel related to the proper labeling, and disposition of regulated waste in accordance with applicable Federal, state and local regulations;
5. Making the Hepatitis B vaccination available to occupationally exposed employees at no cost to the employee;
6. Completing Parts II and III of the Post BBP Exposure Evaluation and Follow-up Form (ESHF-520) after an exposure incident and ensuring the health care professional receives pertinent information for the post exposure evaluation;
7. Providing training to occupationally exposed workers;
8. Working with the PIKA Human Resource personnel to maintain medical and training records as required by this and other ESHPs; and
9. Performing an annual review of the Exposure Control Plan.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP and for the adequate provision of BBP protection kits to minimize the risk of first aid personnel contacting blood or other BBP hazards. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel involved with providing first aid to injured personnel are fully trained in Universal BBP controls and are qualified as outlined in this ESHP.

5.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to assess their initial and continued compliance with this ESHP and other regulatory guidelines.

5.5 EMPLOYEE RESPONSIBILITIES

Employees whose job classification involves the potential for occupational exposures to blood or other infectious materials will have the following responsibilities:

1. Becomes knowledgeable and complies with this Bloodborne Pathogen ESHP;
2. Properly uses required PPE and other methods of control when performing a task which potentially exposes the employee to blood or other potentially infectious materials;
3. Complies with hygiene practices required when working with blood or other potentially infectious materials;
4. Follows proper housekeeping practices;
5. Decontaminates or disposes of PPE, clothing, and/or contaminated equipment properly, and
6. Notifies supervisor immediately when an exposure incident occurs.

6.0 UNIVERSAL PRECAUTIONS

The strategy of "Universal Precautions" was developed by the Center for Disease Control to address concerns regarding transmission of HIV. The concept of universal controls stresses that sources should be assumed to be infectious for blood-borne pathogens. The philosophy of universal precautions shall be applied whenever PIKA employees render first aid involving potential contact with blood or other potential infectious materials.

7.0 EXPOSURE DETERMINATION

Exposure determinations will be performed by the CESHM to identify job classifications in which all and/or some of the employees under that job classification have the potential for occupational exposures. The results of the exposure determination will be documented using the BBP Post-Exposure and Follow-up form (ESHF-520).

8.0 SAFE WORK PRACTICES AND PPE

8.1 SAFE WORK PRACTICES

Safe work practices will be implemented whenever possible to eliminate or reduce the potential for employee exposure, and will include, but are not limited to:

- Hand washing facilities will be readily accessible to employees.
- Employees shall wash their hands immediately or as soon as feasible after removal of gloves or other PPE.
- Employees shall wash hands and any other skin with soap and water, or flush mucous membranes with water immediately following contact with blood or potentially infectious materials.
- If potentially contaminated sharps are encountered, the item shall immediately be disposed of in an appropriate container or decontaminated.

- Eating, drinking, smoking, applying of cosmetics or lip balm, handling of contact lenses or storage/handling of food is prohibited in areas where potentially infectious materials are present.
- Potentially contaminated clothing will be handled IAW Section 9.0 of this program.
- Equipment that has become contaminated will be decontaminated prior to servicing or storage, unless decontamination is not feasible, in which case the equipment will be disposed of properly.

8.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

When occupational exposures remain after the implementation of engineering and work practice controls, appropriate PPE will be utilized in accordance with the following to control employee exposures.

- Appropriate PPE will be provided to employees exposed to infectious materials at no cost to the employee. Appropriate PPE includes, but is not limited to, gloves, gowns, face shields, masks, and goggles.
- PPE is considered "appropriate" if it does not permit infectious materials to reach the employee's personal or work clothing, skin, eyes, mouth, or other mucous membranes under normal conditions of use, for the expected duration of time for which the PPE will be used.
- All PPE will be repaired, or replaced as needed, to maintain its effectiveness.
- When PPE is removed it will be placed in an appropriately designated area or container for storage, washing, decontamination or disposal.
- Masks in combination with eye protection devices, such as safety glasses, goggles or face shields, will be worn whenever blood or other potentially infectious materials may be generated and eye, nose, or mouth contamination can be reasonably anticipated.
- Gloves will be worn when it can be reasonably anticipated that the employee may have hand contact with potentially infectious materials.
- Disposable (single use) gloves will not be washed for reuse and will be disposed of after each use or if their ability to function as a barrier is compromise.

9.0 HOUSEKEEPING

The work site will be maintained in a clean and sanitary condition to prevent the spread of contamination to other areas of the facility. Equipment and working surfaces will be cleaned and decontaminated after contact with blood or other potentially infectious materials. Contaminated work surfaces and equipment shall be decontaminated with an appropriate disinfectant immediately after they become contaminated.

9.1 REGULATED WASTE

All regulated waste will be disposed of in accordance with applicable Federal, state and local regulations. Regulated waste, other than contaminated sharps, shall be placed in containers which are:

1. Closable;
2. Constructed to contain contents and prevent leakage;
3. Properly labeled or color-coded; and
4. Closed prior to removal or replacement.

Regulated waste containing contaminated sharps will be placed in containers which are:

1. Closable;
2. Puncture resistant and leak proof on sides and bottom;
3. Properly labeled or color-coded; and
4. Closed prior to removal or replacement.

10.0 CLOTHING

Potentially contaminated clothing should be removed and bagged at the location where it is used. Potentially contaminated clothing should be handled as little as possible to prevent contamination of the air and of persons handling the clothing. Potentially contaminated clothing should also be placed in bags that prevent leakage and are properly labeled or color-coded.

Additionally, potentially contaminated company-provided clothing should be washed with detergent in water at least 71°C (160°F) for 25 minutes. If low-temperature (<70°C[158°F]) laundry cycles are used, chemicals suitable for low-temperature washing, at proper use concentrations, should be used.

11.0 HEPATITIS B VACCINATIONS

All workers whose jobs involve participation in tasks or activities with exposure to blood or other body fluids to which Universal Precautions apply, will be encouraged to receive a hepatitis B vaccine. Medical evaluations and procedures including the hepatitis B vaccinations will be performed by a licensed healthcare professional, and provided to the employee at no cost to the employee. Vaccinations will be offered within 10 working days of initial assignment and at a later date upon request if employee initially declines the vaccine, and as recommended by the U.S. Public Health Services for future booster doses. Anyone refusing the hepatitis B vaccine must sign a Hepatitis B Vaccine Declination Form (ESHF-521). A copy of 29 CFR 1910.1030 "Bloodborne Pathogens" will be provided to the Healthcare Professional responsible for the hepatitis B vaccination. Documentation of each occupationally exposed employee's hepatitis B vaccination status, shall be maintained in their medical file.

12.0 POST-EXPOSURE EVALUATION AND FOLLOW-UP

12.1 GENERAL REQUIREMENTS

Following an exposure incident, a confidential medical evaluation and follow-up will immediately be made available to the employee involved. The following elements will be covered and documented on the Post BBP Exposure Evaluation and Follow-Up Form (ESHF-520).

1. Documentation of the route(s) of exposure, and the circumstances under which the exposure incident occurred;
2. Identification and documentation of the source individual, unless establishing that identification is infeasible or prohibited by state or local law;
3. When possible the source individual's blood will be tested as soon as feasible, after consent is obtained, in order to determine HBV and HIV infectivity. If consent is not obtained, it will be documented that legally required consent could not be obtained. When the source individual's consent is not required by law, the source individual's blood, if available will be tested and the results documented;
4. When the source individual is already known to be infected with HBV or HIV, testing for the source individual's known HBV or HIV status will not be repeated; and
5. Results of the source individual's testing will be made available to the exposed employee, and the employee will be informed of applicable laws and regulations concerning disclosure of the identity and infectious status of the source individual.

12.2 HEPATITIS B VIRUS POST-EXPOSURE MANAGEMENT

When exposure from a source individual is found to be positive, the worker who has not previously been given a hepatitis B vaccine will be offered the vaccine series, or a single dose of hepatitis B immune globulin (HBIG), if the vaccine cannot be given within seven days of exposure.

Workers who have previously received HBV vaccination and receive an exposure from a positive source should be tested for antibody to hepatitis B, and given one dose of vaccine and one dose of HBIG if the antibody level in the worker's blood sample is inadequate. If the source individual is negative and the worker has not been vaccinated, this opportunity should be taken to provide hepatitis B vaccination. If the source individual refuses testing or he/she cannot be identified, the exposed worker should receive treatment as if the source was determined to be positive.

12.3 HIV POST-EXPOSURE MANAGEMENT

For any exposure to a source individual who is found to be positive for HIV infection the exposed worker should be counseled regarding the risk of infection and evaluated clinically and serologically for evidence of HIV infection as soon as possible after the

exposure. If the exposed employee consents to a baseline blood collection but does not consent at that time to HIV testing, the sample will be preserved for 90 days. Exposed workers who tested seronegative initially should be retested at 6 weeks, 12 weeks, and 6 months after exposure to determine whether transmission has occurred.

If the source individual was tested and found to be seronegative for HIV, the source should be questioned to determine their participation in any activities that would cause a High Risk Factor for infection of HIV. If source has a High Risk Factor, treatment should be as if the source was found to be seropositive. If source has a Low Risk Factor, no follow-up required but HIV testing will be made available if requested by the exposed employee or the health-care provider. If the source individual refuses testing or he/she cannot be identified, the exposed worker should receive treatment as if the source was determined to be positive.

12.4 MEDICAL OPINION DOCUMENTATION

A written opinion of the Health Care Professional shall be obtained and placed in the medical file of the exposed employee with a copy of the written opinion being provided to the exposed employee within 15 days of the completion of the evaluation.

13.0 COMMUNICATION OF HAZARDS TO EMPLOYEES

13.1 LABELING

A fluorescent orange or orange-red label with lettering or symbol in a contrasting color shall identify containers of regulated waste. Red bags or red containers may be used as a substitute for labels.

13.2 TRAINING

All employees with occupational exposure to blood or other potentially infectious materials shall receive training as follows:

1. When initially assigned to a task where occupational exposure may occur; and
2. Annually thereafter.

Additional training will be provided when changes in tasks or procedures affect the employee's occupational exposure. The additional training may be limited to addressing the new exposures created. The training program will contain the following elements:

1. An accessible copy of the regulatory text of this standard and an explanation of its contents;
2. A general explanation of the epidemiology and symptoms of bloodborne diseases;
3. An explanation of the modes of transmission of bloodborne pathogens;
4. An explanation of the employer's exposure control plan and the means by which the employee can obtain a copy of the written plan;

5. An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials;
6. An explanation of the use and limitations of methods that will prevent or reduce exposure including appropriate engineering controls, work practices, and PPE;
7. Information on the types, proper use, location, removal, handling, decontamination, and disposal of PPE;
8. An explanation of the basis for selection of PPE;
9. Information on the hepatitis B vaccine, including its efficacy, safety, method of administration, the benefits of being vaccinated, and that the vaccine and vaccination will be offered free of charge;
10. Information on the appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials;
11. An explanation of the procedure to follow if an exposure incident occurs;
12. Information on the post-exposure evaluation and follow-up that the employer is required to provide for the employee following an exposure incident;
13. An explanation of the signs and labels and/or color coding required for regulated materials containers; and
14. An opportunity for interactive questions and answers with the person conducting the training session.

14.0 RECORDKEEPING

14.1 MEDICAL

PIKA or its designated representative will maintain medical records for each employee with an occupational exposure for a period of 30 years beyond termination of employment. These records will include:

1. The name and social security number of the employee;
2. A copy of the employee's hepatitis B vaccination status including the dates of the hepatitis B vaccinations and any medical records relative to the employee's ability to receive vaccination;
3. A copy of results of examinations, medical testing, and follow-up procedures;
4. The employer's copy of the healthcare professional's written opinion; and
5. A copy of the information provided to the healthcare professional.

Employee medical records will be:

1. Kept confidential; and
2. Not be disclosed or reported without the employee's express written consent to any person within or outside the workplace except as required by this section or as may be required by law.

14.2 TRAINING RECORDS

Training records will be maintained for three years from the date in which training occurred, and will include:

1. The dates of the training sessions;
2. The contents or a summary of the training sessions;
3. The names and qualifications of persons conducting the training; and
4. The names and job titles of persons attending the training sessions.

15.0 ATTACHMENTS

No attachments are associated with this ESHP.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of products containing hazardous substances.

2.0 SCOPE

This ESHP applies to PIKA International, Inc. (PIKA) site personnel, to include subcontractor personnel, and operations involving in the use of products containing hazardous substances. This ESHP is not intended to contain all requirements needed for regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REGULATORY REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed.

- OSHA Construction Industry Standard 29 CFR Part 1926.59; and
- OSHA General Industry Standard 29 CFR Part 1910.1200.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the equipment that personnel will need to safely work with products containing hazardous substances. The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

4.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.

3. Providing the Site Safety and Health Officer (SSHO) with consultation related to hazard identification and the protective measures applicable to this ESHP.
4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve personnel exposure hazardous substances required to perform site operations. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel involved with use of products containing hazardous substances are fully trained and qualified as outlined in this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to assess their initial and continued compliance with this ESHP and other regulatory guidelines.

4.5 SITE PERSONNEL

All PIKA site personnel will be responsible for implementing this ESHP during any assigned tasks that require the use of products containing hazardous substances. While PIKA has the responsibility of providing the necessary information, documentation and resources for implementation of this ESHP, site personnel have a responsibility to integrate the requirements of this ESHP into their daily operations involving hazardous substances.

5.0 PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in operations involving hazardous substances shall be familiar with the potential safety and health hazards associated with the conduct of those operations, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

5.1 MATERIAL SAFETY DATA SHEET (MSDS)

5.1.1 MSDS Availability

An MSDS for each product containing a hazardous chemical, to which employees are or may be exposed, will be obtained and made readily available to site employees. MSDSs

will be located at each project site. The SSHO will be responsible for obtaining and maintaining MSDSs. The SSHO will also be responsible for reviewing MSDSs for significant safety and health information, which will then be passed on to the affected employees during formal training sessions. MSDSs will also be reviewed by the SSHO for completeness. If an MSDS is missing or considered to be incomplete or insufficient, a new MSDS will be requested from the manufacturer.

MSDSs will be available for employees in their work area for review. If an MSDS is not available or a new chemical being used on site does not have a corresponding MSDS, the SSHO will obtain the MSDS from the manufacturer as soon as possible. An MSDS that does not specifically identify the hazardous chemicals contained in the project will be accepted if:

1. The information has been classified as a trade secret; and
2. The MSDS contains adequate information related to the physical and health hazards associated with the product.

5.2 CHEMICAL INVENTORY

A Site Specific Chemical Inventory will be maintained by the SSHO. This inventory will include products containing hazardous chemicals. The Chemical Inventory Report Form (ESHF-528) will be used to maintain the site-specific chemical inventory.

5.3 LABELING

5.3.1 Container Labeling

No container of hazardous chemicals will be released for use until the following label information is verified:

1. Identification of the chemical;
2. Appropriate hazard warnings; and
3. Name and address of chemical manufacturer, or distributor (applies only to manufacturer's labels).

5.3.2 Secondary Container Labeling

Secondary containers will be properly labeled with an appropriate hazard communication label provide personnel with information concerning chemicals in their work areas. This label must communicate the identity of the hazardous chemicals contained in the product and their appropriate physical and health hazard warnings.

5.4 EMPLOYEE INFORMATION AND TRAINING

5.4.1 General

The SSHO will arrange for employee information and training at the time of initial assignment (for existing hazardous chemicals), whenever a new hazardous chemical is

introduced into the work area or an employee changes job locations where new chemicals are encountered.

5.4.2 Required Information

Employees will be trained to recall, in simple language, the following basic information about each hazardous chemical:

1. The basic requirements of the OSHA Hazard Communication Standard, including employee rights under the regulation;
2. Operations/processes where the potential exists for exposure to hazardous chemicals;
3. Location of the written Hazard Communication (HAZCOM) Program, the Chemical Inventory and the MSDSs;
4. How chemicals may be detected/monitored (instrumentation, color, odor, state);
5. Physical hazards (i.e., flammability, reactivity);
6. Chemical hazards, including the effects a chemical has on the body (long and short term) through inhalation, ingestion or skin contact;
7. How workers can protect themselves from overexposure or emergency situations (engineering controls, work practices, PPE and emergency procedures);
8. Steps that have been taken to lessen or prevent exposure to hazardous chemicals through implementation of the HAZCOM Program;
9. Spill response procedures for chemical emergencies;
10. Emergency and first aid procedures to follow if employees are over exposed to any hazardous chemicals; and
11. How to read labels and review MSDSs to obtain appropriate hazard information.

5.4.3 Documentation of Training

Hazardous Communication Training will be documented by the SSHO using the Documentation of Hazard Communication Training Form (ESHF-505).

5.5 HAZARDS FROM NON-ROUTINE TASKS

Periodically, employees are required to perform potentially hazardous, non-routine tasks that may involve chemical or physical hazards. Prior to starting work on such tasks, the SSHO will give the affected employees information about the hazards to which they may be exposed. This training will be documented in the PIKA Site Training Log (ESHF-502), and will include:

1. Specific hazards (chemical and physical);
2. Protective safety measures to be utilized; and
3. Measures that have been or will be taken to lessen the hazards, including ventilation, respirators, PPE, a standby person, and emergency procedures.

5.6 INFORMING CLIENTS/SUBCONTRACTORS

Each client/subcontractor will be instructed to inform the SSHO of any hazardous chemicals which they bring on site and will provide a copy of the MSDS for each specific chemical(s). Outside clients/subcontractors will be provided by the SSHO with the following information to allow them to work safely on site:

1. Hazardous chemicals to which they may be exposed while on the job site;
2. Precautions and protective measures to be taken by employees to avoid possible exposure; and
3. The rules and regulations regarding fire and ignition sources around flammable materials, and rules regarding smoking, welding, grinding, etc.

5.7 INDUSTRIAL HYGIENE SURVEY

Periodic surveys will be performed to evaluate the potential for employee exposure to chemicals on project sites. These surveys will be used to assess exposure levels and the effectiveness of engineering, work practice and personal protective equipment controls. These efforts will be coordinated by the SSHO and the SS, and will include:

1. A walk-through evaluation of potential chemical exposures utilizing the chemical inventory, MSDSs, and, when required, air sampling equipment;
2. A review of occupational illness records for trends of hazard exposure;
3. A review of engineering controls and personal protective measures; and
4. Recommendations for future control methods.

Where a question exists concerning employee exposure to hazardous chemicals, engineering controls or PPE requirements, the CHSM will be contacted immediately.

5.8 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

The following operational precautions personal protective equipment shall be used in preventing or reducing exposures associated with operations involving the use of products containing hazardous substances.

- Operations where hazardous substances are used will be conducted in well ventilated areas, and where needed and available, direct reading instruments will be used to assess personnel exposure; and
- All personnel will wear chemical protective gloves, clothing, etc., as specified by the MSDS.

6.0 AUDIT CRITERIA

The following items related to operations conducted under this ESHP will be audited to determine compliance with this ESHP:

- The Daily Task and Safety Briefing Log (ESHF-502);

- The Chemical Inventory Report Form (ESHF-528);
- The Documentation of Hazard Communication Training Form (ESHF-505); and
- The Daily Inspection and Weekly Audit Report Form (ESH-506).

7.0 ATTACHMENTS

No attachments are associated with this ESHP.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of hazard warning signs, tags, or labels. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA personnel, including subcontractor personnel, and operations involving the need to post site hazards with signs, tags or labels. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REGULATORY REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA Construction Industry Standard 29 CFR Part 1926.200;
- OSHA General Industry Standard 29 CFR Part 1910.145; and
- USACE EM 385-1-1, Section 8.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store, maintain and use appropriate signs and labels for hazard identification and notification. The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

4.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to hazard identification and the protective measures applicable to this ESHP.
4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that the use of signs and labels for hazard notification. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel working in areas where signs and labels are used for hazard identification and recognition are trained and qualified as outlined in this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to assess their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 PROCEDURE

5.1 SAFETY HAZARDS AND OPERATIONAL CONTROL TECHNIQUES

5.1.1 General Requirements

An important element of site safety involves providing site personnel with information related to hazardous operations, areas and materials. To allow for effective, consistent communication of these hazards, the following areas and hazards shall be posted with appropriate signs or labels:

1. All site control zones where specific training, medical surveillance or personal protective equipment (PPE) is required for entry will be posted to restrict

unauthorized or unqualified personnel from entering the area;
2. All areas where operations are conducted which create the potential for personnel exposure to chemical or physical hazards (i.e., noise, respiratory hazards, etc.) will be posted with signs indicating the type of hazard and the PPE to be worn in the area;
3. Signs, labels, or tags shall be visible at all times when the hazard or problem exists, and shall be removed or covered when the hazard or problem no longer exists;
4. In the event that radio frequencies present a hazard to personnel, appropriately colored and configured signs will be posted;
5. Containers of hazardous materials, which do not have adequate warning labels, will be labeled IAW the PIKA ESHP-509 Hazard Communication requirements;
6. All site personnel shall be informed as to the meaning of the various signs, tags and labels used throughout the site;
7. The location of first aid and fire protection equipment will be conspicuously posted; and
8. Signs, tags or labels will be used and conspicuously displayed when lock out/tag out procedures are used for the isolation of hazardous or stored energy.

5.1.2 Color Schemes

For signs, labels and tags (except piping systems) the following color scheme will apply:

1. Red - Designates dangerous conditions, emergency stop controls, fire detection and suppression equipment and containers of flammable liquids;
2. Orange - Designates dangerous parts of machinery or energized equipment;
3. Yellow - Designates conditions requiring caution, marking dangerous chemicals, marking physical hazards, and markings for ionizing radiation;
4. Green - Designates safety equipment and operator devices, and location of first aid and safety equipment (other than fire fighting equipment); and
5. Blue - Designates information of a non-safety nature.

5.1.3 Selection of Sign, Labels and Tags

In addition to the requirements listed above, the following guidelines will be incorporated in the selection and display of signs, labels and tags:

1. Danger signs shall have the word "DANGER" in white on a black oval background and shall indicate a specific immediate danger, capable of causing irreversible damage or injury and indicates that specific precautions be taken to avoid the danger;
2. Caution signs shall have the word "CAUTION" in yellow on a black background and shall be used to call attention to a specific potential hazards, capable of causing severe but reversible damage or injury, against which proper precautions should be taken;

3. General safety signs shall have key words in white on a green background and shall indicate notices of general practice and rules related to health, first aid, medical equipment, sanitation, housekeeping and general safety; and
4. General information signs shall have the word "NOTICE" in white on a blue background and shall provide general information required to avoid confusion or misunderstanding.

5.2 PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

Site personnel will wear appropriate PPE when posting signs to protect them from hazards associated with any tools used to post the signs.

6.0 AUDIT CRITERIA

The following items related to the posting of signs, labels and tags will be audited to determine compliance with this ESHP:

- The Daily Task and Safety Briefing Log (ESHF-502); and
- The Daily Inspection and Weekly Audit Report Form (ESHF-506).

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures required to provide for adequate fire prevention and protection. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA personnel, including contractor and subcontractor personnel and operations conducted where fire prevention measures and fire protection precautions are needed for the safety and health of site personnel. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

1. Applicable parts of OSHA Construction Industry Standard 29 CFR Part 1926, Subpart F;
2. Applicable parts of OSHA General Industry Standard 29 CFR Part 1910, Subpart L; and
3. USACE EM 385-1-1, Section 9.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the requisite fire prevention and protection equipment needed for safe site operations. The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

4.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to hazard identification and the protective measures applicable to this ESHP.
4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve personnel exposure to fire hazards and involve fire prevention procedures. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel involved with fire prevention and protection are fully trained and qualified as outlined in this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to assess their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 PROCEDURES

All personnel, including contractor and subcontractor personnel, involved in operations shall be familiar with the potential safety and health hazards associated with the conduct of this ESHP, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

5.1 CAUSES OF FIRES AND EXPLOSIONS

Although fires and explosions may arise spontaneously, they are more commonly the result of carelessness during the conduct of site activities, such as moving drums,

mixing/bulking of site chemicals and during refueling of heavy or hand held equipment. Some potential causes of explosions and fires include:

1. Mixing of incompatible chemicals, which cause reactions that spontaneously ignite due to the production of both flammable vapors and heat;
2. Ignition of explosive or flammable chemical gases or vapors by external ignition sources;
3. Ignition of materials due to oxygen enrichment;
4. Agitation of shock or friction-sensitive compounds;
5. Welding and cutting operations;
6. Hot surfaces and frictional heat sources;
7. Sparks, whether from static, electrical or mechanical sources;
8. Careless handling of matches, cigarettes and other lighted materials.

5.2 FIRE PREVENTION

Explosions and fires not only pose the obvious hazards of intense heat, open flames, smoke inhalation, and flying objects, but may also cause the release of toxic chemicals into the environment. Such releases can threaten both personnel onsite and members of the general public. Site personnel conducting operations involving flammable or combustible material shall follow the guidelines listed below to aid in the prevention of fires and explosions.

5.2.1 Site Inspections

The SSHO will inspect the site daily to determine if flammable and combustible materials are being safely stored in appropriate containers in properly configured and segregated storage areas. The SSHO will also provide consultation and guidance to personnel in charge of potential sources of ignition so that they are maintained a safe distance from storage areas.

5.2.2 Ignition Sources

All sources of ignition will be prohibited within 50 feet of a potential fire or explosion hazard. Ignition sources which may be of concern are: smoking; small engines and their exhausts; heavy equipment engines and their exhaust; non-intrinsically safe electrical hand tools, lights, equipment, etc.; steel hand tools capable of creating sparks; open flames; non-intrinsically safe monitoring instruments; and room/area heating devices.

5.2.3 Storage of Flammable and Combustible Materials

5.2.3.1 Approved Containers

Quantities of flammable liquids greater than one gallon, shall be stored or handled in OSHA approved safety cans only. These cans have a built-in flame arrestor and a tight-fitting self-closing lid to reduce the possibility of vapors escaping from the can. For

quantities of flammable liquids of one gallon or less, the original container or an OSHA approved safety can shall be used for handling or storage.

5.2.3.2 General Storage Requirements

Site personnel shall utilize the guidelines and procedures listed in this paragraph when storing flammable and combustible materials on site.

1. Flammable materials shall be stored in a segregated area located away from spark or ignition sources, with flagging, or other barrier materials, erected at a radius of fifty feet from the storage area, and "NO SMOKING MATCHES OR OPEN FLAME signs posted at the fifty foot barrier line;
2. If, due to site configuration, a fifty foot radius barrier can not erected around the storage area, signs stating "NO SMOKING MATCHES OR OPEN FLAME WITHIN 50 FEET" will be posted at the storage location;
3. For storage inside a building, no more than 25 gallons of flammable materials may be stored outside of approved fire cabinet, and no more than 60 gallons of flammable or 120 gallons of combustible liquids may be stored in each cabinet;
4. For storage of containers (of not more than 60 gallons each) outside, no more than 1,100 gallons shall be stored in one designated area, with at least five feet separating storage areas;
5. Outdoor storage areas shall be at least 20 feet from the nearest building, and there shall be a 12 foot wide fire truck access lane within 200 feet of the storage area;
6. Storage areas outside shall be graded to allow collection of spilled material or provided with a 12 inch curbed or earthen dike containment system of sufficient volume to contain the contents stored in the area, and provisions shall be made for drainage or collection of accumulated rain water or spilled materials;
7. Metal drums used for storing flammable/combustible liquids shall be equipped with self-closing safety faucets, vent bung fittings, grounding cables and drip pans, and shall be stored outside buildings in an area approved by the SSHO;
8. The storage area shall be kept free of weeds, debris and other combustible materials not related to the storage; and
9. At least one fire extinguisher rated 20B units or greater shall be located between 25 and 75 feet of outdoor storage areas.

5.2.4 Dispensing Flammable and Combustible Liquids

When dispensing flammable or combustible liquids from one container to another, the following requirements shall apply:

1. Areas where flammable or combustible liquids are dispensed in quantities greater than five gallons shall be separated from other operations must be at least 25 feet;
2. Spill containment shall be provided in the dispensing area;

3. All tanks, hoses and containers of five gallons or less shall be kept in metallic contact during transfer operations;
4. Transfer of flammable liquids in containers in excess of five gallons shall be done only when the two containers are electrically bonded, and the container being dispensed from shall be grounded;
5. Natural or mechanical ventilation shall be provided to maintain flammable vapors below 10% of the lower explosive limit; and
6. Transfer of liquids by air pressure is not permitted and either a non-sparking hand pump or gravity feed shall be used.

5.2.5 Handling Liquids at Point of Final Use

When using flammable or combustible liquids at the point of final use, the following requirements shall apply:

1. Flammable liquids shall be kept in closed containers;
2. Leakage or spillage of flammable or combustible liquids shall be collected and disposed of quickly and properly; and
3. No open flames or other sources of ignition will be allowed within 50 feet of operations involving flammable or combustible liquids.

5.2.6 Service and Refueling Areas

The following requirements shall apply to service and refueling areas:

1. Only approved storage containers, trucks and hoses shall be used;
2. No smoking will be allowed within 50 feet of areas where fueling operations are being conducted, and conspicuous signs shall be posted prohibiting smoking in the area;
3. The motors of equipment being fueled shall be shut off during fueling; and
4. A fire extinguisher of at least 20B units or greater shall be located within 75 feet of fueling operations.

5.2.7 Handling and Dispensing

Site personnel shall utilize the guidelines and procedures listed in this paragraph when dispensing flammable and combustible materials.

5.3 FIRE PROTECTION

5.3.1 General Requirements

The general requirements listed below shall be followed to help provide effective fire protection, and shall apply to all sites:

1. All areas where potentially explosive/flammable atmospheres may accumulate shall be monitored using a combustible gas indicator;
2. Prior to initiation of site activities involving explosive/flammable materials, all potential ignition sources shall be removed or extinguished;

3. Non-sparking and explosion-proof equipment shall be used whenever the potential for ignition of flammable/explosive gases/vapors/liquids exists; and
4. Dilution or induced ventilation may be used to decrease the airborne concentration of explosive/flammable atmospheres to below 10% of the lower explosive limit.

5.3.2 Training

All site personnel involved in operations where flammable or combustible liquids or materials are used, or may be encountered, shall be given training, as part of the initial mobilization training, which covers the anticipated hazards and the relevant control techniques. This training shall include fire extinguisher training that covers selection and use of fire extinguishers.

5.3.3 Fire Extinguishers

Portable fire extinguishers shall be selected and conspicuously located on site IAW the type of fire or explosion hazard anticipated. To determine the size and type of extinguishers required, consult the SSHP.

5.4 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

The following safety measures and personal protective equipment (PPE) shall be used in preventing or reducing exposures associated with fire prevention and protection operations. These requirements will be implemented unless superseded by site-specific requirements stated in the Site Safety and Health Plan.

1. Personnel who may come in contact with flammable or combustible liquids shall be assigned appropriate PPE to avoid skin or eye contact with the material; and
2. In the event of an onsite fire, the SSHO will assess the situation, determine the potential hazards and if need be, assign levels of PPE to be worn during fire fighting.

6.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The Daily Task and Safety Briefing Log (ESHF-502);
- The Documentation of Hazard Communication Training Form (ESHF-505);
- The Safety Training Attendance Log (ESHF-503);
- The Daily Inspection and Weekly Audit Report Form (ESHF-506); and
- The fire extinguisher inspection cards.

7.0 ATTACHMENTS

No attachments are associated with this ESHP.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to site sanitation, house keeping and illumination practices. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA personnel, including contractor and subcontractor personnel, and operations involved in PIKA projects. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REGULATORY REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

1. Applicable sections of OSHA Construction Industry Standard 29 CFR Part 1926;
2. OSHA General Industry Standards 29 CFR Part 1910.120 and 141;
3. USACE EM 385-1-1, Section 2.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to meet the sanitation, housekeeping and illumination requirements of this ESHP. The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

4.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to hazard identification and the protective measures applicable to this ESHP.
4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve sanitation, housekeeping and illumination issues. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel are fully trained and qualified as outlined in this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to assess their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 PROCEDURE

5.1 SAFETY HAZARDS AND OPERATIONAL CONTROL TECHNIQUES

All personnel, including subcontractor personnel, shall be familiar with the work practices and control techniques listed in this ESHP which will be used to provide proper on-site sanitation, house keeping and illumination.

5.1.1 Potable Water Supply

An adequate supply of potable (drinkable) water shall be provided onsite at all times, and shall be supplied IAW the following provisions:

1. Containers used for potable water shall be capable of being tightly closed, equipped with a tap and maintained in a clean sanitary condition;
2. A container used for distribution of drinking water shall be clearly labeled as to its contents and not used for any other purpose;

3. Water shall not be dipped from the container and use of a common cup shall not be allowed; and
4. Where single service cups are provided, separate sanitary containers shall be provided for the storage of the unused cups and for the disposal of the used cups.

5.1.2 Nonpotable Water

Outlets and storage containers for nonpotable water, such as water for fire fighting or decontamination shall be clearly labeled to indicate that the water is not suitable for drinking, washing or cooking. At no time shall there be a cross connection or open potential between a system furnishing potable water and a system furnishing nonpotable water.

5.1.3 Toilet Facilities

Temporary toilet facilities shall be located at the site, in the support zone (SZ). Chemical, re-circulating, combustion or flush toilets may be used to fulfill this requirement. Each temporary toilet shall be in good repair, naturally lighted, ventilated, with tight fitting doors, lockable from the inside, and shall be serviced at least weekly. The minimum requirements for toilet facilities can be found in the OSHA standard 29 CFR 1910.120(n). However, to provide for sanitary and adequate facilities, portable toilet facilities will be provided based on one toilet for every ten to fifteen workers assigned to the site.

5.1.4 Washing Facilities

Hand and face washing facilities shall be set up in the SZ, and shall be utilized by personnel exiting the work zone. As a minimum, disposable handy wipes/baby wipes, and trash receptacles will be made available to allow site personnel to wash exposed skin surfaces after exiting the work zone.

5.1.5 Site Housekeeping

All work areas shall be maintained in a clean/neat fashion, free of loose debris and scrap. Any materials/equipment not being used shall be removed from the work area and stored or disposed of accordingly. Work areas shall be supplied with a waste receptacle with a tight fitting lid, the contents of which shall be emptied in such a manner as to avoid creating unsanitary conditions. Break rooms and other areas where food is served or consumed shall be supplied with a waste receptacle with a tight fitting lid, which shall be maintained in a sanitary conditions with the contents emptied on a daily basis. To allow for the daily maintenance and inspection of the machinery and heavy equipment on site, a self-closing flammable/combustible waste can for oil/solvent soaked rags shall be maintained in areas where maintenance operations occur.

5.2 ILLUMINATION

As a rule, site personnel will not be permitted to work during the period between 30 minutes before sundown to 30 minutes after sunrise. To determine that site personnel have the minimum level of lighting needed, or if site operations must be conducted at night, illumination levels in Table 512-1 shall the minimum allowed during the conduct of site related activities.

Table 512-1, Minimum Illumination Levels

Foot-candles	Area of Operation
5	General site area, and inside facilities, such as warehouses, hallways, and exit ways.
3	Excavation and waste areas, field maintenance, active storage and fueling areas.
10	General shops, storerooms, dressing and eating areas, maintenance areas.
30	First aid stations, infirmaries and offices.

5.3 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

The following safety measures and personal protective equipment shall be used in preventing or reducing hazards associated with improper sanitation, illumination and house keeping. These requirements will be implemented unless superseded by site-specific requirements stated in the site plans.

1. Personnel disposing of medical/biological wastes will, as a minimum, use rubber gloves, and any other PPE deemed necessary by the SSHO;
2. Medical and biological wastes shall be disposed of in bags and containers which are designed and labeled specifically for disposal of such materials;
3. Personnel handling refuse from food handling areas will use rubber/latex gloves when cleaning trash receptacles; and
4. Personnel handling flammable/combustible wastes shall wear the level and type of PPE prescribed by the SSHO.

6.0 AUDIT CRITERIA

The following items related to site sanitation, illumination and house keeping will be audited to determine compliance with this ESHP:

- The Daily Task and Safety Briefing Log (ESHF-502);
- The Documentation of Hazard Communication Training Form (ESHF-505);
- The Safety Training Attendance Log (ESHF-503); and
- The Daily Inspection and Weekly Audit Report Form (ESHF-506).

7.0 ATTACHMENTS

No attachments are associated with this ESHP.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide site management personnel with the information necessary to effectively implement respiratory protection requirements for PIKA International, Inc. (PIKA) project personnel. As such, the purpose of this ESHP is to ensure the protection of PIKA employees from airborne chemicals and materials that may be hazardous to the employee's health.

2.0 SCOPE

This ESHP applies to PIKA personnel, including subcontractor personnel, and operations involving the use of respiratory protection. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- 29 CFR 1910.134, OSHA, General Industry Standard on Respiratory Protection.
- 29 CFR 1926.103, OSHA, Construction Standard on Respiratory Protection.
- Z88.2-1969, American National Standards Institute (ANSI) Practices for Respiratory Protection.
- USACE Engineering Manual 385-1-1, 3 November 2003, Section 05.E.

4.0 DEFINITIONS

As utilized in this ESHP, the following definitions will apply.

1. **Air-Purifying Respirator (APR):** A respirator that purifies the air by drawing contaminated air through a filter or sorbent media. This type of respirator is distinguished from a supplied-air respirator, which supplies breathing-air from an outside source versus the ambient atmosphere to the respirator wearer.
2. **Belt-Mounted Respirator:** A respirator in which the cartridges are worn at belt level so that end-of-cartridge-life indicators may be easily viewed by the wearer or so that the cartridges will not interfere with protective facial equipment.
3. **Canister or cartridge:** A container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

4. **Dust:** A solid, mechanically produced particle that is generally greater than one micron in size. Examples of dusts include sawdust, cement, and metal grindings.
5. **Employee exposure:** Exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.
6. **End-of-service-life indicator (ESLI):** A system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.
7. **Escape-only respirator:** A respirator intended to be used only for emergency exit.
8. **Filter or air-purifying element:** A component used in respirators to remove solid or liquid aerosols from the inspired air.
9. **Filtering face piece (dust mask):** A negative-pressure particulate respirator with a filter as an integral part of the face piece or with the entire face piece composed of the filtering medium.
10. **Fit factor:** A quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.
11. **Fit-Test:** The use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual.
12. **Fume:** A solid condensation particle generally less than one micron in size. An example of a fume is the particles generated by welding operations.
13. **Gas:** A material that has no liquid phase at standard temperature and pressure. Examples of gases include oxygen, nitrogen, and hydrogen.
14. **High Efficiency Particulate Air (HEPA):** A filter that is at least 99.97 percent efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.
15. **Immediately Dangerous to Life and Health (IDLH):** An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.
16. **Loose-fitting face piece:** A respiratory inlet covering that is designed to form a partial seal with the face.
17. **Mist:** A liquid condensation particle that is generally greater than one micron in size. An example of a mist is paint overspray.
18. **National Institute of Occupational Safety and Health (NIOSH):** The governmental agency that assigns approval numbers to respirators.
19. **Negative pressure respirator (tight fitting):** A respirator in which the air pressure inside the face piece is negative during inhalation with respect to the ambient air pressure outside the respirator.

20. **Organic Vapor:** The gaseous phase of a liquid at room temperature that is carbon based. Examples of materials that create organic vapors include xylene, toluene, and 1,1,1-trichloroethane.
21. **Oxygen-Deficient Atmosphere:** An atmosphere with an oxygen content below 19.5 percent by volume.
22. **Permissible Exposure Limits (PEL):** Chemical airborne concentrations that are promulgated by either Federal or California OSHA. These are the concentrations of chemicals that a healthy individual may be exposed to for up to eight hours in a normal working day, every workday of the year, without suffering adverse health effects.
23. **Physician or other licensed health care professional (PLHCP):** An individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all the health care services required by the OSHA respiratory protection standard.
24. **Powered Air-Purifying Respirator (PAPR):** An air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.
25. **Respirator Program Administrator:** The single point of contact within a contractor with responsibility for overseeing the respiratory protection program.
26. **Self-contained breathing apparatus (SCBA):** An atmosphere-supplying respirator for which the breathing-air source is designed to be carried by the user.
27. **Service life:** The period of time that a respirator, filter, sorbent, or other respiratory equipment provides adequate protection to the wearer.
28. **Supplied-air respirator (SAR) or air-line respirator:** An atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.
29. **Vapor:** The gaseous phase of a liquid at room temperature. Examples of materials that create vapors include xylene, toluene, and 1,1,1-trichloroethane.

5.0 RESPONSIBILITIES

5.1 CORPORATE ENVIRONMENTAL, SAFETY AND HEALTH MANAGER

The Corporate Environmental, Safety and Health Manager (CESHM) will act as the Respirator Program Administrator (RPA) and will be responsible for the continued development of this ESHP and the PIKA Respiratory Protection Program (RPP). As the RPA, the CESHM will also be responsible for ensuring the proper field implementation of this ESHP, and the RPA will

1. Conduct an annual review of the RPP and provide updates as needed;

2. Provide consultation to the Site Safety and Health Officer (SSHO) regarding identification of potential airborne contaminants and the selection of appropriate respiratory protection;
3. Identify operations or tasks which could potentially require the use of respirators;
4. Place PIKA employees required to use respirators on the PIKA Medical Surveillance Program and provide biological monitoring, when required, that is relevant to the type of hazards to which they could be exposed.
5. Ensure that PIKA employees required to wear respirators are fit tested and trained initially and at least annually thereafter;
6. Conduct or coordinate monitoring and sampling of airborne contaminants to evaluate potential employee exposures to hazardous airborne contaminants and to ensure proper selection of respirator type;
7. Ensure that only NIOSH-approved respirators and cartridges are utilized, and that respirator users are issued only those types of respirators for which they are fit tested and trained to use;
8. Conduct periodic inspections (every 30 - 45 days) at each work site to ensure that respiratory protective equipment is properly issued, used, cleaned, inspected, maintained and stored; and
9. Ensure that acquisition and maintenance of files that document measures taken to assure respiratory protection to include:
   - Current Respiratory Protection Program.
   - Records of fit testing, training, and certifications issued.
   - Copies of medical clearance testing.

5.2 PROJECT MANAGER

The Project Manager is responsible for ensuring the implementation of this ESHP on sites for which the Project Manager is responsible. The Project Manager will also ensure that project resources are provided to allow for effective implementation of this ESHP.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) is responsible for the proper implementation of the respiratory protection procedures outlined in this ESHP. This includes the proper allocation of on-site project resources to ensure that personnel are adequately trained and equipped to protect themselves from respiratory hazards. Additionally, the SS will

1. Apply engineering controls when feasible.
2. Ensure that users are trained to wear respirators.
3. Ensure that respirator users have received an annual training and medical examinations.

4. Ensure respirator users use and operate their respirators under the respiratory protection procedures as described in this program.
5. Allow employees to leave the respirator-use area for any of the following reasons:
   - To wash their faces and respirator face pieces as necessary to prevent eye or skin irritation associated with respirator use.
   - If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the face piece.
   - To replace the respirator or the filter, cartridge, or canister elements.

5.4 SITE SAFETY AND HEALTH OFFICER

The SSHO is responsible for the field implementation of this ESHP and the site-specific respiratory protection procedures contained in the SSHP. To effectively achieve this goal, the SSHO will also be responsible for the following:

1. Acquiring, with assistance form the CESHM, the respiratory protective equipment and other resources required for implementing the RPP;
2. Arranging for, or providing, respirator specific training, in accordance with (IAW) Paragraph 14.0 of this ESHP to site personnel who are required to use respiratory protection;
3. Ensuring that respiratory protective equipment is used, sanitized, inspected, and maintained IAW the applicable sections of this ESHP;
4. Ensuring that employees potentially exposed to airborne contaminants at or above the PEL, or who may encounter oxygen deficient atmospheres are issued appropriate respiratory protective equipment IAW the requirements of the SSHP;
5. Maintaining the PIKA Respirator Issuance Log (ESHF-517) and issuing respirators only to those site personnel who have received proper medical surveillance, fit-testing and training for the specific type of respirator being issued;
6. Conducting and/or supervising and recording the results of site and personal monitoring and sampling necessary to evaluate the level of airborne hazards to which site employees are exposed;
7. Ensure that employees utilizing respirators with a tight-fitting face-piece maintain a **clean-shaven** face in such a manner that facial hair growth does not affect the seal between the respirator and the employee's face. Do not permit tight-fitting respirators to be worn by employees who have (1) any facial hair that comes between the sealing surface of the face-piece and the face, or that interferes with valve function; or (2) any other condition that interferes with the face-to-face-piece seal or valve function;
8. Defining "Respirator Areas" within the site to identify areas of high contaminant levels, thereby preventing unprotected workers from entering the area; and

9. Immediately notifying the CESHM of any changes in site conditions or contaminant concentrations that would impact the level of respiratory protection being used on site.

5.5 RESPIRATOR USERS

All PIKA personnel who use respirators are responsible for the proper use, care and maintenance of the respiratory protective equipment issued to them by the SSHO. To ensure the ability of the respirator to function effectively, the respirator user will conduct the following:

1. Guard the respiratory protective equipment against unnecessary damage;
2. Report any malfunction or defective parts of the equipment to the SSHO immediately;
3. Use only those respirators for which they have been specifically authorized, trained, and fitted;
4. Report to the SSHO any changes in medical status that may impact the user's ability to safely wear a respirator;
5. Report to work clean shaven in the area of the face piece if respirators are to be used;
6. Inspect the respirator and perform a negative and positive pressure fit test prior to respirator use;
7. Use the respirator IAW general and job specific training;
8. Leave the respirator area immediately if doubt arises as to the ability of the respirator to provide sufficient protection; and
9. Participate in the medical surveillance and training programs as required by the SSHO and the site specific SSHP.

5.5.1 Subcontractors

PIKA subcontractors will be required to maintain a written respirator program that meets the requirements of 29CFR 1910.134. Subcontractors shall be responsible for administering and maintaining their own Respiratory Protection Program in accordance with 29 CFR 1910.134 and ensuring that each respirator user has a current respirator fit-test, is medically qualified and properly trained for the respirator they are using.

6.0 RESPIRATOR SELECTION

6.1 RESPIRATOR CATEGORIES

Respirators are designed to protect only against specific types of substances, in certain concentrations, and must be matched to the user, job, and contaminant. Categories of respirators include:

1. APR
   - Particulate removing
   - Vapor/Gas removing
   - Combination
2. Atmosphere (Air)-Supplying Respirators
   - SCBA
   - SAR

6.1.1 Air-Purifying Respirators

6.1.1.1 General Limitations

APRs remove contaminants from the atmosphere; they must be used only in atmospheres with sufficient oxygen and within specified hazard concentration limitations of the specific device. They do not protect against skin or eye irritation by airborne contaminates. They also do not protect against absorption through the skin by airborne contaminants. APRs may not be used for protection in the following circumstances:

- APRs are not effective protection against certain gaseous materials.
- The maximum contaminant concentration against which an air-purifying respirator will protect is determined by the design efficiency and capacity of the cartridge, canister, or filter and the face-piece-to-face seal on the user. For gases and vapors, the maximum concentration for which the air-purifying element is designed is specified by the manufacturer or is listed on labels of cartridges and canisters.
- APRs will not provide the maximum design protection specified unless the face piece is carefully fitted to the wearer's face to prevent inward leakage. The time period over which protection is provided is dependent on canister, cartridge, or filter type; concentration of contaminant; humidity levels in the ambient atmosphere; and the wearer's respiration rate.
- The proper type of canister, cartridge, or filter must be selected for the particular atmosphere and conditions. Air-purifying respirators may cause discomfort due to the noticeable resistance in inhalation.
- Respirators with full-face pieces present special problems to individuals who are required to wear prescription eyewear; such problems should be directed to the RPA.
- Contact lenses will not be worn with respirators.

6.1.1.2 Specific Limitations For Air-Purifying Particulate Respirators

Air-purifying particulate respirators will be used for protection against nonvolatile particles only. These respirators offer no protection against gases or vapors. These respirators are not for use in an atmosphere immediately dangerous to life or health (IDLH), and are not for use in oxygen-deficient atmospheres.

6.1.1.3 Specific Limitations For Air-Purifying Vapor/Gas Respirators

Do not use air-purifying vapor/gas respirators with airborne chemicals that have "poor warning properties." Additionally, these respirators should not be used in atmospheres with unknown chemicals, or in atmospheres with unusually high concentrations of a known chemical. Air-purifying vapor/gas respirators are not to be used in oxygen-deficient atmospheres.

6.1.2 Full Face-Piece APRs

Full face-piece APRs provide protection against eye irritation in addition to respiratory protection. However, the same limitations given in sections 6.2.2 and 6.2.3 also apply with full face-piece respirators.

6.1.3 Atmosphere (Air)-Supplying Respirators

6.1.3.1 General

Atmosphere-supplying or air-supplied respirators deliver breathing-air through a supply hose connected to the wearer's face piece. The breathing-air can be provided from a stationary source, i.e., by a compressed air tank or a breathing air compressor. Atmosphere-supplying respirators are required when there is insufficient oxygen (<19.5 percent), when the concentration of contaminant is too high for an air-purifying cartridge to handle, the toxicity of the material is too hazardous for an air-purifying cartridge, or when required by specific OSHA regulations.

6.1.3.2 General Limitations

Except for some airline suits, no protection is provided against skin irritation by materials such as ammonia and hydrogen chloride, or against absorption through the skin of materials such as hydrogen cyanide and organic phosphate pesticides. Full-face pieces present special problems to individuals who are required to wear prescription eyewear. Use of atmosphere-supplying respirators in an atmosphere immediately dangerous to life or health is limited to self-contained breathing apparatus or to those airline respirators equipped with an "escape" bottle of air.

6.1.3.3 Specific Limitations for Self-Contained Breathing Apparatus (SCBA)

The period over which the device will provide protection is limited by the amount of breathing air in the apparatus, the ambient atmospheric pressure (service life of open-circuit devices is cut in half by a doubling of the atmospheric pressure), and the type of work being performed. Some SCBA devices have a short service life (less than 15 minutes) and are suitable only for escape (self-rescue from an irrespirable atmosphere). Other limitations of SCBA devices are their weight or bulk, or both, limited service life, and the training required for their maintenance and safe use. Self-contained breathing

apparatus to be used in an IDLH environment must be rated for 30 minutes and must be used in the pressure-demand mode.

6.1.3.4 Specific Limitations for SAR

Ordinary airline respirators (no emergency escape air bottle) are limited to use in atmospheres from which the wearer can escape unharmed without the aid of the respirator (i.e., non-IDLH and non-oxygen deficient atmospheres) in the event that the source of air stops and the wearer is required to remove the face piece to breathe. The wearer is restricted in movement by the hose and must return to the respirable atmosphere by retracing his/her route of entry. The hose is subject to being severed or pinched off.

6.2 RESPIRATOR SELECTION

Selection of respirators shall be based on the hazards to which the worker is exposed, the work environment, and the characteristics and limitations of the respirator. Respiratory protective equipment shall be used only for the purpose intended, and no modifications of the equipment shall be made. For protection against gases and vapors, the following forms of protection may be used:

1. An atmosphere-supplying respirator.
2. An air-purifying respirator, provided that:
   - The respirator is equipped with an end-of-service-life indicator (ESLI) certified by the NIOSH for the contaminant.
   - If there is no ESLI appropriate for conditions in the workplace, the respirator filters and cartridges a change schedule that is based on objective information or data will be used to ensure that canisters and cartridges are changed before the end of their service life (see paragraph 6.6).

For protection against particulates, any of the following forms of protection may be used:

1. An atmosphere-supplying respirator.
2. An APR equipped with a filter certified by NIOSH under 30 CFR part 11 as a high-efficiency particulate air (HEPA) filter, or an APR with a filter certified for particulates by NIOSH under 42 CFR part 84.
3. For contaminants that consist primarily of particles with mass median aerodynamic diameters (MMAD) of at least two micrometers, an air-purifying respirator equipped with any filter certified for particulates by NIOSH.

6.2.1 Factors that Influence Respirator Selection

Factors that influence the choice of respiratory protection include:

1. Nature of the hazard - this factor has several important aspects.

- The physical state of the air contaminant; i.e., dust, fume, mist, gas, or chemical vapor. The physical state determines some limitations of the respirator.
- The relative toxicity of the material; e.g., trichloroethylene is more toxic than 1,1,1-trichloroethane; brazing fumes from cadmium alloys are more toxic than fumes from steel alloys; etc.
- The rate at which the contaminant affects the human body. For example, excessive concentrations of silica dust, although hazardous, will not cause an immediate effect; however, an excessive concentration of chlorine gas can overcome an individual almost instantly, making escape impossible.
- The possibility exists that more than one air contaminant in different physical states may be involved.

2. Extent of the hazard - this factor includes the anticipated airborne concentrations and physical area in which the hazard exists.
3. Work requirements and conditions - this factor includes proximity to the source of the airborne contamination and physical restriction of the working area.

7.0 VOLUNTARY USE OF RESPIRATORS

The SS in consultation with the CESHM may provide respirators at the request of site personnel or permit personnel to use their own respirators in non-hazardous areas if the CESHM determines that such respirator use will not in itself create a hazard. If the CESHM determines that voluntary respirator use is permissible, the CESHM, through the SS and SSHO, shall provide the user with the following information, as required by the OSHA respiratory protection standard:

- Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, of if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.
- You should do the following:
  1. Read and heed instructions provided by the manufacturer on use, maintenance, cleaning, and care, and warnings regarding the respirator's limitations.
  2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A

label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.

3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

The SS and SSHO must ensure that the elements of this ESHP are implemented as necessary to ensure that any employee who voluntarily uses a respirator is medically able to use that respirator, and that the respirator is cleaned, stored, and maintained so that its use does not present a health hazard to the user.

8.0 USE OF RESPIRATORS

8.1 NORMAL OPERATIONS

Only respiratory protective equipment that has current approval from NIOSH shall be used. Respirators shall be used as issued: no modifications or substitutions to issued equipment shall be permitted. Additionally the following shall apply:

1. Any modification, no matter how slight, will result in voiding of respirator approval.
2. Only the person to whom it was issued shall use a respirator.
3. Personnel who use respiratory protection shall leave the space if they detect the odor of a contaminant or experience difficulty in breathing.
4. Re-entry shall not be undertaken until respirator integrity and fit, adequate airflow, or filter cartridge replacement, as appropriate, have been accomplished.
5. If employees experience physical symptoms, they shall immediately leave the area of the hazardous atmosphere and notify their supervisor.
6. Proper use, inspection, fitting, and maintenance of the respirator is the responsibility of the individual to whom the respirator was issued.

8.2 PROCEDURES FOR IDLH ATMOSPHERES

For all IDLH atmospheres, the SS and SSHO shall ensure that:

1. One employee or, when needed, more than one employee is located outside the IDLH atmosphere.
2. Visual, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere.
3. The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue.

4. Employee(s) located outside the IDLH atmospheres are equipped with:
   - Pressure-demand or other positive pressure SCBAs, or a pressure-demand or other positive-pressure supplied-air respirator with auxiliary SCBA; and either
   - Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting from entry, or
   - Equivalent means for rescue where retrieval equipment is not required.

8.3 WORK IN PROXIMITY TO UNPROTECTED PERSONNEL

Whenever work operations result in the establishment of a respirator-required area that is near an area occupied by unprotected personnel, those unprotected personnel whose tasks do not require them to wear respirators normally shall not be required to wear them unless their exposures may exceed the permissible exposure limits (PEL) and adequate ventilation cannot be provided. In such instances, work that requires respirators must be performed at a time when a minimum number of other employees are affected.

8.4 CONCURRENT WORK REQUIRING RESPIRATORY PROTECTION

Two or more different jobs that both require respiratory protection may be worked simultaneously, provided that the level and type of respiratory protection worn is adequate for the airborne contaminants and the concurrent work does not create additional hazards.

8.5 POSTING/GUARDING ACCESS TO CONTROLLED AREAS

Unless the area in which respiratory protection is required is limited to the space occupied by the employee who is performing the work, posting or guarding access shall be established and controlled.

8.6 PROHIBITED USES

Air-purifying respirators shall not be used for the accomplishment of work in the following environments:

- Untested tanks or voids.
- Oxygen-deficient atmospheres.
- Atmosphere IDLH.

Access to life-threatening areas is limited to emergency situations. Such areas must be tested and ventilated to safe conditions prior to accomplishment of routine work.

9.0 CHANGING CARTRIDGES

Cartridge changes shall be conducted according to the guidelines presented below for particulate and vapor/gas filters.

1. Particulate-Filter Elements
   - Particulate filters, including paint-mist pre-filters, should be changed if breathing becomes more difficult.
   - Type R filters (rated under 42 CFR 84) must be changed at the end of each shift where exposure includes airborne oil mists.

2. Vapor and gas-removing cartridges and canisters
   - Cartridges or canisters should be replaced when they reach their end of service life as determined by either the end-of-service-life indicator or the end of service life calculations. The end-of-service-life indicator shall be a part of the cartridge and be certified by NIOSH for the contaminant. The end-of-service-life calculations shall be based upon the calculation methods outlined in the OSHA Respiratory Protection Advisor and are based on objective information or data that will ensure that canisters and cartridges are changed before the end of their service life.
   - Cartridges and canisters should also be changed and personnel shall immediately exit the area whenever the wearer can smell or taste the airborne contaminant. If the wearer detects an odor or taste of gas in the inspired air, or feels eye or throat irritation, he/he should leave the hazardous area immediately and go to a clean area to change out the cartridges. The wearer will also immediately notify the SS and the SSHO of the condition and have the end of service life calculations re-evaluated.

10.0 RESPIRATOR USER'S INSPECTION GUIDE

10.1 GENERAL

All respirators shall be inspected for obvious defects by the user prior to use. Emergency respirators (e.g., SCBA) shall be inspected monthly and after each use. A log shall be maintained by PIKA to document these inspections.

10.2 AIR-PURIFYING (HALF-MASK OR FULL-FACE) RESPIRATORS

Respirators shall be free of the following defects, as applicable:

- Excessive dirt
- Cracks, tears, or deterioration
- Distortion
- Inflexibility
- Cracked or badly scratched lenses
- Incorrectly mounted lenses
- Poorly seated or torn inhalation and/or exhalation check valves or diaphragms

- Deterioration; if the device has a corrugated breathing tube, examine it for deterioration by stretching the tube and looking for cracks

Straps shall be free of the following defects, as applicable:

- Breaks, tears, or cuts
- Loss of elasticity
- Broken buckles
- Worn serration or missing tabs or a head harness that may permit slippage.

10.3 AIR-SUPPLIED (HALF-MASK OR FULL-FACE) RESPIRATORS

Inspect face piece and straps as outlined above, and if the device has a corrugated breathing tube, examine it for deterioration by stretching the tube and looking for cracks. Also examine the respirator system components for accumulation of dirt, grit, oil, tears, breaks, etc.

10.4 AIR-SUPPLIED HOODS

Air-supplied hoods shall be inspected for holes and tears prior to use. Air-supplied hoods may be used in lieu of air-supplied respirators, provided the hood has NIOSH approval for the work being performed.

11.0 RESPIRATOR FITTING/TESTING PROCEDURES

11.1 GENERAL

A respirator cannot provide optimum levels of protection unless an air-tight seal is obtained between the respirator and the user's face. Accordingly:

1. A respirator shall not be worn if facial hair comes between the sealing periphery of the face piece and the face, or if facial hair interferes with valve functions.
2. Because half-mask respirators are manufactured in small, medium, and large sizes to fit various sized and shaped faces, and since the wearer is required to have a properly fitting respirator, it is imperative that supervisors make arrangements to obtain the specific model and size respirator certified for each employee who must use one.
3. If spectacles, goggles, face shield, or welding helmet must be worn with a face piece, it shall be worn so as not to interfere with the seal of the face piece to the face.

11.2 RESPIRATOR FACE PIECE FIT-TEST REQUIREMENTS

The respirator cannot provide proper respiratory protection unless it seals air-tight with the face of the wearer and thereby excludes the contaminated atmosphere. To do this, the respirator must be properly fitted to the individual.

11.2.1 Qualitative Fit Testing

A qualitative respirator fit test shall be carried out for each wearer of a negative-pressure and powered air-purifying respirator at least annually. Respirator fit tests are not required for positive-pressure (air-line or SCBA) respirators. The results of the qualitative fit test shall be used to select specific types, makes, and models of negative-pressure respirators for use by the individual.

Qualitative tests using irritant smoke or other agent approved by the PIKA CESHM shall be conducted and documented on persons who will wear a negative-pressure respirator. ESHF-518 shall be used to fit-test respirators with irritant smoke.

11.2.2 Negative and Positive Pressure Tests

The wearer shall check the face-piece seal of any respirator each time the respirator is donned. To check the seal, complete the following negative- and positive-pressure tests.

1. Negative-pressure test:
   - **Close** off the air inlet for the canister, cartridge(s), filter(s), or hose(s) by covering with the palms, being careful not to dislodge the face piece,
   - **Inhale** gently so that the face piece collapses slightly, and
   - **Hold** breath for ten seconds.
   - **If** the face piece remains slightly collapsed and no inward leakage is detected, the respirator fit is adequate.
2. Positive-pressure test:
   - **Close** off the opening of the exhalation valve by covering with the palm, being careful not to dislodge the face piece., and
   - **Exhale** gently into the face piece.
   - **If** slight positive pressure can be built up inside the face piece without leaking, the respirator fit is considered satisfactory.

12.0 RESPIRATOR INSPECTION, CARE, AND MAINTENANCE

12.1 GENERAL

Reusable rubber face piece respirators shall be inspected and cleaned after each use to prevent spread of germs, contamination by chemicals and dusts, and to maintain rubber parts in good repair. Spare parts for reusable respirators must be procured from the respirator supplier.

12.2 CLEANING PROCEDURES

Respirators may not be cleaned with solvents or paint removers, because damage to rubber or plastic pieces may result. Respirators shall be cleaned in accordance with the respirator manufacturer's instructions or by the following method:

1. Remove filters, cartridges, or canisters. Disassemble face pieces by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.
2. Wash components in warm (43° C [110°F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.
3. Rinse components thoroughly in clean, warm (43° C [110° F] maximum), preferably running water. Drain.
4. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:
   - Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43° C (110° F) maximum; or,
   - Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45-percent alcohol) to one liter of water at 43° C (110°F) maximum; or,
   - Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.
5. Rinse components thoroughly in clean, warm (43° C [110° F] maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on face pieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.
6. Components should be hand-dried with a clean, lint-free cloth or air-dried.
7. Test the respirator to ensure that components work properly.
8. For self-contained breathing apparatus (SCBA), disassemble and hand-clean the pressure-demand and exhalation valve as appropriate, exercising care to avoid damaging the rubber diaphragm.
9. Visually inspect face pieces and parts for deterioration, distortion, or other faults that might affect the performance of the respirator. Discard faulty items, replacing only with parts specifically designed for the particular respirator.
10. Place respirator in a clean, zip-lock bag, or container for storage after it has completely dried.

12.3 RESPIRATOR STORAGE

Cleaned respirators shall be stored to protect against dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals. The storage area shall be clean and sanitary. Respirators shall be packed or stored so that the face piece and exhalation

valve will rest in a normal position and function will not be impaired because the face piece sat in an abnormal position. Respirators issued to individuals shall be stored in a clean plastic bag, carton, or carrying case, as appropriate.

12.3.1 Emergency-Use Respirators

Emergency escape-only respirators shall be inspected before being carried into the workplace for use. Self-contained breathing apparatus shall be inspected monthly. Air and oxygen cylinders shall be maintained in a fully charged state and shall be recharged when the pressure falls to 90 percent of the manufacturer's recommended pressure level. The inspection must:

- Establish that the regulator and warning devices function properly.
- Check the respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the face piece, head straps, valves, and connecting tube; and
- Check the elastomeric parts for pliability and signs of deterioration.

For respirators maintained for emergency use, the maintaining organization shall:

- Certify the respirator by documenting the date the inspection was performed, the name (or signature) of the person who made the inspection, the findings, required remedial action, and a serial number or other means of identifying the inspected respirator.
- Provide this information on a tag or label that is attached to the storage compartment for the respirator, is kept with the respirator, or is included in inspection reports stored as paper or electronic files. This information shall be maintained until replaced following a subsequent certification.

13.0 BREATHING-AIR QUALITY AND SUPPLIED AIR SYSTEMS

13.1 AIR QUALITY FOR SUPPLIED AIR SYSTEMS

Compressed air for breathing purposes shall be of at least Grade D quality. Grade D air contains:

1. Oxygen content: 19.5-23.5 percent.
2. Less than 10 ppm carbon monoxide.
3. Less than 1000 ppm carbon dioxide.
4. Less than 5 mg/m^3 total hydrocarbons.
5. No objectionable odors.

13.2 TEMPERATURE CONSIDERATIONS

Compressed air that is to be used at temperatures below freezing should have excess water vapor removed so as to attain a dew point below the minimum temperature anticipated. Compressed air, as it passes through regulators and valves from a high

pressure to a low pressure, expands and cools down, resulting in a temperature lower than the surrounding temperature.

13.3 BREATHING-AIR COMPRESSORS

Breathing-air compressors must be located where contaminated air cannot enter the system. If the compressor is oil-lubricated, it shall be equipped with both a high-temperature and carbon monoxide alarm. The high-temperature alarm will be set at the temperature specified in the manufacturer's literature. The carbon monoxide alarm will be set at 10 ppm. Compressors used for breathing air must be specifically designed and certified for the purpose.

13.4 BREATHING-AIR TESTING

Breathing-air quality shall be laboratory tested and certified at least quarterly. Supervisors of those activities capable of producing their own breathing air are responsible for such testing and record keeping (see item 9 in section 28.2.1). The air from non-oil-lubricated, low-pressure air pumps designed specifically to provide respirator breathing-air does not need to be tested.

13.5 BREATHING-AIR HOSES

Only hoses designed for breathing-air shall be used and they shall have NIOSH approval and be compatible with the respirator being used. Air-line hoses shall be protected from damage. Hoses shall be arranged to prevent tripping and allow ready access/exit. Additionally, the following shall apply

1. Air-lines used for supplying breathing air shall be tagged or labeled as "Breathing-Air Supply Line." Breathing-air-lines shall be labeled by the owning organization.
2. All breathing-air-line couplings shall be incompatible with outlets for other gas systems.
3. When not in use, ends of breathing-air system shall be capped or sealed.
4. The total hose length shall be limited to a maximum of 300 feet.
5. All equipment used from the respirator face piece to the breathing-air pump must be from the same manufacturer.

14.0 RESPIRATOR TRAINING

14.1 WHO REQUIRES TRAINING

All personnel who will use or issue respirators and their supervisors shall receive appropriate respirator training initially and annually thereafter. The training shall consist of the following:

1. Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.
2. The limitations and capabilities of the respirator.

3. How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.
4. How to inspect, put on and remove, use, and check the seals of the respirator.
5. The procedures for maintenance and storage of the respirator.
6. How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.
7. The general requirements of the OSHA respiratory standard (29 CFR 1910.134).

15.0 RESPIRATOR AUTHORIZATION CARD

Each person who satisfactorily completes the respirator physical examination, training, and fit-testing shall be issued a Respirator Fit Test Card (ESHF-519). The data on the card shall include:

1. The expiration date on the card shall be one year from the earliest date of:
   - Respirator physical examination,
   - Respirator training; or
   - Respirator fit-testing.
2. The respirators for which the person was satisfactorily fit-tested.
3. The card shall be carried on the individual's person when the individual is using a respirator.

16.0 RESPIRATOR ISSUE

Respirators and filter cartridges are issued through the SSHO shop stores only upon the presentation of a completed and signed Respirator Fit Test.

17.0 LOSS OF QUALIFICATION

Employees may lose their respirator use qualification and/or respirator at any time for any of the following reasons:

1. Expiration of qualification (health certificate or training).
2. Determination by a medical officer that the employee is not physically qualified for respirator use.
3. Lack of knowledge or willful neglect of requirements, as demonstrated by failing the qualification exam or by serious violations of this instruction, such as:
   - Use of the wrong type of respirator.
   - Failure to wear a respirator where required.
   - Removal of a respirator in a respirator area.
   - Tampering with a respirator.
   - Entry into an untested, oxygen-deficient, or life-hazardous space unprotected.
   - Wearing the respirator with facial hair that prohibits proper sealing or interferes with proper internal valve operation.

18.0 AUDIT CRITERIA

The following items related to heavy equipment operations will be audited to ensure compliance with this ESHP:

- The Daily Task and Safety Briefing Log (ESHF-502);
- The Documentation of Hazard Communication Training Form (ESHF-505);
- The Safety Training Attendance Log (ESHF-503); and
- The Daily Inspection and Weekly Audit Report Form (ESHF-506).

19.0 ATTACHMENTS

Attachment 1 - Irritant Smoke Fit-Testing Procedure, Qualitative Fit-Testing

ATTACHMENT 1
IRRITANT SMOKE FIT-TESTING PROCEDURE
QUALITATIVE FIT-TESTING

General The employer shall include the following provisions in the fit-test procedures. Testing is to be conducted annually.

1. The test subject shall be allowed to pick the most comfortable respirator from a selection including respirators of various sizes from different manufacturers. The selection shall include at least three sizes of elastomeric face pieces of the type of respirator that is to be tested, i.e., three sizes of Half-Mask; or three sizes of Full Face piece. Respirators of each size must be provided from at least two manufacturers.
2. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension, and how to determine a comfortable fit. This instruction may not constitute the subject's formal training on respirator use; it is only a review.
3. The test subject shall be informed that he/she is being asked to select the respirator that provides the most comfortable fit. Each respirator represents a different size and shape, and if fitted, maintained, and used properly, will provide substantial protection.
4. The test subject shall be instructed to hold each face piece up to the face and eliminate those that obviously do not give a comfortable fit.
5. The more comfortable face pieces are noted; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in item 6 below. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.
6. Assessment of comfort shall include reviewing the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:
   - Position of the mask on the nose;
   - Room for eye protection;
   - Room to talk; and
   - Position of mask on face and cheeks.
7. The following criteria shall be used to help determine the adequacy of the respirator fit:
   - Chin properly placed
   - Adequate strap tension, not overly tightened;
   - Fit across nose bridge;
   - Respirator of proper size to span distance from nose to chin;
   - Tendency of respirator to slip; and
   - Self-observation in mirror to evaluate fit and respirator position.
8. The test subject shall conduct the negative- and positive-pressure fit checks as described below. Before conducting the negative- or positive-pressure test, the

subject shall be told to seat the mask on the face by moving the head from side-to-side and up and down slowly while taking in a few slow deep breaths. Another face piece shall be selected and retested if the test subject fails the fit-check tests.

- Positive-pressure test. Close off the exhalation valve and exhale gently onto the face piece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.
- Negative-pressure test. Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s). Inhale gently so that the face piece collapses slightly, and hold the breath for ten seconds. If the face piece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

9. The test shall not be conducted if there is any hair growth between the skin and the face piece sealing surface, such as stubble beard growth, beard, or long sideburns that cross the respirator sealing surface. Any type of apparel that interferes with a satisfactory fit shall be altered or removed.
10. If a test subject exhibits difficulty in breathing during the tests, he/she shall be referred to a physician trained in respiratory disease or pulmonary medicine to determine whether the test subject can wear a respirator while performing his/her duties.
11. The test subject shall be given the opportunity to wear the successfully fitted respirator for a period of two weeks. If at any time during this period the respirator becomes uncomfortable, the test subject shall be given the opportunity to select a different face piece and to be retested.
12. The employer shall maintain a record of the fit-test administered to an employee. The record shall contain at least the following information:
    - Name of employee;
    - Type of respirator;
    - Brand, size of respirator; and
    - Date of test.
13. Prior to the commencement of his/her fit-test, the test subject shall be given a description of the Fit-Test and the test subject responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least five minutes before the start of the Fit-Test.
14. The test subject shall be instructed to keep his/her eyes closed.

15. The test operator shall direct the stream of irritant smoke from the smoke tube toward the face-seal area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the face piece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.
16. If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.
17. Test Exercises. The test subject shall perform exercises in the test environment in the manner described below:
    - **Normal breathing.** In a normal standing position, without talking, the subject shall breathe normally.
    - **Deep breathing.** In a normal standing position, without talking, the subject shall breathe slowly and deeply, taking care so as to not hyperventilate.
    - **Turning head side to side.** Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.
    - **Moving head up and down.** Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).
    - **Talking.** The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.
    - **Grimace.** The test subject shall grimace by smiling or frowning.
    - **Bending over.** The test subject shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud type units that prohibit bending at the waist.
    - **Normal breathing.** Same as the first exercise. Each test exercise shall be performed for one minute except for the grimace exercise, which shall be performed for 15 seconds. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become uncomfortable, another model of respirator shall be tried.

Irritant Fume Protocol

1. The respirator to be tested shall be equipped with P100 or high-efficiency particulate air (HEPA) filters.

2. The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its characteristic odor.
3. Break both ends of a ventilation smoke tube containing stannic oxychloride, or equivalent. Attach one end of the smoke tube to a low-flow air pump set to deliver 200 milliliters per minute.
4. Advise the test subject that the smoke can be irritating to the eyes and instruct the subject to keep his/her eyes closed while the test is performed.
5. The test conductor shall direct the stream of irritant smoke from the smoke tube toward the face-seal area of the test subject. He/she shall begin at least 12 inches from the face piece and gradually move to within one inch, moving around the whole perimeter of the mask.
6. The exercises identified in section 28.13.9, General, item 17 shall be performed by the test subject while the respirator seal is being challenged by the smoke.
7. Each test subject who passes the smoke test without evidence of a response shall be given a sensitivity check of the smoke from the same tube after the respirator has been removed to determine whether he/she reacts to the smoke. Failure to evoke a response shall void the Fit-Test.
8. The Fit-Test shall be performed in a location with sufficient exhaust ventilation to prevent the testing agent from generally contaminating the testing area.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide PIKA International, Inc. (PIKA) personnel with general guidelines and procedures for the selection and use of personal protective equipment (PPE). In accordance with (IAW) OSHA standards, PIKA will, whenever possible, use engineering controls or other means to control personnel exposures to chemical and physical hazards encountered during project tasks. Whenever engineering controls or other protective measures are not feasible or adequate, this ESHP will be used to select the PPE necessary to ensure the safety and health of site personnel.

2.0 SCOPE

This ESHP will be applicable to PIKA projects where PIKA personnel or its subcontractors are required to use PPE to reduce the risks of exposure to chemical, physical or biological hazards. Requirements and provisions for the use of PPE will be specified in a Site-specific Safety and Health Plan (SSHP), an Accident Prevention Plan (APP), or other PIKA ESHPs. This ESHP does not apply to the issuance or use of respiratory protective equipment which is addressed in ESHP-513.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- 29 CFR 1910 Subpart I, OSHA General Industry Standard on PPE as Amended 15 November 2007 by the Final Rule for Employer Payment for Personal Protective Equipment.
- 29 CFR 1926 Subpart E, OSHA, Construction Standard on PPE as Amended 15 November 2007 by the Final Rule for Employer Payment for Personal Protective Equipment.
- USACE Engineering Manual 385-1-1, 3 November 2003, Section 05.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the equipment which site personnel will need to safely perform the electrical work identified in this ESHP. The PM will also take a lead role in the

integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve personnel exposure to known or potential electrical safety hazards. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel who conduct operations involving the control of hazardous energy sources are fully trained and qualified as outlined in this ESHP.

4.3 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The PIKA CESHM is responsible for the continued development and review of this ESHP and for providing consultation to the project-specific Site Safety and Health Officer (SSHO). The CESHM will also:

1. Review newly developed or improved PPE to identify products that may afford a higher degree of protection or may provide a level of protection not previously available;
2. Conduct a task hazard assessment for each task performed on site and identifying the chemical, physical and biological hazards from which site personnel will require protection;
3. Complete the PIKA Certification of Activity Hazard Assessment (CTHA) form (ESHF-529) for each task conducted on site and specify in the CTHA the PPE that will be required to reduce exposure risks;
4. Develop the PPE requirements for each project site IAW the anticipated hazards and incorporating that information into the project Safety Plans; and
5. Periodically inspect the PIKA project sites to ensure the provisions of this ESHP are being implemented.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO is responsible for the on-site implementation of this ESHP. As such, the SSHO will:

1. Provide initial training, as specified in paragraph 5.0 of this ESHP, to inform site personnel of the selection, use, limitations, cleaning and maintenance of PPE used on site;
2. Issue PPE IAW the provisions of the CTHA and project Safety Plans;
3. Assist site personnel with the inspection and maintenance of PPE;
4. Consult with the CESHM to determine the levels and types of PPE to be used for tasks not previously addressed in a CTHA;
5. Completing the CTHA form for any new tasks that were not previously addressed in the project Safety Plans, and forwarding that form to the CESHM for approval.

6. Conducting daily inspections and weekly audits of the site to determine if workers are safely complying with the PPE requirements of this ESHP.

5.0 SELECTION OF PPE

5.1 INTRODUCTION

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 that 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 be provided by the client, or collected by PIKA 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:

- Initiation of a new work phase or work that begins on a different portion of the site;
- Changes occur in job tasks during a work phase;
- Changes occur in the season/weather;
- Effectiveness of PPE is reduced due to temperature extremes or individual medical considerations;
- Previously unidentified contaminants are encountered;
- Ambient contaminant levels change as a result of site operations; and
- Changes in work scope effect the degree of contact with contaminants.

If work tasks are added or amended after completion and approval of the project Safety Plans, the SSHO will conduct the task hazard assessment and consult with the CESHM. The level and type of PPE to be used will be identified and the SSHO will complete the CTHA form (ESHF-513). Any changes in PPE that involve downgrading the level of PPE will be allowed only after review by the CESHM.

5.2 SELECTION CRITERIA

The CESHM will utilize the general chemical resistance information found in Appendix B and Table 514-1 of this ESHP, 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. During the selection of PPE the CESHM will also take into the consideration the following factors:

1. Limitations of the equipment;
2. Work mission duration;

3. Temperature extremes;
4. Material flexibility; and
5. Durability/Integrity of the equipment.

Once the specific types of PPE have been selected for each task, the SSHO, and if needed the CESHM, will work to locate approved PPE items that will properly fit each employee designated to wear PPE. Selection of respiratory protection will be conducted IAW ESHP-513 of the PIKA CESHP.

5.3 PROVISION OF PPE

5.3.1 PIKA Provided PPE

In accordance with new OSHA PPE guidelines published in the Federal Register 15 November 2007, PIKA will be responsible for providing PPE at no cost to the employee with the exception of the items listed below. This new requirement will go into effect on February 13, 2008 and PIKA will be required to implement the PPE payment requirements no later than May 15, 2008. The items for which PIKA is not responsible for payment include the following:

1. Non-specialty safety toe protective footwear (including steel-toe shoes or steel-toe boots). Note: When the PIKA provides metatarsal guards and allows the employee, at his or her request, to use shoes or boots with built-in metatarsal protection, PIKA is not required to reimburse the employee for the shoes or boots.
2. Non-specialty prescription safety eyewear, provided that the employer permits such items to be worn off the job-site.
3. The logging boots required by 29 CFR 1910.266(d)(1)(v);
4. Everyday clothing, such as long-sleeve shirts, long pants, street shoes, and normal work boots;
5. Ordinary clothing, skin creams, or other items, used solely for protection from weather, such as winter coats, jackets, gloves, parkas, rubber boots, hats, raincoats, ordinary sunglasses, and sunscreen.

In addition, PIKA must pay for replacement PPE, except when the employee has lost or intentionally damaged the PPE.

5.3.2 Employee Provided PPE

Where an employee provides adequate PPE he or she owns, PIKA may allow the employee to use it and is not required to reimburse the employee for that equipment. PIKA shall not require an employee to provide or pay for his or her own PPE, unless the PPE is excepted by items 1 – 5 listed above in paragraph 5.3.1 of this ESHP.

6.0 TRAINING

6.1 TRAINING SCHEDULE

PIKA, contractor or subcontractor site personnel will be given initial, PPE-specific training, which complies with this section. This training will be given by the SSHO or CESHM prior to personnel participating in site operations where PPE is required. PPE training will include the relevant topics outlined in paragraph 5.2 of this ESHP. 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; or
3. Changes in the types of PPE to be used render previous training obsolete.

6.2 REQUIRED TRAINING TOPICS

PIKA will provide 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; and
7. The limitations of the PPE.

Personnel provided 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 initial use of the PPE.

Upon completion of the training and after each employee has successfully demonstrated the requisite understanding, the SSHO will complete the Personal Protective Equipment Training form (ESHF-530), 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.

7.0 LEVELS OF PPE

The following paragraphs outline the different levels of PPE that may be used by PIKA 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 is 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 in project Safety Plans 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 ESHP, and may be referenced when selecting specific PPE required for each level described below.

7.1 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 provide adequate ultra violet radiation protection; and
5. The OSHA standards for PPE selection are vague concerning the selection of some particular types of specific PPE. Therefore, as part of the task hazard analysis PIKA will evaluate site tasks to identify hazards and will provide the PPE which provides the necessary to ensure the safety and health of site personnel, regardless of the activity they perform.

7.2 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 also 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); and
6. Two-way radio, one per team.

7.3 MODIFIED LEVEL D PPE

Modified Level D affords protection from casual contact with contaminated soils and materials, but should not be worn whenever there is a potential for over exposure to airborne hazardous substances. Modified Level D involves the use of the following PPE:

1. Chemical resistant suit, with attached booties;
2. Five (5) minute escape mask (if the potential for airborne exposure exists);
3. Chemical resistant over boots;
4. Gloves - Cotton inner liners, 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; and
8. Two-way radio, one per team.

7.4 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. Level C with an air-purifying respirator can only be used for protection against chemicals and concentrations for which NIOSH/MSHA approved cartridge exists. 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 over boots;
4. Gloves - cotton liners, latex inner and chemical resistant outer;
5. Hard hat (when working around heavy equipment or overhead hazards);
6. Leather work boots with safety toe; and
7. Two-way radio, one per team.

7.5 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 airtight and skin exposure to hazardous vapors is possible. Therefore, this level of protection is not acceptable for use where contact with the liquids or vapors that are extremely toxic or corrosive to the skin is anticipated. This level should not be used if the site contains CWM agents that 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 over boots;

5. Gloves - cotton liners, latex inner and chemical resistant outer;
6. Hard hat (when working around heavy equipment or overhead hazards);
7. Leather work boots with safety toe; and
8. Two-Way Radio, one per team.

7.6 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 to ensure that hazardous gases and vapors do not leak into the suit. Since Level A is usually worn in areas where highly toxic and corrosive materials are known to exist, the Level A suit 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 it is capable of resisting the chemicals expected to be found on site. Since Level A affords the greatest level of protection to dermal hazards, it will be worn in 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 and over come by CWM, or other materials, and require rescue. Level A will involve the use of the following PPE:

1. SCBA, airline or a combination of both (NIOSH/MSHA approved);
2. Total-encapsulating chemical protective suit with attached boots and gloves;
3. Coveralls or Scrubs - cotton;
4. Gloves - cotton liners, latex inner and chemical resistant outer;
5. Boots - leather work boots (or equivalent), and chemical resistant over boots;
6. Chemical resistant boot covers (optional);
7. Disposable protective suit worn over totally encapsulating suit (optional);
8. Hard hat (when working around heavy equipment or overhead hazards) and;
9. Two-way radios, or an equivalent communication system (worn inside encapsulating suit), 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 not known or measurable. Therefore, the structural integrity and air tightness of the suit, and its seams, zippers and glove seals are extremely important. To ensure the 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.

8.0 PPE DONNING PROCEDURES

8.1 INTRODUCTION

The purpose of the PPE donning procedures 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 presented here are given as a general guide and may be altered by the SSHO if warranted by site operations and approved by the CESHM. Since these are general procedures, they may be modified by project Safety Plans which address site-specific hazards and may have unique requirements for PPE donning.

8.2 GENERAL REQUIREMENTS

This paragraph contains general procedures and requirements for donning levels of PPE. Specific procedures for donning each level of PPE are discussed in the paragraph immediately following the description of that 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/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 exclusion zone (EZ) to do so;
6. Whenever protective boots/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 with 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 seams at the stress points in the crotch, arm pits 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.

8.3 DONNING PROCEDURES FOR MODIFIED LEVEL D

To don Modified Level D, keep in mind the general recommendations above and then 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 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 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 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.

8.4 DONNING PROCEDURE FOR LEVEL C PPE

To don Level C, follow the general considerations 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 other PPE (hard hat, safety glasses, splash shield, etc.) and proceed toward the CRZ access point;
6. If earplugs 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 a negative and positive pressure fit test to verify that the mask is not leaking;
9. Don 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 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.

8.5 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, 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 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 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 earplugs are to be worn, insert them now, before putting the respirator facepiece, or any other PPE that might obstruct the proper insertion of the plugs;
8. Don the SCBA facepiece, but do not connect the airline at this time, and conduct a negative and positive pressure fit test to verify that the mask is not leaking;
9. Put on inner glove liner, inner gloves and outer gloves, and tape gloves to suit;
10. While connecting SCBA to the facepiece, turn on the regulator valve and check air flow and breathing usability of the unit;
11. Once the suit and SCBA are situated and the assistant checks to determine if the wearer is breathing freely, and puts 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.

8.6 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 7.6, 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 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, 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 earplugs are to be worn, insert them now, before putting the respirator facepiece, or any other PPE that might obstruct the proper insertion of the plugs;
8. Don the SCBA facepiece, but do not connect the airline at this time, and conduct a negative and positive pressure fit test to verify that the mask is not leaking;
9. Put on inner glove liner and inner gloves then put on hardhat;
10. While connecting SCBA to the facepiece, turn on the regulator valve and check airflow and breathing ease ability 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, facepiece and hard hat;
12. Once the suit is situated and the assistant checks to verify the wearer is breathing freely, the assistant will zip up the suit and check 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.

9.0 INSPECTION PROGRAM

9.1 INSPECTING INCOMING SHIPMENTS OF PPE

The SSHO or a designated appointee will inspect incoming shipments of PPE received from the PIKA 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.

9.2 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 capable of protecting the employee from

site hazards. As applicable, site personnel will check the following when pre-donning inspections are conducted:

- Chemical Resistant Clothing (suits, gloves, boots, etc.)
  - Check that clothing is made of proper material
  - Visually check seams, coating, zippers and look for tears
  - Check gloves and boots for pin holes
  - Stretch material and check flexibility and look for cracks
- Eye, Face and Head PPE
  - Ensure that equipment is ANSI approved
  - Check that hard hats are in good condition, with no cracks, or chemical/material buildup visible
  - Check hardhat headband for proper function and completeness
  - Ensure eye/face/head PPE fits comfortably and securely
  - Check safety classes and face shields for cracks or scratches that could impair vision or compromise structural integrity
  - Check safety glasses for side shields
- Fully-encapsulating Suits
  - Check operation of pressure relief valves and fitting of suit
  - Check face shield for cracks glazing or fogging
  - Ensure suit passes pressure test
  - Visually check seams, coating, zippers and look for tears
  - Check gloves and boots for pin holes
  - Stretch material and check flexibility and look for cracks
- Respirators
  - Inspect IAW PIKA ESHP-513 Respiratory Protection of the PIKA CESHP

9.3 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.

10.0 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 PPE 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.

11.0 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 procure a replacement.

12.0 STORAGE

PPE will be stored in a location that 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.

13.0 ATTACHMENTS

No attachments are associated with this ESHP.

14.0 RELATED REFERENCE

OSHA 29 CFR 1910 Subpart O; Motor Vehicles, Mechanized Equipment, and Marine Operations

Table 514-1
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
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
C.	*Cadmium oxide fume	E	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

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

	CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
	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
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
	ISHPropanol	E	E	E	E
	ISHPropyl alcohol	E	E	E	E
K.	Kerosene	E	F	E	F
	Ketoners	G	E	P	E
L.	Lacquer thinners	G	F	P	F

	CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
	Lactic acid	E	E	E	E
	Lautric acid	E	F	E	E
	Lineoleic acid	E	P	E	F
	Linseed oil	E	P	E	F
M.	Maleic acid	E	E	E	E
	Mercuric chloride	G	E	G	E
	Mercury	G	G	G	E
	Methane gas	E	E	E	E
	Methanol	E	E	E	E
	Methyl acetate	G	F	P	G
	Methyl alcohol	E	E	E	E
	Methylamine	F	F	G	G
	Methyl bromide	G	F	F	G
	Methyl celiosolve	G	G	G	G
	*Methyl chloride	NR	NR	NR	NR
	*Methyl ethyl ketone	G	G	NR	E
	Methyl formate	G	F	F	G
	Methylene bromide	G	G	F	G
	Methylene chloride	G	F	F	G
	*Methyl isobutyl kelone	F	F	P	E
	Methyl methacrylate	G	G	F	E
	Mineral oils	E	F	E	F
	*Monochlorobenzene	F	P	P	F
	Monoethanolamine	E	G	E	E
	Morpholine	E	E	G	E
	Muriatic acid	E	G	G	E
N.	Naphthalene	G	F	G	F
	Naphthas aliphatic	E	F	E	F
	Naphthas, aromatic	G	P	G	P
	*Nitric acid	G	F	F	F
	*Nitric acid, red and white fuming	P	P	P	P
	*Nitrobenzene	F	P	F	F
	*Nitroethane	F	P	F	F
	Nitrogen gas	E	E	E	E
	*Nitromethane	F	P	F	F
	*Nitropropane	F	P	F	F
	Nitrous oxide	G	Q	G	G
O.	Octyl alcohol	E	E	E	E
	Oleic acid	E	F	E	G
	Oxalic acid	E	E	E	E
	Oxygen liquid	F	P	NR	F
	Ozone	G	P	P	G
P.	Paint thinners	G	F	G	F
	Paint and varnish removers	G	F	F	F
	Palmitic acid	E	E	E	E
	*Paradichlorobenzene	E	F	E	E
	Parathion	P	F	F	F
	Pentaborane	F	P	F	F
	Pentachlorophenol	F	G	G	G
	Pentane	E	G	E	G
		E	F	G	G

	CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
	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
	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
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

	CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
	Toluene diisocyanate	F	G	F	G
	*Toluol	F	P	F	NR
	Trichlor	F	P	G	P
	*Trichloroethylene	F	F	G	P
	*Trichloroethane	P	P	F	P
	Tricresyl phosphate	G	F	E	F
	Tridecyl alcohol	G	F	E	F
	Triethanolamine	E	G	E	G
	Trinitrotoluene	G	P	G	F
	Trinitrotoluol	G	P	G	F
	Triptane	E	P	E	F
	Tung oil	E	P	E	F
	Turco No. 2996	P	P		F
	Turpentine	G	F	E	F
U.	Unsymmetrical Dimethylhydrazine	F	P	F	P
V.	Varnoline gas	E	F	E	F
	Vanadium fume and dust	E	E	E	E
	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

SPECIFICATIONS 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 ESHP 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, PIKA will ensure that affected personnel utilize appropriate PPE. When individual personnel provide their own PPE, PIKA 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. The following shall apply when eye/face protection is required:

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 PPE will be clearly marked with the manufacturer's name;
4. Eye and face protection will be selected and worn which 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, 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; and
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 me maintained and inspected to ensure they are in working order and that their structural integrity has not been compromised through exposure to chemicals, physical abuse or improper storage; and
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, or 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; and
3. At a minimum, footwear will be leather work boots.

6.0 Hand Protection

Each employee exposed to operations where there is a danger of hand injury due to skin absorption or contact with hazardous substance, 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. PIKA 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 to contact blood or other infectious materials they will as a minimum wear surgical type latex gloves at the time of potential contact; and
3. Chemical resistant gloves that 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 PIKA personnel who may require use of body/limb protection devices include:

1. Working in hot environments - cooling vest or other temperature reducing device;

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

APPENDIX B

PROTECTIVE CLOTHING MATERIAL GUIDE
Protective Clothing Material Guide

Tyvek7: 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; and is inexpensive and suitable for disposable garments.

Polyethylene: Used as a coating on polyolefin material such as Tyvek7, increasing resistance to acids, bases, pesticides, and salts.

Saranex7: Made of Saran, a Dow product. Coated on Tyvek7. it is a very good general-purpose disposable material. Better overall protection than Polyethylene. Resistant to PCB's and chlorinated hydrocarbons.

Barricade7: A Dupont material with better general chemical resistance than Saranex7. 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.

Responder7: One of the strongest limited-use materials, with a multi-layer construction. Responder7 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 a 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 facepieces 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. Nitrile is commonly available and inexpensive.

PVAJ: 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.

Viton7: Product of Dupont. Fluoroelastomer that is similar to Teflon. This materials consists of excellent resistance to degradation and permeation by aromatic and chlorinated hydrocarbons, and petroleum compounds. It is very resistant to oxidizers. However, it is extremely expensive material used in gloves and fully encapsulating suits.

SilverShield7: 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 from over 280 chemicals and mixtures. Provides 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.

Chloropel7: 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 good all-around protective material.

Nomex7: Product of Dupont. Made from an aromatic polyamide fiber, it is noncombustible and flame resistant up to 220°C, thus providing good thermal protection, and is very durable and acid resistant. Used in fire fighters' turnout gear and some fully encapsulating suits as a base for the rubber.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) 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. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA personnel, including subcontractor personnel, and operations involving the use of on and off road motor vehicles. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

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

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for the availability of the resources needed to implement this ESHP, and shall also verify that this ESHP is incorporated into site specific plans, procedures and training for sites where this ESHP is to be implemented.

1.1. CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.

2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related the implementation of this ESHP.
4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

1.2. SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve vehicle operating procedures and hazards. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel involved with vehicle operation are fully trained and qualified as outlined in this ESHP.

1.3. SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to assess their initial and continued compliance with this ESHP 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 wheeled or greater vehicle propelled by a self contained power unit designed for use off road. Every person regularly or occasionally operating a motor vehicle shall possess a valid permit 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 parts,

equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use. The part, 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 headlights, one on each side.
2. At least one red taillight and one red or amber stop light on each side.
3. Directional signal lights both front and rear.

All motor vehicles, except APUV's, trailers or semitrailers 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 various conditions of service. Service brakes on trailers and semitrailers 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 of the prime mover from the cab. Exceptions to this are vehicles in tow by an approved tow bar hitch.

Every motor vehicle shall be equipped with the following equipment:

1. A working speedometer;
2. A fuel gauge;
3. An audible warning device in operating condition;
4. A windshield equipped with an adequate powered windshield wiper;
5. An operable defrosting and defogging device;
6. And an adequate rear view mirror or mirrors;
7. Cabs, cab shields, and other protection shall be provided to protect the driver from the hazards of falling or shifting materials;
8. Non-slip surfaces shall be provided on steps;
9. Glass in windshields, windows, and doors shall be safety glass;
10. Cracked or broken glass shall be replaced;

11. All towing devices shall be structurally adequate for the weight drawn and be properly mounted; and
12. All motor vehicles shall be equipped with 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; and
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.

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

1. One red flag not less than 12 inches square and 3 reflective markers which shall be available for immediate use in case of emergency stops.
2. Two wheel chocks for each vehicle or each unit of a combination of vehicles.
3. At least one fire extinguisher rated at 20 BC units, with at least two such rated fire extinguishers being required for flammable cargoes; including MEC/MD.
4. Vehicle exhaust shall be controlled so that it will present no hazards to the operator, passengers, or other personnel.
5. Records of tests and safety inspections shall be maintained at the site and shall be available on request.
6. All rubber tired motor vehicles shall be 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 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, 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 not be required at a crossing within a business or residential district; 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 per 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 securely anchored, a rear gate, 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 truck body, in a standing position on the body, or 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 persons in the vehicle are seated and the guardrail and rear gate are in place or doors 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 where 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. Motor vehicles carrying loads which project more than 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 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 while operating an APUV.

3. APUV'S are to be used on off-road and on gravel roads only. (No paved road use.)
4. APUV'S shall be driven during daylight hours only.
5. Only four wheeled 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).

5.7 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

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

6.0 AUDIT CRITERIA

The following items related to power and hand tool operations will be audited to determine compliance with this ESHP:

- The Daily Task and Safety Briefing Log (ESHF-502);
- The Documentation of Hazard Communication Training Form (ESHF-505);
- The Safety Training Attendance Log (ESHF-503); and
- The Vehicle Inspection Checklist and Report Form (ESHF-507).

7.0 ATTACHMENTS

No attachments are associated with this ESHP.

1.0 PURPOSE

This environmental safety and health procedure (ESHP) establishes safety practices, means, methods and operations for tree felling, wood chipping, vegetation and brush clearing. This SOP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements for SSHP or APP development are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA personnel and subcontractors involved in tree felling, wood chipping, vegetation and brush clearing. This ESHP addresses the use of chain saws, wood chippers, string or bladed brush cutters, and mechanized vegetation shredding and removal equipment. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA General Industry Standard 29 CFR 1910.266, Logging.
- USACE EM 385-1-1, Section 13.F, Hand and Power Tools.
- USACE EM 385-1-1, Section 16.0, Machinery and Mechanized Equipment.
- The owner's manual for equipment and machinery used.
- The PIKA CESHP.

4.0 DEFINITIONS

The definitions provided below directly apply to this ESHP.

1. Backcut (felling cut) - The final cut in a felling operation.
2. Ballistic nylon - A nylon fabric of high tensile properties designed to provide protection from lacerations.
3. Buck - To cut a felled tree into logs.
4. Butt - The bottom of the felled part of a tree.
5. Clearance – Clearing within the work area includes removing and disposing of trees, brush and vegetation.
6. Designated person - An employee who has the requisite knowledge, training and experience to perform specific duties.
7. Domino felling - The partial cutting of multiple trees which are left standing and then pushed over with a pusher tree.

8. Facecut – The cut in the tree that is located on the side of the tree that corresponds to the designated direction of the tree when it falls. The facecut consists of two cuts that remove a notch from the tree and is cut perpendicular to the direction the tree will fall. The facecut is cut into the tree no more than 1/3rd the diameter of the tree.
9. Fell (fall) - To cut down trees.
10. Feller (faller) - An employee who fells trees.
11. Guarded - Covered, shielded, fenced, enclosed, or otherwise protected by means of suitable enclosures, covers, casings, shields, troughs, railings, screens, mats, or platforms, or by location, to prevent injury
12. Grubbing – Grubbing is removing from the ground and disposing of stumps, roots and stubs, brush and debris.
13. Landing - Any place where logs are laid after being yarded, and before transport from the work site.
14. Limbing - To cut branches off felled trees.
15. Lodged tree (hung tree) - A tree leaning against another tree or object which prevents it from falling to the ground.
16. Log - A segment sawed or split from a felled tree, such as, but not limited to, a section, bolt, or tree length.
17. Logging - For this ESHP, logging is defined as any operation conducted on site that involves the use of chain saws for tree felling, limbing or sizing.
18. Snag - Any standing dead tree or portion thereof.
19. Spring pole - A tree, segment of a tree, limb, or sapling which is under stress or tension due to the pressure or weight of another object.
20. Undercut – A notch in a tree to guide the direction of the tree and to prevent splitting or kickback.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the equipment that personnel will require to safely perform vegetation removal operations. The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

5.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to hazard identification and the protective measures applicable to this ESHP.
4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve personnel use of vegetation removal equipment or personnel exposure to vegetation removal hazards. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel involved with vegetation removal operations are fully trained and qualified as outlined in this ESHP.

5.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to assess their initial and continued compliance with this ESHP and other regulatory guidelines.

6.0 PROCEDURES

6.1 ENVIRONMENTAL CONDITIONS

All vegetation and tree removal work shall terminate and each employee shall move to a place of safety when environmental conditions, such as but not limited to, electrical storms, strong winds that may affect the fall of a tree, heavy rain or snow, extreme cold, dense fog, fires, mudslides, and darkness, create a hazard for the employee in the performance of the job. The SSHO, in conjunction with the SS will determine both the time to halt operations and the time to resume operations.

6.2 WORK AREAS AND PERSONNEL SEPARATION

6.2.1 General Requirements

Employees involved in vegetation and tree removal shall be spaced and the duties of each employee shall be organized so the actions of one employee will not create a hazard for any other employee. This shall include the personnel who are operating hand equipment, such as chain saws and brush cutters, as well as those personnel operating mechanized brush removal equipment and wood chippers. The requirements outlined in this ESHP are the minimum distances and additional distance between personnel and equipment zones may be required due to varying site conditions. Site-specific separation distances that vary from those discussed in this ESHP will be presented in the SSHP or APP. The buddy system will be used anytime personnel are involved in vegetation and tree removal procedures. Each employee involved with these operations shall work in a position or location that is within visual or audible contact with another employee.

6.2.2 Personnel Separation Using Fuel-powered Brush Cutters

Individuals conducting brush cutting and removal with fuel-powered brush cutters will be spaced at least 50 feet apart while the brush cutters are in operation. This restriction assumes that the operators are properly attired in personal protective equipment (PPE). Personnel who are not operating fuel-powered brush cutters will maintain a separation of at least 100 feet. Greater distances than those listed above may be required if specified by the manufacturer in the owner's manual.

6.2.3 Personnel Separation for Tree Felling

Work areas shall be assigned so that trees cannot fall into an adjacent occupied work area. If multiple felling personnel are working adjacent to each other, the distance between adjacent occupied work areas shall be at least two tree lengths of the trees being felled. The distance between adjacent occupied work areas shall reflect the degree of slope, the density of the growth, the height of the trees, the soil structure and other hazards reasonably anticipated at that work site. A distance of greater than two tree lengths shall be maintained between adjacent occupied work areas on any slope where rolling or sliding of trees or logs is reasonably foreseeable.

6.3 GENERAL EQUIPMENT OPERATIONAL PROCEDURES

6.3.1 Chain Saw Operation

Each chain saw used on site shall be equipped with a functional chain brake. Each chain shall also be equipped with a protective device that minimizes chain-saw kickback. No chain-saw kickback device shall be removed or otherwise disabled. Additionally the procedures listed below will be followed during chain saw operations.

1. Chainsaw operators are required to be trained in the operation, inspection and maintenance of heavy equipment.

2. Each gasoline-powered chain saw shall be equipped with a continuous pressure throttle control system that will stop the chain when pressure on the throttle is released.
3. The chain saw shall be operated and adjusted in accordance with the manufacturer's instructions.
4. The chain saw shall be fueled at least 20 feet from any open flame or other source of ignition.
5. DO NOT fuel if the engine is hot. Allow the engine to cool down for 10 minutes before refueling.
6. The chain saw shall be started at least 20 feet from the fueling area.
7. The chain saw should be started on the ground or where the saw is firmly supported. This may include the use of plywood or other protective measure to ensure the chain does not contact the ground. Drop starting a chain saw is prohibited.
8. The chain saw should be controlled with two hands during saw operations. Exceptions to this include the minimal time needed to adjust the throttle or reach for and activate the kill switch.
9. The chain saw shall not be used to cut directly overhead and the manufacturer's recommendations for chain saw use will be followed during chain saw operations.
10. The chain saw shall be carried in a manner that will prevent operator contact with the chain saw bar or chain.
11. Before the feller starts the retreat when a tree starts to fall, the chain saw shall be either immediately shut off and placed on the ground, or the throttle initially released and the saw carried out of the area (but no more than 50 feet) until the saw can be turned off and set down safely.
12. The chain saw shall be shut down whenever a saw is carried further than 50 feet. The chain saw shall be shut down when carried for less than 50 feet if there are any conditions that could cause the operator to stumble, slip or fall (i.e., obstructed terrain, slippery surfaces, dense underbrush, etc.).
13. Ear plugs and/or ear muffs required for Chainsaw operation and other high noise activities will be used as deemed necessary by the SSHO.

6.3.2 Gas-powered Brush Cutter/Trimmer Operation

Gas-powered brush cutters/trimmers will be used in accordance with the manufacturer's recommendations as specified in the Owner Manual. Brush cutters/trimmers will be equipped with a kill-switch and personnel will be familiar with the procedure for using the equipment controls and the kill-switch. Additionally, field personnel will follow the procedures listed below.

1. Brush cutter/trimmer operators are required to be trained in the operation, inspection and maintenance of heavy equipment.

2. Read the operators manual prior to operating the trimmer.
3. Never allow untrained personnel to operate the trimmer.
4. Make sure the muffler is in good condition. In dry weather, use a fire-safe muffler.
5. Ensure that shields and other guards are in place and working properly. DO NOT remove or disable guards or other safety devices.
6. Use proper fuel mixture with the manufacturer's recommended two-stroke oil mixed to the manufacturer's recommendations.
7. Check the cutting blades prior to each use for cracks, missing teeth, and overall condition. Replace bent, warped, damaged or dull blade.
8. Do not overfill the fuel tank and allow fuel to leak onto muffler or hot engine.
9. DO NOT fuel if the engine is hot. Allow the engine to cool down for 10 minutes before refueling.
10. Maintain a safety zone of at least 50 feet (100 foot radius) to avoid injury from thrown objects.
11. Stop operations immediately if approached.
12. The trimmer should be started on the ground or where the unit is firmly supported in an open area.
13. The trimmer should be controlled with two hands during operations. Exceptions to this include the minimal time needed to adjust the throttle or reach for and activate the kill switch.
14. Hold the unit with both hands, plant feet firmly.
15. Keep the trimmer head below waist level.
16. Always stand on the proper side of the trimmer while cutting. On a curved shaft trimmer, the line head rotation is clockwise (cut on the left side.) On a straight shaft trimmer, the line head rotation is counterclockwise (cut on the right side).
17. Bring the engine to operating speed before starting vegetation cutting.
18. Do not operate engine faster than needed to effectively cut the vegetation.
19. Allow the engine to return to idle speed when not cutting.
20. Always turn off the engine and disconnect the spark plug, if accessible, before attempting to unclog or adjust the trimmer.
21. To avoid placing hands near the blade, use a stick to remove any vegetation clogging the unit.
22. Stop the engine before putting the cutter down.
23. Secure the cutter to prevent fuel spillage and damage during transport.
24. Ear plugs and/or ear muffs are required for brush cutter/trimmer operation and other high noise activities as deemed necessary by the SSHO.

6.4 MECHANIZED SHREDDER OPERATION

The mechanized shredder utilized by PIKA is a large excavator with a fuel powered vegetation and tree shredder attached to the boom. This attachment is very heavy and

requires extreme care when being operated, especially in an area with munitions and explosives of concern (MEC). Excavator and shredder operations will be conducted IAW the manufacturer's instructions and safety precautions. Additionally the excavator and shredder will be operated according to the following:

1. Shredder equipment operators are required to be trained in the operation, inspection and maintenance of shredder.
2. The shredder will be inspected prior to use each day.
3. Operator must stay in seat while machine is running.
4. Operator must know how to shut down in an emergency.
5. Operator must always have eye contact with the attachment.
6. Operator must be aware of personnel entering the work area.
7. A 500 foot exclusion area is mandatory when operating in a MEC contaminated area and a 200 foot exclusion zone area is mandatory when operating in a non-MEC area.
8. When a person enters the work area, shut down machine and inform them of the danger. Do not start the machine non-protected personnel have cleared the exclusion area.
9. Operator and UXO sweep personnel must have radio communications when operating in an MEC contaminated area. Loss of communications will cause immediate work stoppage.
10. Operator will not enter any area until UXO personnel have swept the area and declared it safe for vegetation clearance.
11. Operator will not allow riders on or in machine.
12. Operator must keep the Shredder and boom a safe distance from obstructions, buildings, and power lines.
13. Never allow the Shredder to come within 6 inches of the ground at any time.
14. Only lift cutter drum as high as needed. Operation of cutter wheel more than 1 foot above ground is extremely dangerous.
15. Operator must use extreme care when on uneven or rough terrain. When on hillsides or steep inclines. Only track up and down slopes. On steep inclines do not operate over side of tracks.
16. Stay away from cliffs, overhangs, and uneven ground.
17. If machine starts to slide on sloped terrain, lower boom to ground to slow or stop slide.
18. DO NOT operate shredder more than 45 deg. Out of flat. Engine damage **will** occur.
19. Keep machine under control and use common sense in operations.
20. Position throttle to idle and idle for 5 minutes prior to shutdown.
21. Turn shredder ignition to OFF position, and lower carrier to ground and disengage excavator controls when shutting down operations.

22. Ear plugs or ear muffs required for Shedder operation and other high noise activities deemed necessary by the SSHO.

6.5 TREE FELLING PROCEDURES

6.5.1 General requirements

The general requirements listed below shall be followed during tree-felling operations.

1. Trees shall not be felled in a manner that may create a hazard for an employee, such as but not limited to, striking a rope, cable, power line, or machine.
2. The immediate supervisor shall be consulted when unfamiliar or unusually hazardous conditions necessitate the supervisor's approval before cutting is commenced.
3. No employee shall approach a feller closer than two tree lengths of trees being felled until the feller has acknowledged that it is safe to do so, unless the employer demonstrates that a team of employees is necessary to manually fell a particular tree.
4. No employee shall approach a mechanical felling operation closer than two tree lengths of the trees being felled until the machine operator has acknowledged that it is safe to do so.
5. Each danger tree shall be felled, removed or avoided. Each danger tree, including lodged trees and snags, shall be felled or removed using mechanical or other techniques that minimize employee exposure before work is commenced in the area of the danger tree. If the danger tree is not felled or removed, it shall be marked and no work shall be conducted within two tree lengths of the danger tree unless the employer demonstrates that a shorter distance will not create a hazard for an employee.
6. Each danger tree shall be carefully checked for signs of loose bark, broken branches and limbs or other damage before they are felled or removed.
7. Accessible loose bark and other damage that may create a hazard for an employee shall be removed or held in place before felling or removing the tree.
8. Felling on any slope where rolling or sliding of trees or logs is reasonably foreseeable shall be done uphill from, or on the same level as, previously felled trees.
9. Domino felling of trees is prohibited, unless this method is used to fell a single danger tree by felling another single tree into it.

6.5.2 Manual Felling

Before each tree is felled, conditions such as, but not limited to, snow and ice accumulation, the wind, the lean of tree, dead limbs, and the location of other trees, shall be evaluated by the feller and precautions taken so to not create a hazard for the feller or other site personnel. During manual tree felling, the procedures listed below will be followed.

1. The chain-saw operator shall be certain of footing before starting to cut. The chain saw shall not be used in a position or at a distance that could cause the operator to become off-balance, to have insecure footing, or to relinquish a firm grip on the saw.
2. Prior to felling any tree, the chain-saw operator shall clear away brush or other potential obstacles that might interfere with cutting the tree or using the retreat path.
3. Before felling is started, the feller shall plan and clear a retreat path. The retreat path shall extend diagonally away from the expected felling line at an angle of approximately 45°. Once the backcut has been made the feller shall immediately shut down the saw, place the saw on the ground and move a safe distance away from the tree on the retreat path.
4. Start the facecut with a 45° notch on the side that the tree will fall towards. Cut the bottom of the notch first, about one third of the way through the diameter. The second cut is made at a 45° angle that will meet the depth of the first cut. The backcut (felling cut) should be made from the opposite side, about 2 inches higher than the floor of the notch. Do not cut all the way through but leave a hinge that will keep the tree from kicking back and upward as it falls. The hinge will be about 1/8 to 1/6 of the diameter where you are cutting but it may vary depending on when the tree starts to fall.
5. If a tree happens to be so well balanced that it does not fall after a felling cut has been made, two wedges can be used to start the fall and influence its direction. Always use two wedges and a sledge that has a face 1/3 larger than the face of the wedge.
6. Always remove the chain saw when wedges are being driven into the cut. Strike the wedge carefully since a careless blow may cause the wedge to pop out of the cut and allow the tree to fall backward, on you.
7. Never use an axe as the wedge or driver; the head of the axe may shatter and you could be injured by flying pieces of the axe. If cutting must be continued, insert the chain saw into the cut very carefully since the conditions are extremely dangerous.
8. When a spring pole or other tree under stress is cut, no employee other than the feller shall be closer than two trees lengths when the stress is released.

6.5.3 Limbing and Trunk Sizing

Limbing and trunk sizing (bucking) can create significant hazards for the chain saw operator and others in the area due to the movement of the tree that may result when the limbs are removed or the trunk is cut into manageable pieces. To minimize the hazards, the procedures outlined below will be followed during limbing and bucking operations.

1. Limbing and bucking on any slope where rolling or sliding of trees or logs is reasonably foreseeable shall be done on the uphill side of each tree or log.
2. Before bucking or limbing wind-thrown trees, precautions shall be taken to prevent the root wad, butt or logs from striking an employee. These precautions include, but are not limited to, chocking or moving the tree to a stable position.
3. An examination will be conducted to ensure the fallen tree is stable and will not move as the limbs are removed. The situation will be examined at every limb to be removed to ensure that the limb will not bind against the saw.
4. The chain saw operator will cut on the opposite side of the tree trunk whenever possible, thereby keeping the trunk between the operator and the saw.
5. The chain saw operator shall never stand on the downhill side when removing limbs, and personnel in the area will keep in mind that the tree trunk may roll as limbs are removed.
6. Personnel should always watch for limbs that may spring out when they are cut due to the released tension, as these limbs can cause injury.
7. Larger limbs may require more than one cut to be removed safely. The cuts should be planned so that the blade will not be bound. Stored energy in the limb or trunk can cause a cut to pinch the blade and immobilize the saw. Wedges can be used as previously mentioned, and the operator should plan an escape route when removing large limbs since they may roll when they become free of the tree trunk.
8. When cutting large limbs and the trunk of the tree into convenient lengths, ensure the trunk is supported along its entire length and will not roll.
9. To cut a large limb or trunk, cut downward from the top of the trunk (overbuck) about one-third of the diameter and then roll it over to make final cuts (underbuck).
10. Wedges can be used to keep the cut open if the log or limb cannot be rolled over. Again, wedges must be driven with care so as not to come in contact with the chain saw.

6.5.4 Kickback Hazards

Kickback of a chainsaw is when the teeth on the chain catch on something as they rotate around the tip of the blade. The teeth may have enough force to cause the blade to kick back violently toward the operator, hence the term "kickback." There are several situations that are prone to cause kickbacks:

1. When the nose of the blade strikes another object.
2. Starting a bore cut improperly.
3. When the blade nose or tip catches the bottom or side of a saw cut during reinsertion.

The best defense against kickback is to keep the tip guard on the chain saw. However this limits what can be done with the saw. Keeping a firm hold on the saw and using a saw that has a chain-brake or kickback guard can maintain some kickback control.

Chain saw operators should always be watchful for blade-pinching situations and plan accordingly. The base of the blade should be used to cut branches rather than the tip of the blade, and a high chain speed should be used when reinserting the blade in a cut or removing it from a cut. Since dull teeth are more likely to cause kickback, ensure that the saw teeth are sharp. Never cut above shoulder height, otherwise the saw will be difficult to control and there will be a high potential for kickback towards the head and face.

6.6 WOOD CHIPPING

During wood chipping operations, it is necessary to provide a safe work system and to comply with the appropriate safeguarding of machinery standards. Along with any manufacturer specific safety precautions or procedures, the procedures listed below will be followed:

1. Chipper access covers or doors shall not be opened until the drum or disc is at a complete stop.
2. Feed chute and discharge chute shall be guarded to prevent contact with the disc, knives, or blower blades.
3. The chipper shall be shut down and locked out in accordance with the requirements of PIKA ESHP-36, Lockout/Tagout Safety, when an employee performs any servicing or maintenance.
4. Trailered chippers shall be chocked during usage on any slope where rolling or sliding of the chipper is reasonably foreseeable.
5. Operators shall be trained and supervised prior to and when using the machine.
6. Pruning material left on the ground in close proximity to the operator's position will be removed to prevent a trip hazard.
7. The operator shall not wear loose items of clothing that may get caught or snag on pruning material as it is fed into the chipper.
8. The operator shall feed the chipper from a side position away from the front of the in-feed chute and once the in-feed rollers catch the wood, the operator will then move away from the feed line of the chipper.
9. The butt end of branches shall be fed into the chipper in-feed rollers first.
10. At no time will personnel climb onto, or stand on the in-feed chute of the chipper, nor will anyone sit or ride on the in-feed chute of the chipper.
11. Adequate warning signs shall be posted as a constant reminder to operators of the potential hazards associated with the machine.
12. Ensure that the in-feed rollers are completely stopped prior to correcting an action or cleaning up small pieces of wood or leaves on the machine.

13. Guarding and emergency control mechanisms will be maintained in place and operational at all times when the machine is running.

6.7 OVERHEAD ELECTRIC LINES

Tree felling operations near overhead electric lines shall be done in accordance with the requirements of 29 CFR 1910.333(c)(3). The SS shall notify the power company immediately if a felled tree makes contact with any power line. Each employee shall remain clear of the area until the power company advises that there are no electrical hazards.

6.8 FLAMMABLE AND COMBUSTIBLE LIQUIDS

Flammable and combustible liquids shall be stored, handled, transported, and used in accordance with the requirements of PIKA ESHP-23, Fire Protection.

6.9 VEGETATION REMOVAL EQUIPMENT INSPECTION AND MAINTENANCE

6.9.1 General Requirements

All equipment used in vegetation and tree removal will be inspected prior to use each day. Equipment inspections will also be conducted periodically throughout the day during refueling. Any equipment found to be defective and in need of repair by an authorized service center will be reported to the SS and SSHO, tagged as out of service, properly repaired and re-inspected prior use. If any equipment is found to be in need of routine maintenance or other approved adjustment that can be made by the operator, the service shall be conducted prior to resuming operations.

6.9.2 Chain Saw Inspection and Maintenance

As a minimum, chain saw inspection will include the following:

1. Controls, to assure proper function;
2. Chain saw chains, to assure proper adjustment;
3. Chain saw mufflers, to assure that they are operational and in place;
4. Chain brakes and nose shielding devices, to assure that they are in place and function properly;
5. Cutting edges, to assure that they are sharp and properly shaped; and
6. All other safety devices, to assure that they are in place and function properly.
7. If chainsaw is in need of repair the chainsaw will be tagged as out of service, properly repaired and re-inspected prior use.

6.9.3 Chipper Inspection and Maintenance

The wood chipper shall be inspected and maintained in accordance with the manufacturer's instructions, but not less that one inspection prior to use each day. At no time will the chipper be operated if the required controls and guards are not in

place. If chipper is in need of repair the chipper will be tagged as out of service, properly repaired and re-inspected prior use.

6.9.4 Gas Powered Brush Cutter/Trimmer Inspection and Maintenance

Inspect the brush cutter periodically for potential hazards such as loose belts, and missing or damaged guards. Examine for accumulations of grass, leaves or excessive grease to reduce fire hazard. Conduct routine maintenance and inspections in accordance with the manufacturers operation manual. If brush cutter/trimmer is in need of repair the cutter/trimmer will be tagged as out of service, properly repaired and re-inspected prior use.

6.9.5 Shredder Inspection and Maintenance

To conduct inspection and maintenance on the shredder, the general steps outlined below shall be conducted. However, manufacturer requirements will be used if different then the procedures listed below.

1. Follow normal shutdown procedures.
2. Check machine systems (fuel, air, water, oil hydraulic)
3. Make sure machine is free of debris and flammable fluids.
4. Make sure bolts, covers, and safety equipment is secure.
5. Check cutter drum for damaged teeth, blocks, or holders.
6. Grease machine every two hours (see operators manual.)
7. The shredder air filter box has an air filter restriction indicator. It is located inside the engine compartment on the side of the filter housing. When the filter indicator is red, the filter should be changed.
8. If the shredder is in need of repair the shredder will be tagged as out of service, properly repaired and re-inspected prior use.

6.9.6 Training

Chain saw, brush cutter and Shredder operations training shall be provided to each employee, including supervisors. This training shall be provided according to the following:

1. Prior to initial assignment for each new employee;
2. Whenever the employee is assigned new work tasks, tools, equipment, machines or vehicles; and
3. Whenever an employee demonstrates unsafe job performance.
4. The training shall be designed and presented to address the following elements:
5. Safe performance of assigned work tasks;
6. Safe use, operation and maintenance of tools, machines and vehicles the employee uses or operates, including emphasis on understanding and following

the manufacturer's operating and maintenance instructions, warnings and precautions;

7. Recognition of safety and health hazards associated with the employee's specific work tasks, including the use of measures and work practices to prevent or control those hazards;
8. Recognition, prevention and control of other safety and health hazards in the vegetation removal and logging industry;
9. Procedures, practices and requirements of the employer's work site; and
10. The requirements of the OSHA logging standard.

Each new employee and each employee who is required to be trained shall work under the close supervision of a designated person until the employee demonstrates to the employer the ability to safely perform their new duties independently.

6.9.7 First-aid Training Requirements

At least two full-time site employees shall be trained and certified in first aid and cardiopulmonary resuscitation (CPR). Whenever possible, the SSHO will be one of the two site personnel. The training shall be equivalent to that provided by the American Red Cross. Once trained, these employees will be tasked with the responsibility of initial first aid response to injured employees whenever other medical support personnel are not immediately available on site. PIKA shall assure that employee's first-aid and CPR training and/or certificate of training remain current, and the most recent training certification shall be maintained.

6.9.8 First-aid Supplies and Kits

In accordance with Appendix B of 29 CFR 1910.266, the list outlined below sets forth the minimally acceptable number and type of first-aid supplies for first-aid kits required for logging operations. The size and number of first aid kits shall be sufficient to accommodate the maximum number of people (including and visitors) on site at any given time. Standard 16-unit first aid kits will be located with each team and two trauma kits will be maintained on site. Additionally, first aid kits will be provided with adequate water, gel burn bandages, and other supplies necessary to cleanse burns, wounds, or lesions. The first aid supplies listed below have been assessed and approved by PIKA's consulting licensed physician. First aid kits will be inspected at least weekly and maintained in operational order.

- A minimum of a 16-Unit first aid kit with each team (i.e., each team performing distinct tasks)
- Bloodborne pathogen protection kit
- Portable eye wash bottles for use during transportation to the 15-minute eye wash station
- Burn kit with bandages

- Trauma bandages
- A fire blanket
- Fire extinguisher

6.10 PERSONAL PROTECTIVE EQUIPMENT

PIKA shall assure that personal protective equipment (PPE) used on site, including any PPE provided by an employee, is maintained in a serviceable condition. The employer shall assure that PPE, including any PPE provided by an employee, is inspected before initial use during each work shift. Defects or damage shall be repaired or the unserviceable PPE shall be replaced before work is commenced.

PIKA shall provide, at no cost to the employee, and assure that each employee who operates a chain saw or gas powered brush cutter wears the following personal protective equipment (PPE):

1. Leg protection constructed with cut-resistant material, such as ballistic nylon, that covers the full length of the thigh to the top of the boot on each leg.
2. Foot protection, such as heavy-duty logging boots that are waterproof or water repellent, and that cover and provide support to the ankle.
3. Head protection, such as a hardhat that shall be worn in areas where there is a potential for head injury from falling or flying objects.
4. Eye protection where there is a potential for eye injury due to falling or flying objects; and
5. Face protection where there is potential for facial injury such as, but not limited to, operating a chipper. Employees performing chain-saw operations may wear logger-type mesh screens.
6. Plastic snake shin guards may be work when using a brush cutting blade on the gas powered brush cutter.

7.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The Daily Task and Safety Briefing Log (ESHF-502);.
- The Daily Inspection and Weekly Audit Report Form (ESHF-506); and
- The Daily Operational and Safety Logs maintained by the SS and SSHO.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the safe operation and maintenance of forklifts. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA personnel, including subcontractor personnel, and operations involving the use and maintenance of forklifts. This ESHP is not intended to contain all requirements needed to for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA General Industry Standard 29 CFR 1910.178, Powered Industrial Trucks.
- OSHA Construction Industry Standard 29 CFR 1926 Subpart O; Motor Vehicles, Mechanized Equipment, and Marine Operations.
- USACE EM 385-1-1, Section 16, Machinery And Mechanized Equipment.

4.0 DEFINITIONS

As utilized in this ESHP, the following definitions shall be used and applied.

1. **Load backrest extensions.** Where necessary to protect the operator, forklift trucks shall be fitted with a vertical load backrest extension to prevent the load from hitting the mast when the mast is positioned at maximum backward tilt. For this purpose, a "load backrest extension" means a device extending vertically from the fork carriage frame to prevent raised loads from falling backward.
2. **Forks.** Forks, fork extensions and other attachments shall be secured so that they cannot be accidentally dislodged, and shall be used only in accordance with the manufacturer's recommendations.
3. **Counterweights.** Weights used to counter the effects of lifting a load. Counterweights shall be so affixed that they cannot be accidentally dislodged.
4. **Approved Forklift.** An approved forklift means one listed or approved for the intended use by a nationally recognized testing laboratory. Approved trucks acquired and used

after February 15, 1972, shall bear a label or other identification indicating testing laboratory approval.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the equipment that personnel will require to safely perform fork lift operations. The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

5.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to hazard identification and the protective measures applicable to this ESHP.
4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve the use of fork lifts or personnel exposure fork lift hazards. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel involved with fork lift operation are fully trained and qualified as outlined in this ESHP.

5.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to assess their initial and continued compliance with this ESHP and other regulatory guidelines.

6.0 PROCEDURES

6.1 GENERAL

Whenever an operator identifies an unsafe operating condition, the operator will immediately halt forklift operation and notify the SSHO of the unsafe condition. Use of the forklift within the unsafe area will be discontinued until the safety issues have been resolved.

Prior to the forklift operation each day, the operator will conduct a pre-operation inspection of the forklift. This inspection will be conducted formally prior to operation each day and informally throughout the day. If a discrepancy is noted, an Equipment Inspection Checklist and Report Form (ESHF-508) will be completed by the inspector and the discrepancy communicated to the SSHO and SS. At no time will a forklift with a discrepancy be operated until the discrepancy is fixed. On a weekly basis, this inspection will be documented using the attached inspection form.

The operator will remain alert to personnel and equipment located in the work area, and personnel working in the operational area of the forklift will be informed to remain clear of the operating area.

Personnel will exercise caution when mounting and dismounting the fork lift. Never touch the control levers when getting on and off the machine -- use the handrails, and maintain three points of contact before climbing.

6.2 SAFETY PRECAUTIONS

PIKA personnel will follow the safety precautions outlined below for safe operation of the forklift.

- Unauthorized personnel shall not ride on forklifts unless a safe place to ride is provided in the cab when riding is authorized. Forklifts shall be equipped with rollover protection of such design and construction as to prevent the possibility of the operator being crushed because of a rollover or upset.
- When traveling uphill or downhill, the attachment will be lowered close to the ground.
- When traveling downhill or in tight quarters, reduce the engine speed and work slowly.
- On loose and soft ground, instead of digging up close to the machine, back off the machine a little, in order to provide extra room for the machine.
- Never jump on or off the machine when traveling or during operation.
- When a forklift is left unattended, load-engaging means shall be fully lowered, controls neutralized and brakes set. Unless the truck is in view and within 25 feet (7.62 m) of the operator, power shall be shut off. If the fork lift is on a sloped surface, wheels shall be blocked or curbed.
- Forklifts shall not be operated inside highway vehicles or railcars having damage which could affect operational safety.
- Only stable, safely arranged loads within the rated capacity of the truck shall be handled.

- Forklift drivers shall ascend and descend grades slowly.
- Forklift operators shall slow down and sound the horn at crossaisles and other locations where visibility is obstructed.
- If the load obstructs the forward view of the driver, the direction of travel shall be with the load trailing.
- Steering knobs shall not be used unless the truck is equipped with power steering.
- When forklifts use cargo-lifting devices that have a means of engagement hidden from the operator, a means shall be provided to enable the operator to determine that the cargo has been engaged.
- When cargo is being towed on pipe trucks or similar equipment, a safe means shall be provided to protect the driver from sliding loads.
- When the atmosphere in an area is hazardous only forklifts approved for such locations shall be used.
- When operators are exposed to overhead falling hazards, forklift trucks shall be equipped with securely attached overhead guards. Guards shall be constructed to protect the operator from falling boxes, cartons, packages, or similar objects.
- Overhead guards shall not obstruct the operator's view, and openings in the top of the guard shall not exceed six inches in one of the two directions, width or length. Larger openings are permitted if no opening allows the smallest unit of cargo being handled to fall through the guard.
- Overhead guards shall be built so that failure of the vehicle's mast tilting mechanism will not displace the guard.
- An overhead guard, otherwise required by this procedure, may be removed only when it would prevent a truck from entering a work space and if the operator is not exposed to low overhead obstructions in the work space.
- Overhead guards shall be large enough to extend over the operator during forklift operations, including forward tilt.

7.0 CAPACITIES AND WEIGHTS

Forklifts shall be marked with their rated capacities, which shall be visible to the operator, and rated capacities, with and without removable counterweights, shall not be exceeded. Rated capacities shall be marked on the vehicle and shall be visible to the operator. The vehicle weight, with and without counterweight, shall be similarly marked.

8.0 MAINTENANCE PRACTICES

Forklifts shall be maintained in safe working order. Safety devices shall not be removed or made inoperative except as otherwise provided in this section for the purpose of maintaining the equipment. Maintenance of fork lifts will be conducted as specified by the manufacturer and will include as a minimum the precautions listed below.

- Only designated persons shall perform maintenance and repair. At no time will repairs be performed by persons who do not possess appropriate training and experience in the

repair of mechanical lifting devices. Lockout or tagout the equipment that requires servicing.

- Batteries on powered trucks shall be disconnected during repairs to the primary electrical system unless power is necessary for testing and repair. On trucks equipped with systems capable of storing residual energy, that energy shall be safely discharged before work on the primary electrical system begins. Additionally, the SSHO will assess the maintenance operation to determine if Lockout/Tagout procedures are to be applied.
- Replacement parts whose function might affect operational safety shall be equivalent in strength and performance capability to the original parts that they replace.
- Those repairs to the fuel and ignition systems of industrial trucks which involve fire hazards shall be conducted only in locations designated as safe for such repairs.
- Gas generated from battery electrolyte is flammable so do not smoke or expose open flames when servicing the batteries. Also, make sure to keep this electrolyte off clothing and skin, and out of eyes. Never use a match to check battery levels.
- Use extreme caution when removing the radiator cap. If the engine is still hot, boiling water may spray out. If possible, wait until the engine has cooled.
- Stop the engine when filling the fuel tank and be sure there are no open flames or heated surfaces that could ignite the fuel.

9.0 TRAINING

9.1 GENERAL REQUIREMENTS

PIKA is required to verify that each powered industrial truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of training and an evaluation. Prior to permitting an employee to operate a powered industrial truck (except for training purposes), each operator will have successfully completed the training required by this ESHP. Trainees may operate a powered industrial truck only:

1. Under the direct supervision of persons who have the knowledge, training, and experience to train operators and evaluate their competence; and
2. Where such operation does not endanger the trainee or other employees.

Training shall consist of a combination of formal instruction (e.g., lecture, discussion, interactive computer learning, video tape, written material), practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace. Persons who have the knowledge, training, and experience to train powered industrial truck operators and evaluate their competence shall conduct operator training and evaluation.

9.2 TRAINING PROGRAM CONTENT

Powered industrial truck operators shall receive initial training in the following topics.

1. Truck-related topics:

- Operating instructions, warnings, and precautions for the types of truck the operator will be authorized to operate;
- Differences between the truck and the automobile;
- Truck controls and instrumentation: where they are located, what they do, and how they work;
- Engine or motor operation;
- Steering and maneuvering;
- Visibility (including restrictions due to loading);
- Fork and attachment adaptation, operation, and use limitations;
- Vehicle capacity;
- Vehicle stability;
- Any vehicle inspection and maintenance that the operator will be required to perform;
- Refueling and/or charging and recharging of batteries;
- Operating limitations;
- Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of vehicle that the employee is being trained to operate.

2. Workplace-related topics:
   - Surface conditions where the vehicle will be operated;
   - Composition of loads to be carried and load stability;
   - Load manipulation, stacking, and unstacking;
   - Pedestrian traffic in areas where the vehicle will be operated;
   - Narrow aisles and other restricted places where the vehicle will be operated;
   - Hazardous (classified) locations where the vehicle will be operated;
   - Ramps and other sloped surfaces that could affect the vehicle's stability;
   - Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust;
   - Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation.

9.3 REFRESHER TRAINING AND EVALUATION

Refresher training, including an evaluation of the effectiveness of that training, shall be conducted to determine if the operator has the knowledge and skills needed to operate the powered industrial truck safely. Refresher training in relevant topics shall be provided to the operator when:

1. The operator has been observed to operate the vehicle in an unsafe manner;
2. The operator has been involved in an accident or near-miss incident;
3. The operator has received an evaluation that reveals that the operator is not operating the truck safely;
4. The operator is assigned to drive a different type of truck;

5. A condition in the workplace changes in a manner that could affect safe operation of the truck;
6. An evaluation of each powered industrial truck operator's performance shall be conducted at least once every three years.

9.4 CERTIFICATION

PIKA shall certify that each operator has been trained and evaluated as required by this ESHP. The certification shall include the name of the operator, the date of the training, the date of the evaluation, and the identity of the person(s) performing the training or evaluation.

10.0 ATTACHMENTS

No attachments associated with this ESHP.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving heavy equipment, to include backhoes, excavators, front-end loaders, and other heavy equipment with the exception of cranes. The operation of cranes is outlined in the PIKA ESHP-301, Crane Safety. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA personnel, including contractor and subcontractor personnel, and operations involving the use of heavy equipment. This ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with this ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA Construction Standard 29 CFR Part 1926, Subpart O (as applicable).
- OSHA Industry Standard 29 CFR Part 1910, Subpart N (as applicable).
- USACE EM 385-1-1, Safety Manual, Section 16.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the equipment that personnel will require to perform safe heavy equipment operations. The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

4.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to hazard identification and the protective measures applicable to this ESHP.
4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve personnel operating heavy equipment or personnel exposed to heavy equipment hazards. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel involved with the inspection, operation and maintenance of heavy equipment are fully trained and qualified as outlined in this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to assess their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 PROCEDURES

5.1 GENERAL REQUIREMENTS

All personnel, including contractor and subcontractor personnel, involved in heavy equipment operations shall be familiar with the potential safety and health hazards associated with the conduct of this operation, and with the work practices and control techniques to be used to reduce or eliminate these hazards. In the event that munitions and explosives of concern are present in the work site, the procedures for anomaly avoidance and soil excavation will be presented in the project plans.

The operator prior to use on each shift shall inspect heavy equipment and an Equipment Inspection Checklist and Report Form (ESHF-508) shall be completed to determine that operating components are not defective.

- Vehicles will not have cracked windshields or windows.
- Blades, buckets, dump bodies, and other hydraulic systems must be fully lowered when equipment is not in use.
- Parking brakes will be engaged when equipment is not in use.

5.2 PROTECTION DEVICES

Seat belts and Rollover Protective Structures (ROPS) will be provided and used on heavy equipment and motor vehicles including:

- Crawler and rubber tire tractors;
- Self-propelled pneumatic tire earth movers;
- Motor graders;
- Water tank trucks with tank height less than the cab; and
- Self-propelled construction equipment such as front-end loaders, backhoes, rollers, and compactors.

ROPS will not be required on:

- Trucks designed for hauling on public highways;
- Crane-mounted dragline backhoes;
- Cranes, draglines, or equipment on which the operator's cab and boom rotate as a unit and sections of rollers and compactors (tandem steel-wheeled and self-propelled pneumatic tire type that do not have an operator's station);

Falling Object Protective Systems (FOPS) will be provided on bulldozers, tractors, excavators or similar equipment used in clearing operations or when the operator is exposed to falling object hazards. FOPS include guards, canopies, or grills to protect the operator from falling or flying objects as appropriate to the nature of the clearing operations.

5.3 REQUIRED SAFETY EQUIPMENT

Mechanical and Material handling equipment with an obstructed rear view must have (when being operated in reverse) an audible alarm sufficient to be heard under normal working conditions and will operate automatically upon commencement of backward motion. Self-propelled equipment must be equipped with a backup alarm unless the equipment allows the operator to face the direction of motion.

- Material handling equipment that lack ROPS must be operated on grades that the equipment can safely accommodate.
- A safety barrier will be used to protect workers whenever tires are inflated, removed, or installed on split rims.

- All self-propelled heavy equipment must carry a dry chemical or carbon-dioxide fire extinguisher with a minimum rating of 5-B:C.
- Gas cylinders must be properly secured to heavy mobile equipment.
- Hard hats, safety glasses, safety shoes, and other protective gear are to be worn at around heavy equipment.

5.4 SAFE PRACTICES

When operating cranes and other types of hoisting equipment and verbal communication is difficult, standard hand signals shall be used. Designate one person per equipment operator to give hand signals.

1. The operation of heavy equipment shall be limited to authorized personnel specifically trained in its operation;
2. A competent person shall visually inspect heavy equipment daily prior to operation, and report any abnormalities/deficiencies to the SSHO;
3. The operator shall use the safety devices provided with the equipment, including seat belts, and backup warning indicators and horns shall be maintained in operable order;
4. While in operation, personnel not directly required in the area shall keep a safe distance from the equipment;
5. The operator's cab shall be kept free of non-essential items and loose items shall be secured;
6. Personnel shall avoid moving into the path of operating equipment and areas blinded from the operator's vision shall be avoided;
7. Heavy equipment requiring shall not be permitted to run unattended;
8. Except for equipment designed to be serviced while in operation, equipment shall be shut down and positive means taken to prevent its operation while repair or servicing is being conducted;
9. All equipment shall be secured at the end of the day, or when not in operation, with the blades/buckets of earth moving equipment placed on the ground;
10. Equipment operated on the highway shall be equipped with turn signals visible from the front and rear;
11. Stationary machinery and equipment shall be placed on a firm foundation and secured before being operated;
12. All points requiring lubrication during operation shall have fittings so located or guarded to be accessible without hazardous exposure;
13. Heavy equipment operating within an off-highway job site not open to public traffic, shall have a service brake system and a parking brake system capable of stopping and holding the equipment fully loaded on the grade of operation;
14. All equipment with windshields shall be equipped with powered wipers, and equipment that operates under conditions that cause fogging or frosting of windshields shall be equipped with operable defogging or defrosting devices;

15. Whenever the equipment is parked, the parking brake shall be set, and equipment parked on inclines shall have the wheels chocked or track mechanism blocked and the parking brake set;
16. Personnel shall not work or pass under the buckets or booms of loaders in operation;
17. When heavy equipment must negotiate in tight quarters, or if operators of earth moving equipment cannot see the bucket, a secondary person shall be stationed to guide the operator;
18. Additional riders shall not be allowed on equipment unless it is specifically designed for that purpose (i.e., there is an additional seat with a seat belt);
19. Only trained or licensed people are to operate heavy equipment;
20. Use chains, hoists, straps, and any other equipment to aid in safely moving heavy materials;
21. Never walk directly in back of, or to the side of, heavy equipment without the operator's knowledge;
22. Be sure that no underground or overhead power lines, sewer lines, gas lines, telephone lines, or other utilities present a hazard in the work area. This includes marking of underground utilities and flagging support wires for utility poles. Guy lines will be marked with yellow caution tape at eye level and several other points to aid in visual identification;
23. Be knowledgeable of marked "swing zones" for rotating equipment, e.g., backhoes, track hoes and excavators.

5.5 MAINTENANCE PRACTICES

The following procedures will be followed for maintenance of heavy equipment.

1. Tagout equipment that is or needs to be serviced.
2. Never work under a machine that is supported only by the boom and bucket. Use heavy-duty wooden blocks under the crawlers when working under the machine.
3. When working on the boom, arm, or bucket, lower the bucket to the ground.
4. If necessary to inspect, service, or repair the machine with its boom and arm up, apply safety blocks and struts.
5. Use extreme caution when removing the radiator cap. If the engine is still hot, boiling water may spray out. If possible, wait until the engine has cooled.
6. Gas generated from battery electrolyte is flammable so do not smoke or expose open flames when servicing the batteries. Also, make sure to keep this electrolyte off clothing and skin, and out of eyes. Never use a match to check battery levels.
7. Stop the engine when filling the fuel tank and be sure there are no open flames or heated surfaces that could ignite the fuel.

5.6 PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

The following safety measures and personal protective equipment shall be used in preventing or reducing exposures associated with heavy equipment operations. These requirements will be implemented unless superseded by site-specific requirements stated in the SSHP or APP.

1. Heavy equipment operators will have received training which addresses the safe operation of the equipment to be used; and
2. Heavy equipment operators shall wear the level of personal protective equipment as specified in the SSHP or APP.

6.0 AUDIT CRITERIA

The following items related to heavy equipment operations will be audited to determine site compliance with this ESHP:

- The Daily Task and Safety Briefing Log (ESHF-502);
- The Documentation of Hazard Communication Training Form (ESHF-505);
- The Safety Training Attendance Log (ESHF-503); and
- The Daily Inspection and Weekly Audit Report Form (ESHF-506).

7.0 ATTACHMENTS

No attachments associated with this ESHP.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving excavation or trenching. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA site personnel, to include contractor and subcontractor personnel, and operations involving soil excavation or trenching. This ESHP is not intended to contain a comprehensive listing of the requirements needed to achiever complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REGULATORY REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- Applicable sections of OSHA Construction Industry Standard 29 CFR Part 1926, Subpart P; and
- USACE EM 385-1-1, Section 25.

4.0 DEFINITIONS

As used in this ESHP, the following terms apply:

1. **Accepted Engineering Practices** - those requirements that are compatible with standards of practice required by a registered professional engineer.
2. **Aluminum Hydraulic Shoring** - a pre-engineered shoring system comprised of aluminum hydraulic cylinders (crossbraces) used in conjunction with vertical rails (uprights) or horizontal rails (walers). Such a system is designed specifically to support the sidewalls of an excavation and prevent cave-ins.
3. **Bell-Bottom Pier Hole** - a type of shaft or footing excavation, the bottom of which is made larger than the cross section above to form a bell shape.
4. **Benching (Benching System)** - means a method of protecting employees from cave-ins by excavating the sides of an excavation to form one horizontal

level, or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

5. **Cave-In** – means the separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and it's sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.
6. **Competent Person** - one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
7. **Cross Braces** - the horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or wales.
8. **Excavation** - any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.
9. **Faces or Sides** - the vertical, or inclined, earth surfaces formed as a result of excavation work.
10. **Failure** - the breakage, displacement, or permanent deformation of a structural member, or connection, so as to reduce its structural integrity and its supportive capabilities.
11. **Hazardous Atmosphere** - an atmosphere, which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.
12. **Kick-out** - the accidental release or failure of a cross brace.
13. **Protective System** - a method of protecting employees from cave-ins, from material that could fall or roll from an excavation face, or into an excavation, or from the collapse of adjacent structures. Protective Systems include Support Systems, Sloping and Benching Systems, Shield Systems, and other systems that provide the necessary protection.
14. **Ramp** - means an inclined walking or working surface that is used to gain access to one point from another, and is constructed from earth or from structural materials such as steel or wood.
15. **Registered Professional Engineer** - a person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer", within the meaning of this standard, when approving designs for manufactured protective systems or "tabulated data" to be used in interstate commerce.
16. **Sheeting** - the members of a shoring system that retain the earth in position and, in turn, are supported by other members of the shoring system.

17. **Shield (Shield System)** - a structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either pre-manufactured or job-built. Shields used in trenches are usually referred to as "trench boxes" or "trench shields".
18. **Shoring (Shoring System)** - a structure such as a metal, hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.
19. **Sloping (Sloping System)** - a method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation, so as to prevent cave-ins.
20. **Stable rock** - natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side, or sides, of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.
21. **Structural Ramp** - a ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rock are not considered structural ramps.
22. **Support System** - a structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground insulation, or the sides of an excavation.
23. **Tabulated Data** - tables and charts approved by a registered professional engineer and used to design, and construct a protective system.
24. **Trench (Trench excavation)** - a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m). If forms or other structures are installed, or constructed, in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.
25. **TSF (tsf)** - means tons per square foot.
26. **Uprights** - the vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not contact each other Uprights placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called "sheeting."

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the equipment that personnel will require to perform safe trenching and excavation operations. The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

5.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to visitor excavation and trenching operations.
4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve personnel exposure to excavation and trenching hazards. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel involved with trenching and excavations are fully trained and qualified as outlined in this ESHP.

5.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to assess their initial and continued compliance with this ESHP and other regulatory guidelines.

5.5 TRENCHING AND EXCAVATION COMPETENT PERSON

A trenching and excavation competent person is one who by virtue of experience or training is capable of identifying existing and predictable hazards in the surroundings or working conditions and is authorized to take corrective actions. This person may be the SSHO, a registered professional engineer or other site personnel with the appropriate knowledge and experience needed to accurately assess trenching/excavation hazards. The competent person will be responsible for inspecting the trenching/excavation when employee exposure to potential hazards can be reasonably expected. The inspection shall be conducted daily prior to personnel entry into the trench/excavation site and after every rainstorm or other hazard-increasing occurrence. The competent person shall complete the Excavation and Trenching Inspection Checklist (ESHF-516) each time the excavation is inspected and a copy of the inspection will be posted at the excavation site. When possible, the SS will act as the trenching and excavation Competent Person as defined above. However, this role may be filled by the SSHO provided the SSHO is properly trained.

6.0 PROCEDURE

Personnel, including contractor and subcontractor personnel, involved in excavation or trenching operations shall be familiar with the potential safety and health hazards associated with the conduct of this operation, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

6.1 SAFETY HAZARDS AND OPERATIONAL CONTROL TECHNIQUES

Employees will be protected from cave-ins by an adequate protective system. The only two exceptions to this requirement are: an excavation made entirely in stable rock, and/or the excavation is less then 5 feet in depth and the competent person has determined that there is no indication of a potential cave-in. A preliminary decision of a protection system can be determined by referring to Figure 519-1. The competent person must thoroughly classify the soil in order to implement effective control measures to protect employees involved in excavation operations. Refer to OSHA Appendix A at the end of this procedure for soil classification guidelines (Attachment 519-1). Soil must be classified using at least one visual and one manual test, and soil classifications must be documented. Types of protection systems can be found at the end of this procedure for the following sloping and benching guidelines (Attachment 519-2):

- Sloping and benching systems
- Timber shoring, hydraulic aluminum shoring
- Trench boxes
- Shielding systems or
- The combination of sloping and shoring systems.

The safety and health hazards and operational control techniques to be used during conduct of excavation or trenching operations are discussed below:

1. Prior to initiation of any excavation or trenching activity, the location of underground utilities and installations shall be determined;
2. When the excavation/trench achieves a depth of five feet, a competent person shall inspect the excavation or trench prior to entry by personnel to determine if there are any indications that a cave-in could occur;
3. An excavation or trench greater than five feet in depth shall be inspected daily by a competent person prior to commencement of work activities;
4. Evidence of cave-ins, slides, sloughing, or surface cracks will be cause for work to cease until necessary precautions are taken to safeguard workers;
5. Excavations five feet or deeper, will be sloped at an angle of one and one half horizontal to one vertical (34 degrees measured from the horizon);
6. Excavations five feet or deeper which can not be sloped as specified in item 5 above shall require a registered engineer to design the sloping, benching, or support system;
7. Protective systems shall be selected from OSHA 29 CFR 1926 Subpart P and/or designed by a registered professional civil engineer;
8. Spoils and other materials shall be placed a least two feet from the edge of the excavation;
9. Materials used for sheeting, shoring, or bracing shall be in good condition;
10. Timbers shall be sound, free of knots, and of appropriate dimensions for the trench;
11. Safe access shall be provided into the excavation(s) by means of a gradually sloped personnel access/egress ramp, or ladders or stairs will be provided;
12. Ladders used shall extend 3 ft. above grade level and be secured from movement;
13. Excavations 4 ft. or more in depth shall have a means of egress at a frequency such that lateral travel to the egress point does not exceed 25 ft.;
14. Walkways or bridges with standard guardrail shall be provided where employees are required or permitted to cross over excavations;
15. If the depth of an excavation or trench is greater than 4 feet, it shall be inspected by the SSHO to determine if it meets the criteria for a confined space;
16. If an excavation or trench is determined to be a Confined Space the requirements set forth in the Confined Space Program found in the PIKA CESHP shall apply, as well as the requirements of 29 CFR 1910.146 and EM 385-1-1;

17. Accumulated water inside an excavation shall be removed prior to personnel entry;
18. Excavations or trenches shall be properly barricaded or flagged off to prevent personnel from accidentally falling into the excavation or trench; and
19. In accordance with the requirements of 29 CFR 1926.651(g), if an excavation or trench is greater than 4 feet in depth, and the potential exists for having a hazardous atmosphere inside the excavation or trench, then the atmosphere shall, as a minimum, be tested for oxygen deficiency and toxicity prior to entry by site personnel.

6.2 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

Personnel shall wear the appropriate level of protection as specified in the SSHP. The PPE outlined in the SSHP will have been selected in accordance with the chemical and physical hazards anticipated for the given task. Additionally, no site personnel shall enter a trench or excavation site until a competent person has inspected it and safety and health related precautions and controls have been implemented.

7.0 TRAINING REQUIREMENTS

Prior to being assigned to work in a trench or excavation employees will receive training on the hazards associated with working in a trench or excavation.

8.0 AUDIT CRITERIA

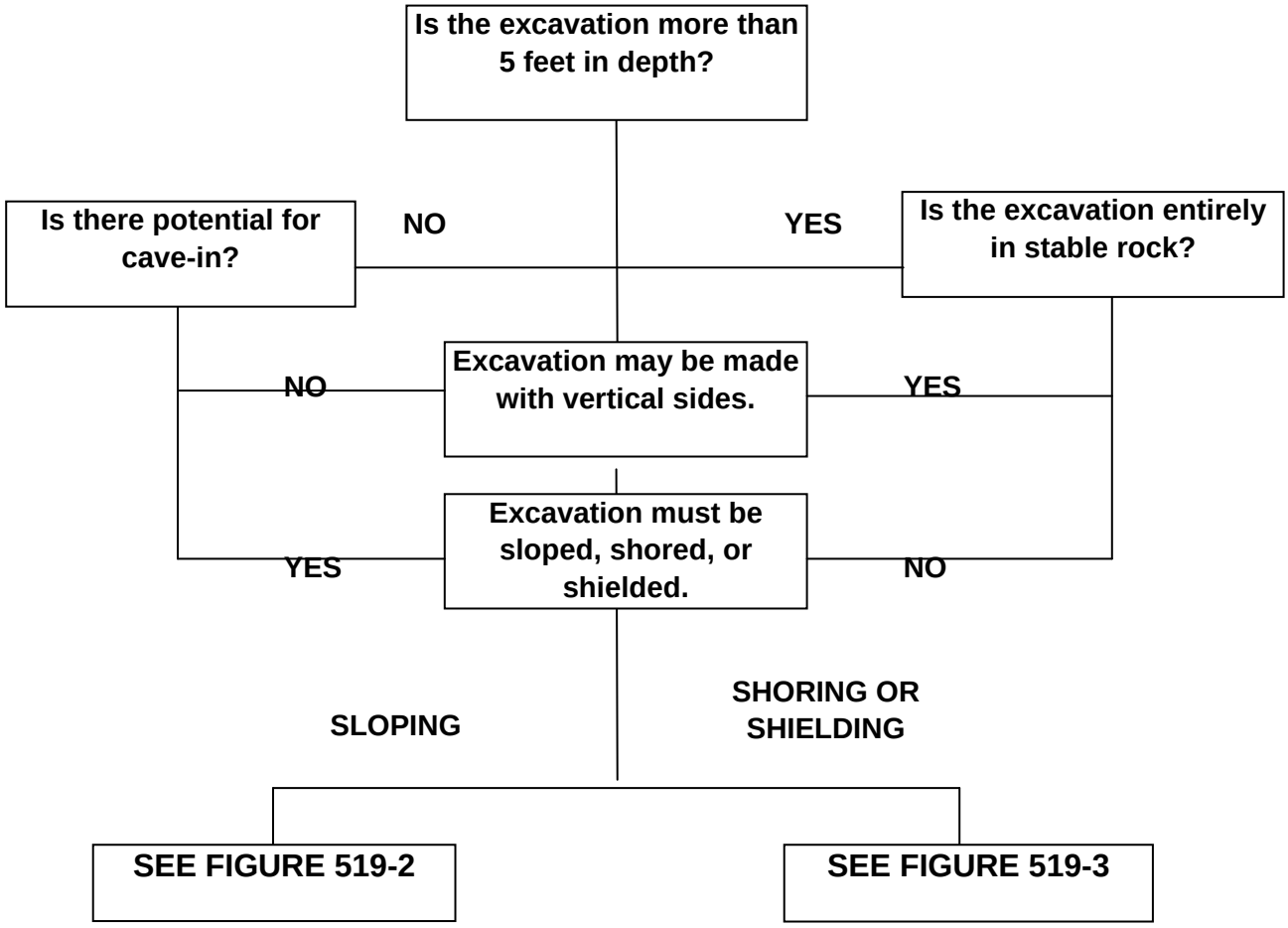
The following items related to excavation or trenching operations will be audited to assess compliance with this ESHP:

- The Daily Task and Safety Briefing Log (ESHF-502);
- The Excavation and Trenching Inspection Checklist (ESHF-516);
- The Documentation of Hazard Communication Training Form (ESHF-505); and
- The Safety Training Attendance Log (ESHF-503).

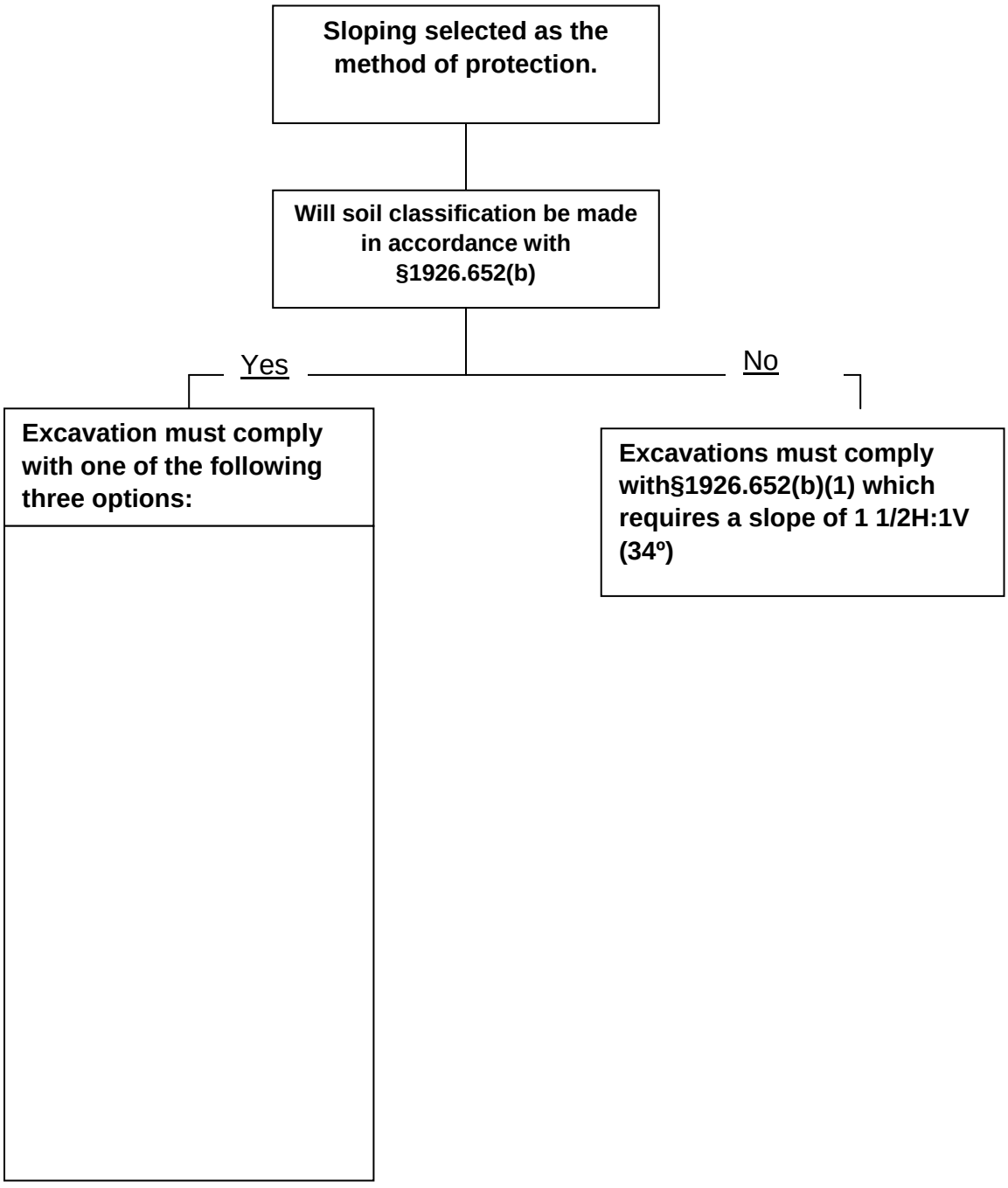
9.0 ATTACHMENTS

- Preliminary Decisions (for excavations 20 feet or less in depth) - Figure 519-1.
- Sloping Options (for excavations 20 feet or less in depth) - Figure 519-2.
- Shoring and Shielding Options (for excavations 20 feet or less in depth) - Figure 519-3.
- Soil Classification 1926 Subpart P Appendix A - Attachment 519-1.
- Protective Systems - Attachment 519-2.

PRELIMINARY DECISIONS (FIGURE 519-1)



SLOPING OPTIONS (FIGURE 519-2)



SHORING AND SHIELDING OPTIONS (FIGURE 519-3)

Shoring or shielding selected as the method of protection

Soil classification is required when shoring or shielding is used. The excavation must comply with one of the four options:

Option 1:
§1926.652(b)(1) which requires Appendices A and C to be followed (e.g. timber shoring)

Option 2:
§1926.652(c)(2) which requires manufacturers data to be followed (e.g. hydraulic shoring, trench jacks, air shores, shields)

Option 3:
§1926.652(c)(3) which requires tabulated data (see definition) to be followed (e.g. any system as per the tabulated data)

Option 4:
§1926.652(c)(4) which requires the excavation to be designed by a registered professional engineer (e.g. any designed system)

ATTACHMENT 519-1
SOIL CLASSIFICATION (1926 SUBPART P APPENDIX A)

(a) Scope and application –

(1) Scope. This appendix describes a method of classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. The appendix contains definitions, sets forth requirements, and describes acceptable visual and manual tests for use in classifying soils.

(2) Application. This appendix applies when a sloping or benching system is designed in accordance with the requirements set forth in 1926.652(b) (2) as a method of protection for employees from cave-ins. This appendix also applies when timber shoring for excavations is designed as a method of protection from cave-ins in accordance with appendix C to subpart P of part 1926, and when aluminum hydraulic shoring is designed in accordance with appendix D. This Appendix also applies if other protective systems are designed and selected for use from data prepared in accordance with the requirements set forth in 1926.652(c), and the use of the data is predicated on the use of the soil classification system set forth in this appendix.

(b) Definitions. The definitions and examples given below are based on, in whole or in part, the following; American Society for Testing Materials (ASTM) Standards D653-85 and D2488; The Unified Soils Classification System; The U.S. Department of Agriculture (USDA) Textural Classification Scheme; and The National Bureau of Standards Report BSS-121.

"Cemented soil" means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.

"Cohesive soil" means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sideslopes, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

"Dry soil" means soil that does not exhibit visible signs of moisture content.

"Fissured" means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

"Granular soil" means gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

"Layered system" means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

"Moist soil" means a condition, in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.
"Plastic" means a property of a soil, which allows the soil to be deformed or molded without cracking, or appreciable volume change.

"Saturated soil" means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or sheer vane.

"Soil classification system" means, for the purpose of this subpart, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B, and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the characteristics of the deposits and the environmental conditions of exposure.

"Stable rock" means natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.

"Submerged soil" means soil which is underwater or is free seeping.

"Type A" means cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:

(i) The soil is fissured; or

(ii) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or

(iii) The soil has been previously disturbed; or

(iv) The soil is part of a sloped, layered system where the layers dip into the

excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or
(v) The material is subject to other factors that would require it to be classified as a less stable material.

"Type B" means:
(i) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or
(ii) Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.
(iii) Previously disturbed soils except those which would otherwise be classed as Type C soil.
(iv) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or
(v) Dry rock that is not stable; or
(vi) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

"Type C" means:
(i) Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less; or
(ii) Granular soils including gravel, sand, and loamy sand; or
(iii) Submerged soil or soil from which water is freely seeping; or
(iv) Submerged rock that is not stable, or
(v) Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.
"Unconfined compressive strength" means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.

"Wet soil" means soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

(c) Requirements –
(1) Classification of soil and rock deposits. Each soil and rock deposit shall be classified by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with the definitions set forth in paragraph (b) of this appendix.

(2) Basis of classification. The classification of the deposits shall be made based on the results of at least one visual and at least one manual analysis. Such analyses

shall be conducted by a competent person using tests described in paragraph (d) below, or in other recognized methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Department of Agriculture textural classification system.

(3) Visual and manual analyses. The visual and manual analyses, such as those noted as being acceptable in paragraph (d) of this appendix, shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify properly the properties, factors, and conditions affecting the classification of the deposits.

(4) Layered systems. In a layered system, the system shall be classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.

(5) Reclassification. If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a competent person. The deposit shall be reclassified as necessary to reflect the changed circumstances.

(d) Acceptable visual and manual tests. –

(1) Visual tests. Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.

(i) Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine-grained material is cohesive material. Soil composed primarily of coarse-grained sand or gravel is granular material.

(ii) Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.

(iii) Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tension cracks could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.

(iv) Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.

(v) Observed the opened side of the excavation to identify layered systems. Examine layered systems to identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.
(vi) Observe the area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water seeping from the sides of the excavation, or the location of the level of the water table.
(vii) Observe the area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the stability of the excavation face.

(2) Manual tests. Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.
(i) Plasticity. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8-inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two-inch (50 mm) length of 1/8-inch thread can be held on one end without tearing, the soil is cohesive.
(ii) Dry strength. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty,
and there is no visual indication the soil is fissured, the soil may be considered unfissured.
(iii) Thumb penetration. The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. (This test is based on the thumb penetration test described in American Society for Testing and Materials (ASTM) Standard designation D2488 - "Standard Recommended Practice for Description of Soils (Visual – Manual Procedure).") Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great effort. Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molded by light finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences. If the excavation is later exposed to wetting influences (rain, flooding), the classification of the soil must be changed accordingly.

(iv) Other strength tests. Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand-operated shearvane.

(v) Drying test. The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick (2.54 cm) and six inches (15.24 cm) in diameter until it is thoroughly dry:

(A) If the sample develops cracks as it dries, significant fissures are indicated.

(B) Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as an unfissured cohesive material and the unconfined compressive strength should be determined.

(C) If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If they pulverize easily into very small fragments, the material is granular.

ATTACHMENT 519-2
SLOPING AND BENCHING (1926 SUBPART P, APPENDIX B)

Configurations of sloping and benching systems shall be in accordance with Figure B-1.

TABLE B-1: MAXIMUM ALLOWABLE SLOPES

SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPES (H:V)[1] FOR EXCAVATIONS LESS THAN 20 FEET DEEP[3]
STABLE ROCK	VERTICAL (90 Degrees)
TYPE A [2]	3/4:1 (53 Deg.)
TYPE B	1:1 (45 Deg.)
TYPE C	1 1/2:1 (34 Deg.)

Footnote (1) Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off. Slopes stated below are in the horizontal to vertical ratio
Footnote (2) A short-term maximum allowable slope of 1/2H:1V (63 degrees) is allowed in excavations in Type A soil that are 12 feed (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth shall be 3/4H:1V (53 degrees).
Footnote (3) Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.

1.0 Excavations made in Type A soil.

1.1.1 Simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 3/4:1 as outlined in Figure .

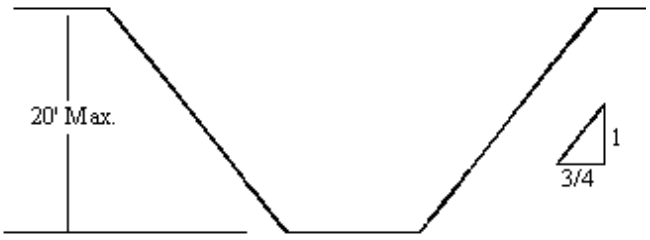


FIGURE B-1.1.1: SIMPLE SLOPE - GENERAL

1.1.1 Simple slope excavations in Type A soils that are open 24 hours or less (short term) and which are 12 feet or less in depth shall have a maximum allowable slope of 1/2:1.

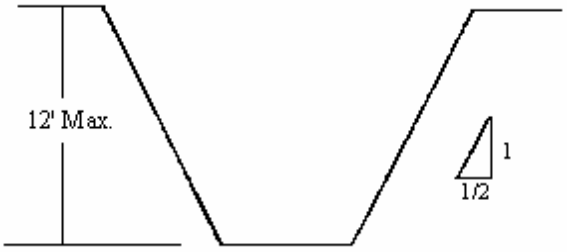


FIGURE B-1.1.2: SIMPLE SLOPE - SHORT TERM

1.2. Benched excavations 20 feet or less in depth shall have a maximum allowable slope of 3/4 to 1 and maximum bench dimensions as follows:

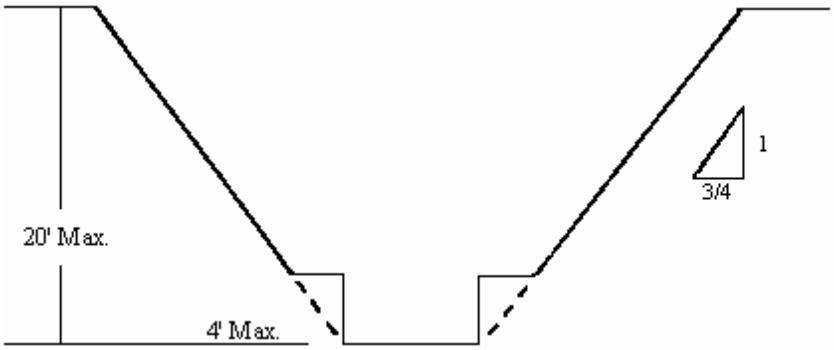


Figure B-1.2.1: SIMPLE BENCH

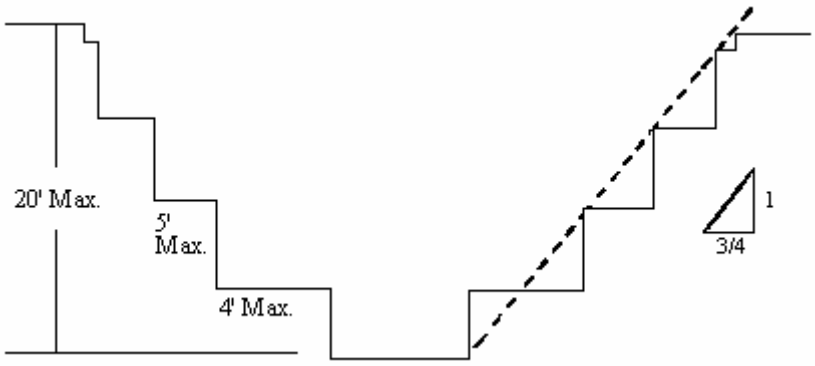


Figure B-1.2.2: MULTIPLE BENCHES

1.3.1 Excavations 8 feet or less in depth which have unsupported vertically sided lower portions shall have a maximum vertical side of 3 1/2 feet. Excavations more than 8 feet but not more than 12 feet in depth with unsupported vertically sided lower portions shall have a maximum allowable slope of 1:1 and a maximum vertical side of 3 1/2 feet

.

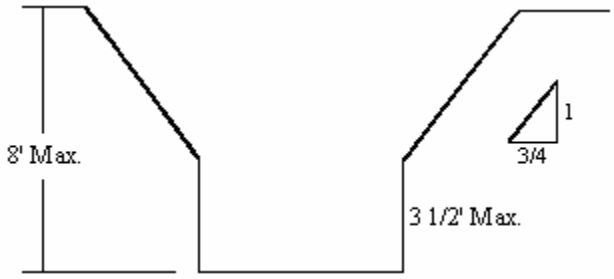


Figure B-1.3.1: UNSUPPORTED VERTICALLY SIDED LOWER PORTION MAXIMUM 8 FEET IN DEPTH

1.3.2 Excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maximum allowable slope of 3/4:1. The support or shield system must extend at least 18 inches above the top of the vertical side.

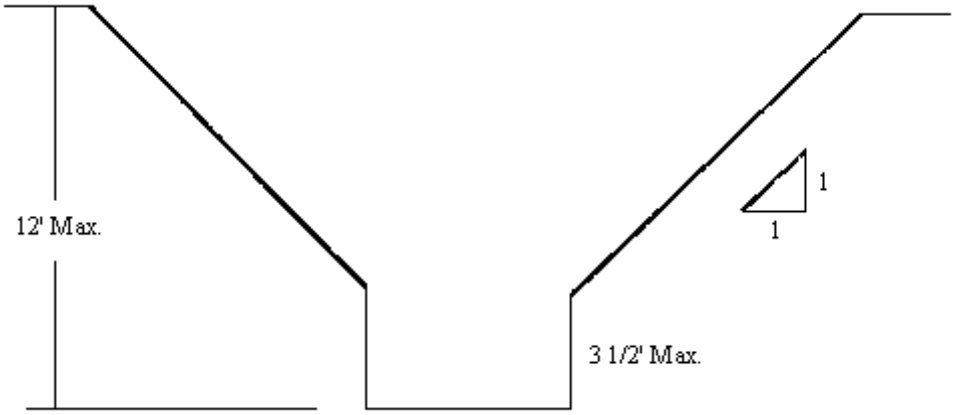


Figure B-1.3.2: UNSUPPORTED VERTICALLY SIDED LOWER PORTION MAXIMUM 12 FEET IN DEPTH

1.4 Other simple slope, compound slope, and vertically sided lower portion excavations shall be in accordance with the other options permitted under 1926.652(b).

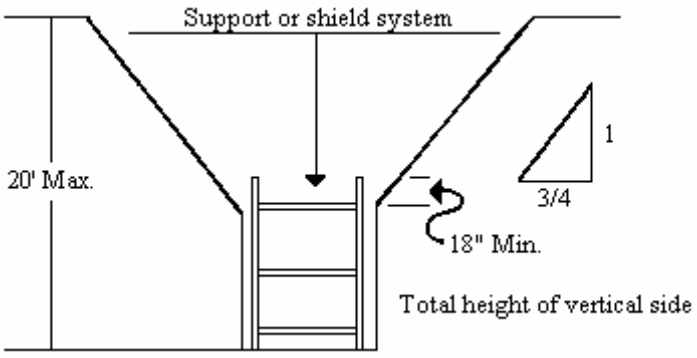


Figure B-1.4: SUPPORTED OR SHIELDED VERTICALLY SIDED LOWER PORTION

2.0 EXCAVATIONS MADE IN TYPE B SOIL

2.1 Simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.

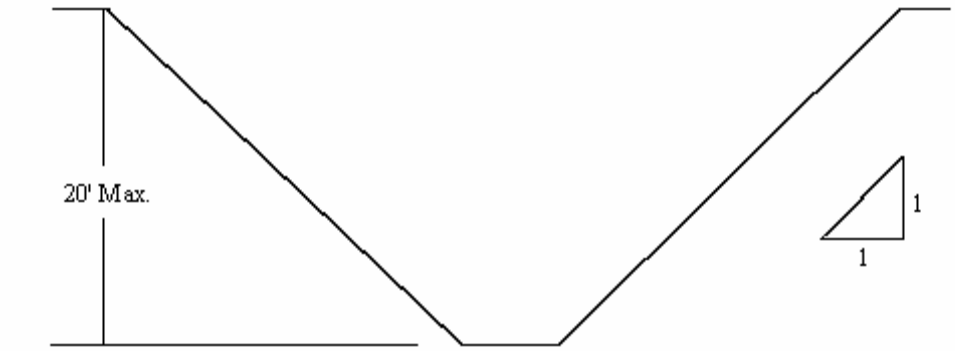


FIGURE B-2.1: SIMPLE SLOPE

2.2 Benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions as follows:

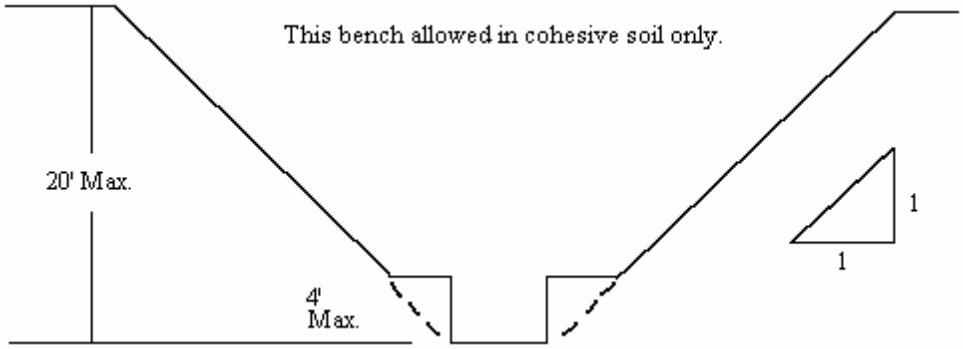


FIGURE B-2.2: SINGLE BENCH
(These benches allowed in cohesive soil only).

2.3 Excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1.

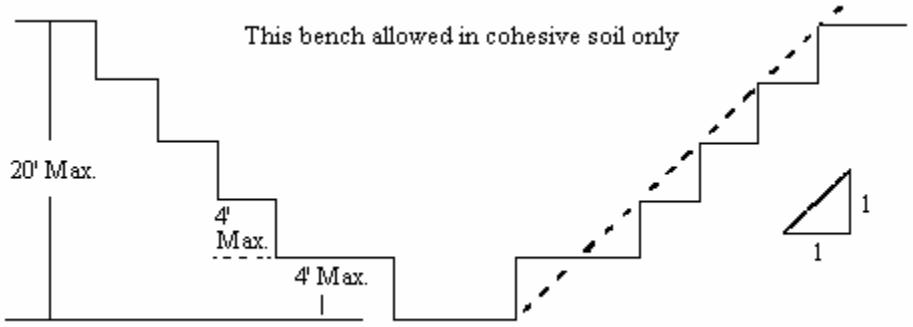


FIGURE B-2.3: MULTIPLE BENCHES
(These benches allowed in cohesive soil only)

2.4 All other sloped excavations shall be in accordance with the other options permitted in 1926.652(b).

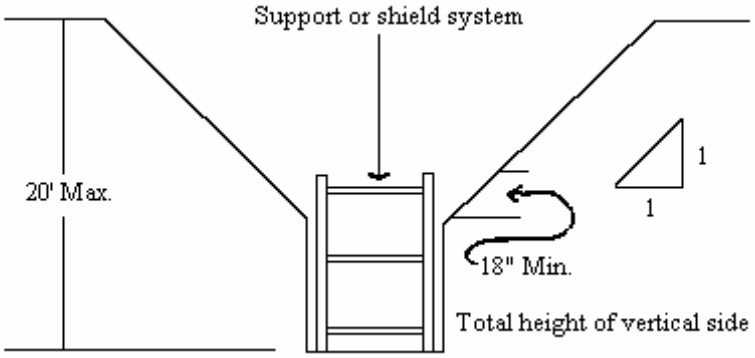


FIGURE B-2.4: VERTICALLY SIDED LOWER PORTION

3.0 EXCAVATIONS MADE IN TYPE C SOIL

3.1 Simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1 1/2:1.

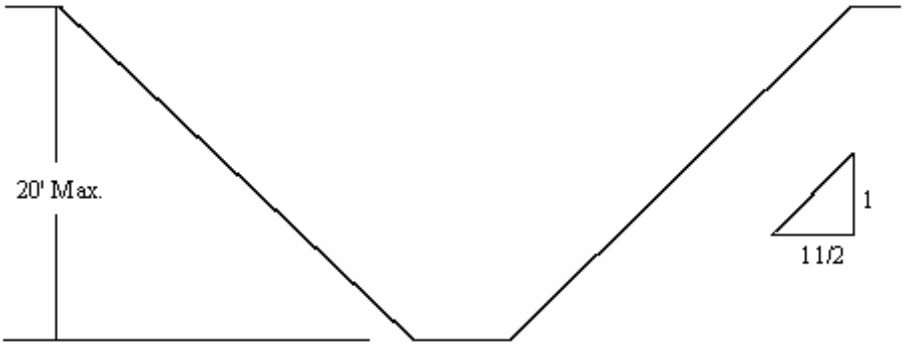


FIGURE B-3.1: SIMPLE SLOPE

3.2 **E**xcavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1 1/2:1.

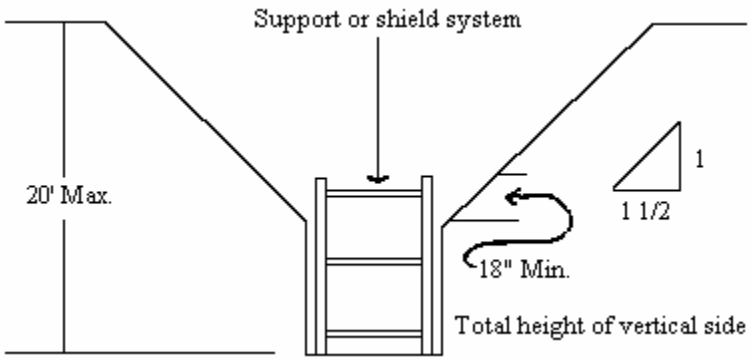


FIGURE B-3.2: VERTICAL SIDED LOWER PORTION

3.3 All other sloped excavations shall be in accordance with the other options permitted in 1926.652(b).

4.0 EXCAVATIONS MADE IN LAYERED SOILS

4.1 Excavations 20 feet or less in depth made in layered soils shall have a maximum allowable slope for each layer as set forth below.

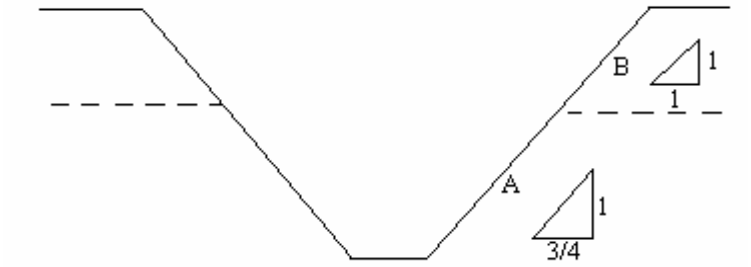


FIGURE B-4.1.1: TYPE B SOIL OVER TYPE A SOIL

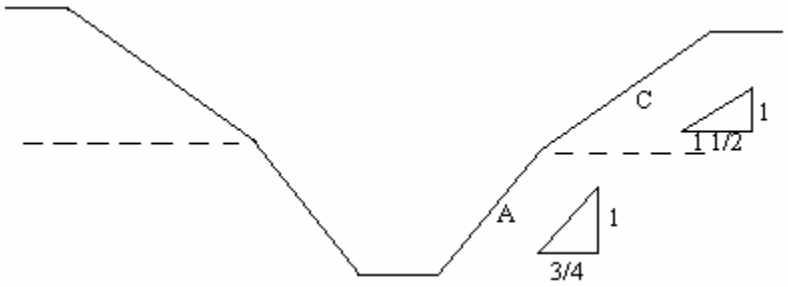


FIGURE B-4.1.2: TYPE C SOIL OVER TYPE A SOIL

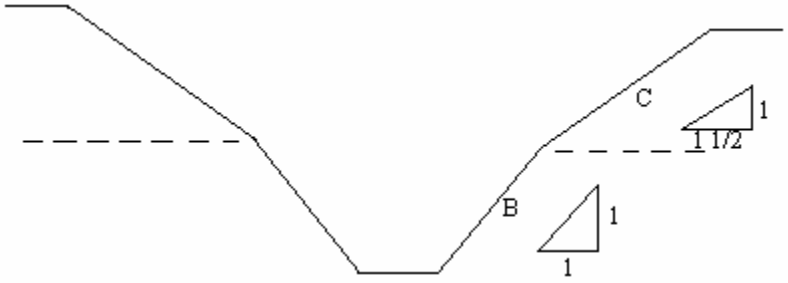


FIGURE B-4.1.3: TYPE C SOIL OVER TYPE B

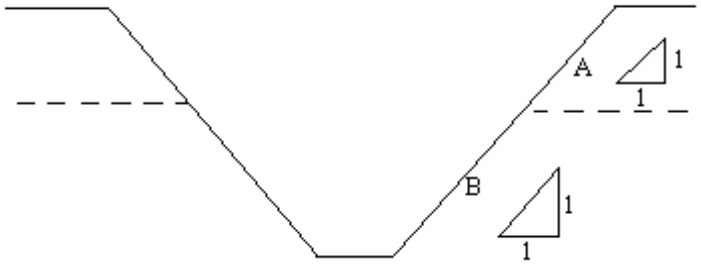


FIGURE B-4.1.4: TYPE A SOIL OVER TYPE B SOIL

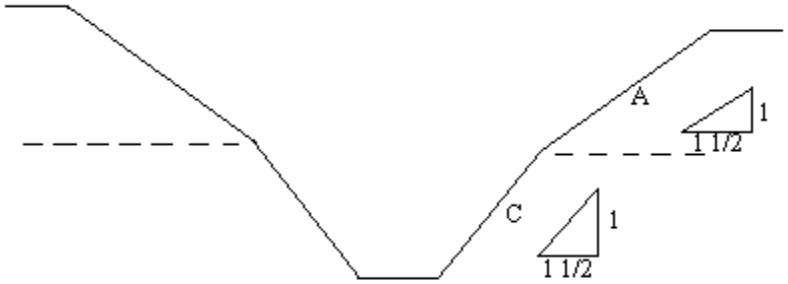
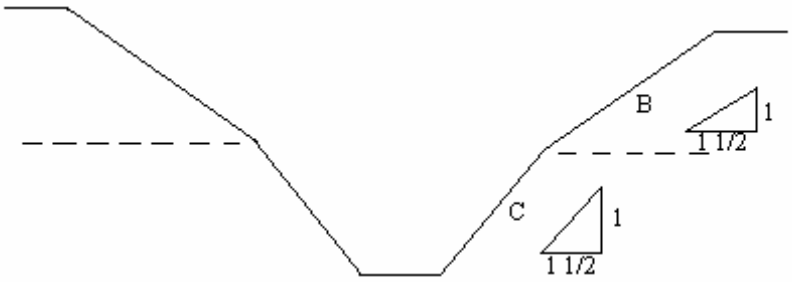


FIGURE B-4.1.5: TYPE A SOIL OVER TYPE C SOIL



1

FIGURE B-4.1.6: TYPE B SOIL OVER TYPE C SOIL

4.2 All other sloped excavations shall be in accordance with the other options permitted in 1926.652(b).

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of hand and power tools. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA personnel, including subcontractor personnel involved with the use of hand or power tools. This ESHP does not address pneumatic tools that are addressed in PIKA ESHP-307, Pneumatic Tool Safety. Additionally, this ESHP is not intended to contain all requirements needed for complete regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA General Industry Standard 29 CFR 1910, Subpart P, Hand and Portable Powered Tools and Other Hand-Held Equipment.
- OSHA Construction Industry Standard 29 CFR 1926 Subpart I, Tools – Hand and Power.
- USACE EM 385-1-1, Section 13, Hand and Power Tools.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) is responsible for the overall implementation of this ESHP for PIKA projects to which the PM has been assigned and to which this ESHP applies. In this role, the PM will be responsible for the acquisition and management of the PIKA personnel, equipment and training resources needed to implement this ESHP.

4.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA Corporate CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to task hazards and their protective measures.
4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will implement this ESHP for operations that involve personnel exposure to the hazards associated with electrical equipment and for which electric safety requirements are necessary for safeguarding employees. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and properly document relevant information related to implementation of this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will be responsible for ensuring that the safety and health hazards and control techniques associated with this ESHP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to determine their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 PROCEDURE

Personnel, including contractor and subcontractor personnel, involved in power and hand tool operations shall be familiar with the potential safety and health hazards associated with the conduct of this operation, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

5.1 POWER TOOLS

Power tools have great capability for inflicting serious injury upon personnel if they are not used and maintained properly. To control the hazards associated with power tool operation, the safe work practices listed below shall be observed when using power tools:

1. Operation of power tools shall be conducted by authorized personnel familiar with the tool, its operation, and safety precautions;

2. Power tools shall be inspected prior to use, and defective equipment shall be removed from service until repaired;
3. Power tools designed to accommodate guards shall have such guards properly in place;
4. Loose fitting clothing or long hair shall not be permitted around moving parts;
5. Hands, feet, etc., shall be kept away from moving parts;
6. Maintenance and/or adjustments to equipment shall not be conducted while it is in operation or connected to a power source;
7. An adequate operating area shall be provided, allowing sufficient clearance for operation;
8. Electrical tools shall be operated IAW the specifications outlined in the PIKA ESHP-523, Electrical Safety; and
9. Good housekeeping practices shall be followed.

5.2 HAND TOOLS

Use of improper or defective tools can contribute significantly to the occurrence of on-site accidents. Therefore, the work practices listed below shall be observed when using hand tools:

1. Hand tools shall be inspected for defects prior to each use;
2. Defective hand tools shall be removed from service and repaired or properly discarded;
3. Tools shall be selected and used in the manner for which they were designed;
4. Be sure of footing and grip before using any tool;
5. Do not use tools that have split handles, mushroom heads, worn jaws, or other defects;
6. Gloves shall be worn to increase gripping ability and/or if cut, laceration or puncture hazards exist during the use of the tool;
7. Safety glasses or a face shield shall be used if use of tools presents an eye/face hazard;
8. Do not use makeshift tools or other improper tools;
9. When working overhead, tools shall be secured to prevent them from falling;
10. Use non-sparking tools in the presence of explosive vapors, gases, or residue;
11. If hand tools become contaminated they must be properly decontaminated, bagged, marked and held for disposition by the client on-site coordinator; and
12. Tools used in the EZ which have porous surfaces, such as wooden or rubber coated handles, shall be discarded as contaminated upon termination of site activities, unless testing can prove the absence of contamination.

5.3 CONTROL SWITCHES AND CRANKS

Hand-held power sanders, grinders with wheels of 2 inch diameter or less, routers, planers, laminate trimmers, nibblers, shears, scroll saws, and jig saws with blade

shanks one-fourth of an inch wide or less may be equipped with only a positive on-off control.

The use of cranks on hand-powered winches or hoists is prohibited, unless they are equipped with positive self-locking dogs. Hand wheels without projecting spokes, pins, or knobs will be used.

6.0 SAFETY AND PPE REQUIREMENTS

The following safety measures and personal protective equipment shall be used in preventing or reducing exposures associated with power and hand tool operations. These requirements will be implemented unless superseded by specific requirements stated in the SSHP.

1. Hard hat and safety boots shall be worn when working with power or hand tools;
2. Safety glasses with side shields shall be worn when operating, servicing or working around hand or power tools;
3. Hearing protection shall be worn if hand/power tool operation has the potential for noise exposures greater than 85 dBA TWA;
4. Leather, or other protective, gloves shall be worn when using hand/power tools; and
5. Protective face shields shall be worn for operations which have the potential for generating flying fragments, objects, chips, particles, etc.

7.0 AUDIT CRITERIA

The following items related to power and hand tool operations will be audited to ascertain site compliance with this ESHP:

- The Daily Task and Safety Briefing Log (ESHF-502);
- The Documentation of Hazard Communication Training Form (ESHF-505);
- The Daily Safety Training Attendance Log (ESHF-503); and
- The Daily Inspection and Weekly Audit Report Form (ESHF-506).

8.0 ATTACHMENTS

No attachments are associated with this ESHP.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures designed to prevent accidental energizing of equipment that can result in the release of stored mechanical, electrical, pneumatic, or chemical energy. Equipment, process systems, and machines requiring service or maintenance shall be de-energized and secured prior to servicing or maintenance via lockout/tagout (LO/TO) practices. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA personnel, including subcontractor personnel, and operations involving exposure stored and hazardous energy. This ESHP is not intended to contain all of the Federal, state or client references needed for complete compliance with all requirements. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA 29 CFR 1910.147, Control of Hazardous Energy.
- OSHA 29 CFR 1926.417, Lockout and Tagging of Circuits.
- USACE EM 385-1-1, Section 12, Control of Hazardous Energy (Lockout/Tagout).

4.0 DEFINITIONS

As used in this procedure, the following terms apply:

1. **Affected Employee** - An employee who is required to operate or use a machine or equipment (i.e., backhoe, drill rig, nibbler, etc.) on which servicing or maintenance is being performed under lockout or tagout, or who is required to work in an area in which servicing or maintenance is being performed.
2. **Authorized Employee** - An employee who locks out or tags out machines or equipment in order to perform maintenance or servicing on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing services or maintenance covered under this procedure.

3. **Lockout (LO)** - The placement of a lockout device, such as a lock with key, on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.
4. **Energy Isolating Device** – Is a mechanical device that physically prevents the transmission or release of energy. For example: A manually operated electrical circuit breaker or a disconnect switch. The term does not include a push button, selector switch, and other control type devices.
5. **Tagout (TO)** - The placement of a tagout device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed in accordance with the established procedure.
6. **Servicing and/or Maintenance** - Work place activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines, process systems, or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or start up of the equipment and the release of hazardous energy or hazardous substances.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the equipment that personnel will require to safely control hazardous sources of energy (i.e., to perform LO/TO). The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

5.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to visitor entry and protective measures.

4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve personnel exposure to known or potential sources of stored hazardous energy. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel who conduct operations involving the control of hazardous energy sources are fully trained and qualified as outlined in this ESHP.

5.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to assess their initial and continued compliance with this ESHP and other regulatory guidelines.

6.0 PROCEDURES

Personnel, including contractor and subcontractor personnel, involved in LO/TO operations shall be familiar with the potential safety and health hazards associated with the conduct of this operation, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

6.1 PREPARATION FOR SHUTDOWN

The following steps will be conducted prior to the shutdown or isolation of machines or equipment for servicing or maintenance:

1. Lockout and tagout procedures shall be implemented by an authorized personnel only;
2. Authorized personnel shall fully understand the type and magnitude of the energy to be controlled, the means necessary for energy isolation/control, and be able to recognize applicable hazardous energy sources;
3. Prior to maintenance or servicing, the authorized personnel will shut down equipment or machinery by the normal stopping procedure (close valve, open switch, etc.);
4. Sources of hazardous energy will be physically located and the equipment or machine will be deactivated from those energy sources so that the equipment or machine is completely isolated (electrical, hydraulic, pneumatic, etc.);

5. Locks/Tags shall be assigned to each authorized employee by the SSHO, and a LO/TO Device Issuance Log will be completed (ESHF-534); and
6. The authorized personnel conducting the LO/TO will notify affected personnel in the area that maintenance and servicing is required, and that the equipment or machine must be shut down and locked/tagged out to perform the maintenance or servicing.

6.2 APPLICATION OF LO/TO DEVICES

The following procedural steps will be followed whenever LO/TO must be conducted to allow for the complete control of hazardous energy,;

1. Once energy sources have been identified, authorized personnel who will be conducting servicing or maintenance shall affix their own assigned lock and/or tag to the energy controlling devices leading to the equipment or machine;
2. The locks and/or tags will be used to hold these energy controlling devices in a safe or off position;
3. Stored or residual energy must be dissipated or restrained, as with hydraulic systems, gas, steam, and water pressure, etc., by such methods as blocking and/or bleeding of the stored/residual energy;
4. When the configuration of the controlling device for equipment or machines cannot be secured with a lock, a tag will be used in place of the lock and additional measures will be taken (remove fuses, blocking lines, disconnecting power supply, etc.) to bring the equipment or machines to a zero-energy state; and
5. When tagout devices are used instead of lockout devices, they must be applied in such a manner as to provide the same level of personnel protection as would be afforded by a lockout device.

6.3 VERIFICATION OF ISOLATION

Authorized personnel responsible for the LO/TO will witness or individually verify that the equipment or machine is completely de-energized by:

1. Determining that no employees are exposed;
2. Attempting to actually energize or activate the equipment or machine using the normal operational control; and
3. Testing the equipment or machine to verify will not operate.

If there is a possibility of re-accumulation of stored energy to a hazardous level, verification of isolation will be continued until servicing or maintenance has been completed, or the potential for accumulation no linger exists. After these steps have been accomplished, the authorized person(s) conducting the verification will return the operating controls to the "off" or "neutral" position. Only after these verification steps

have been accomplished can the equipment or machinery be considered safe for servicing or maintenance.

6.4 RELEASE FROM LO/TO

In order to conduct safe and effective removal of LO/TO devices, the following steps will be conducted to allow release from LO/TO:

1. The authorized person(s) who conducted the LO/TO will inspect the area in and around the equipment or machine to determine that non-essential items (tools, spare parts, etc.) and affected employees have been safely removed or repositioned to a safe location;
2. The authorized person(s) will verify that the operating controls are in the "off" or "neutral" position;
3. The authorized person(s) will notify affected personnel in the area that the equipment or machine is to be re-energized;
4. The authorized person(s) who originally placed the LO/TO devices will remove the lock(s) and/or tag(s) from the energy controlling device(s), and re-energize the equipment or machine;
5. The authorized person will notify affected personnel in the area that the equipment or machine is ready for use; and
6. Lock(s) and/or tag(s) shall be returned to the SSHO when the maintenance/ servicing task is complete.

6.5 ABSENCE OF THE AUTHORIZED PERSON(S) DURING REMOVAL

These procedures are to be followed whenever the authorized person(s) who placed the LO/TO devices is not on site (sick or vacation) at the time of removal. If the authorized employee is on site, the LO/TO device(s) shall be removed only by the person to whom it was assigned.

In the event that the authorized person(s) cannot be located on site, the SSHO will make reasonable attempts to determine that the authorized person(s) is in fact not on site at the time of removal. Once it has been established that the authorized person(s) is not on site, the LO/TO device(s) assigned may then be removed by the SSHO in conjunction with the SSHO. When the authorized employee returns to the facility, he/she will be informed by the SSHO that the LO/TO devices were removed during his/her absence

6.6 GROUP LO/TO

When equipment or machine maintenance or servicing is performed by a group of individuals, group LO/TO will be utilized to provide for the safety of affected individuals.

Primary responsibility for the safe operation of group LO/TO will be vested in the SSHO, who will conduct the following:

1. Ascertain the exposure status of individual personnel with regard to the lockout or tagout of the equipment or machine; and
2. Will coordinate the affected work forces and to maintain continuity of protection.

During operations that involve more than one authorized person, each authorized person will affix their personally assigned LO/TO device to the group lock, group lock box, or comparable mechanism. This will be accomplished when each person begins work and removal of these LO/TO devices shall occur only when work on the equipment or machine has been completed. Once each individual lock/tag has been affixed and the authorized personnel have verified the LO/TO, the normal LO/TO procedures, as outlined in Sections 7.1 thru 7.5, shall be followed.

6.7 SHIFT OR PERSONNEL CHANGE

Specific instruction shall be utilized during shift or personnel changes to maintain the continuity of LO/TO protection, including provision for the orderly transfer of locks or tags between off-going and on-coming employees. This shall be conducted to minimize personal exposure to hazards from the unexpected energizing or start-up of the equipment or machine, or the release of stored energy.

6.8 TRAINING AND COMMUNICATION

6.8.1 Training of Affected Personnel

Each person working in the area where LO/TO procedures must be implemented shall be instructed in the purpose and use of the LO/TO procedure, and about the prohibitions related to attempts to re-start or re-energize equipment or machinery which are locked or tagged out.

6.8.2 Lockout Training for Authorized LO/TO Personnel

Each person who will be authorized to conduct LO/TO procedures shall receive training in the following areas prior to using this procedure:

1. The function and purpose of this ESHP;
2. Recognition of hazardous energy sources;
3. Types and magnitude of the hazardous energy which may be encountered on site;
4. The means necessary for energy isolation and control;
5. Where tags may be used, training will include procedures for affixing tags and a discussion of the limitations of tagout; and
6. Hands-on practice training with locks and tags prior to implementing LO/TO activities.

6.8.3 Tagout Training for Authorized Employees

In the event that only tagout procedures and techniques are used on site, authorized personnel shall be trained in the following limitations of tags:

1. Tags are essentially warning devices affixed to energy isolating devices and do not provide the physical restraint on those devices that is provided by a lock;
2. When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated;
3. Tags must be legible and understandable by authorized and affected personnel whose work operations are, or may be, in the area;
4. Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use; and
5. The importance of the fact that tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered on site.

6.8.4 Employee Retraining

Retraining of authorized and affected personnel shall be conducted at least annually to reestablish employee proficiency and to introduce new or revised control methods and procedures. Retraining will also be conducted whenever the periodic inspections, as outlined in Section 8.0 of this ESHP reveal inadequacies in the authorized person's knowledge or use of this LO/TO ESHP. Also, retraining may be necessary due to changes in job assignments, equipment, machinery, or processes that introduces a new hazard.

7.0 LOCKOUT/TAGOUT MATERIALS AND HARDWARE

The locks, tags, chains, key blocks, or other devices for isolating, securing, blocking, bleeding or isolating energy source shall be provided to the authorized personnel at no charge to these personnel. These devices shall be identified and used solely for the purpose of LO/TO.

7.1 LOCKOUT/TAGOUT DEVICE REQUIREMENTS

LO/TO devices utilized for protection against unexpected energizing or start up of the equipment or machines, or release of stored energy shall meet the following requirements:

1. LO/TO devices shall be of durable construction capable of withstanding the environment for the maximum period of time these devices are exposed.
2. Tagout devices shall be constructed and printed so that exposure to weather conditions or corrosive environments will not cause the tag to deteriorate or become illegible.

3. LO/TO devices shall be standardized within the facility by color, shape, and/or size, and print and format of tagout devices shall be standardized.
4. Lockout devices will prevent removal without the use of excessive force or unusual techniques, such as bolt cutters or metal cutting tools.
5. Tagout devices, including their means of attachment, shall prevent inadvertent or accidental removal.
6. The material used to attach a tagout device shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, environment-tolerant nylon cable tie.
7. Tagout devices shall warn against hazardous conditions if the equipment or machine is energized and shall include a legend such as: **DO NOT START**; **DO NOT OPEN**; **DO NOT CLOSE**; **DO NOT ENERGIZE**; **DO NOT OPERATE**, etc.
8. Lockout and tagout devices shall indicate the identity of the employee applying the device(s).

7.2 OTHER PROTECTIVE MATERIALS

Authorized LO/TO personnel will be supplied other protective materials such as blanks, blocks, chains, supports, to assist in the control of the potentially hazardous energy.

8.0 PERIODIC INSPECTIONS

The SSHO shall conduct periodic inspections of the on site LO/TO procedures at least monthly to determine that this ESHP and its requirements are being followed.

9.0 PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

Site personnel shall wear and utilize the type and level of PPE outlined in the SSHP or specified by the SSHO when conducting LO/TO operations.

10.0 AUDIT CRITERIA

The following LO/TO related items will be audited to determine compliance with this ESHP:

- The Daily Task and Safety Briefing Log (ESHF-502);
- Past archived project-specific canceled tagout tags;
- The Lockout/Tagout Issuance Log (ESHF-534);
- The Documentation of Hazard Communication Training Form (ESHF-505);
- The Safety Training Attendance Log (ESHF-503); and
- The Daily Inspection and Weekly Audit Report Form (ESHF-506).

11.0 ATTACHMENTS

No attachments are associated with this ESHP.

ESHF-533: ISSUE LOG FOR LOCKOUT/TAGOUT DEVICES

LOCK/ TAG #	AUTHORIZED EMPLOYEE	DESCRIPTION/TYPE OF DEVICE ISSUED	ISSUED			RETURNED		
			BY	DATE	TIME	BY	DATE	TIME

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to manual lifting and material handling. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP are outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA personnel, including subcontractor personnel, and operations involving manual lifting and material handling. This ESHP is not intended to contain all requirements needed for regulatory compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REGULATORY REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- Applicable sections of OSHA Construction Industry Standard 29 CFR Part 1926, Subparts H and N.
- Applicable sections of OSHA General Industry Standard 29 CFR Part 1910, Subpart H.
- USACE EM 385-1-1, Section 14.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for approving the purchase of and authorizing the resources needed to implement this ESHP, and shall also incorporate this ESHP into site specific plans, procedures and training for sites where this ESHP is to be implemented.

4.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.

2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to lifting, materials handling and protective measures.
4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will implement this ESHP for operations that involve personnel exposure to the hazards associated with manual lifting and material handling. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record in the appropriate site documentation the relevant information related to the implementation of this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will be responsible for discussing the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to determine their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 PROCEDURE

PIKA personnel, and contractor and subcontractor personnel, involved in material handling operations, shall be familiar with the potential safety and health hazards associated with the conduct of this operation, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

5.1 SAFE MATERIAL HANDLING AND LIFTING TECHNIQUES

The safety and health hazards and operational control techniques to be used during conduct of material handling operations are discussed below.

5.1.1 Engineering Controls

Whenever heavy or bulky material is to be moved, the size, shape, weight, distance and path of movement of the object must be considered, and the following hierarchy shall be followed in selecting a means for material handling:

1. Elimination of material handling need through engineering design;
2. Movement of the material by mechanical device (i.e., a lift truck, crane etc.);
3. Movement by manual means using mechanical aid (i.e., dolly or cart); and
4. Movement by manual means.

5.1.2 Safe Work Practices

The following fundamentals address the proper manual material lifting procedures:

1. At no time will an employee attempt to lift an item individually which weights more than 50 pounds.
2. A firm grip on the object is essential, therefore the hands and object shall be free of oil, grease and water, which might prevent a firm grip;
3. The hands, and especially the fingers shall be kept away from any points that cause them to be pinched or crushed, especially when setting the object down;
4. The item shall be inspected for metal slivers, jagged edges, burrs, rough or slippery surfaces and pinch points, and gloves shall be used, if necessary, to protect the hands;
5. The feet shall be placed far enough apart for good balance and stability;
6. Personnel shall determine that solid footing is available prior to lifting the object;
7. When lifting, get as close to the load as possible, bend the legs at the knees, and keep the back as straight as possible;
8. To lift the object, the legs are straightened from their bending position;
9. Never carry a load that you cannot see over or around;
10. When placing an object down, the stance and position are identical to that for lifting, with the back kept straight and the legs bent at the knees, the object is lowered;
11. If needed, personnel shall be provided with back support devices to aid in preventing back injury during lifting activities;
12. Materials will not be moved over or suspended over personnel unless positive precautions have been made to protect personnel from falling objects; and
13. Where movement of materials may be hazardous to persons, taglines or other devices shall be used to control loads being handled by hoisting equipment.

5.1.3 Two Person Lifting

When two or more people are required to handle an object, coordination is essential to verify that the load is lifted uniformly and that the weight is equally divided between the individuals carrying the load. When carrying the object, each person, if possible, shall face the direction in which the object is being carried.

5.2 MATERIAL STORAGE

The general guidelines listed below shall be followed when materials are stored on site. For more detailed guidelines pertaining to the storage of specific items such as lumber, bricks, pipe, reinforcing steal, etc., consult the references listed in Section 3.0 of this ESHP.

1. Materials shall be stored in orderly piles or stacks away from walkways and roadways, and access ways around stored material shall be kept clear;

2. Materials stored in tiers, whether in bags, containers or bundles, shall be stacked, blocked or interlocked and limited in height to prevent sliding or collapse and maintain stability;
3. Materials shall be stored at a height that is as low as practical and shall not be stored at a height greater than 20 feet;
4. Flammable and combustible materials shall be stored IAW applicable regulations;
5. Personnel shall be in a safe position while materials are being loaded or unloaded from vehicles;
6. Non-compatible materials shall not be stored together; and
7. Reusable lumber shall have all nails that could pose a hazard to personnel withdrawn before being stored.

5.3 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

The following safety measures and personal protective equipment shall be used for the prevention of accidents associated with material handling operations. These requirements will be implemented unless superseded by site-specific requirements stated in the SSHP.

1. When handling materials, proper gloves will be worn to prevent puncture, laceration or abrasion; and
2. Gloves will be selected according to the nature, material and condition of the item(s) to be lifted.

6.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The Daily Task and Safety Briefing Log (ESHF-502);
- The Documentation of Hazard Communication Training Form (ESHF-505);
- The Daily Safety Training Attendance Log (ESHF-503); and
- The Daily Inspection and Weekly Audit Report Form (ESHF-506).

7.0 ATTACHMENTS

No attachments are associated with this ESHP.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of scaffolding. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The requirements related to the development of a SSHP or an APP is outlined in the PIKA CESHP.

2.0 SCOPE

This ESHP applies to PIKA personnel, including contractor and subcontractor personnel, and operations involving electrical safety requirements that are necessary for the practical safeguarding of employees in their workplaces. This ESHP is not intended to contain all of the requirements needed for complete regulatory and client compliance. Consult the documents listed in section 3.0 of this ESHP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

1. OSHA Construction Industry Standard 29 CFR Part 1926, Subpart K;
2. OSHA General Industry Standard 29 CFR Part 1910, Subpart S; and
3. USACE EM 385-1-1, Section 11.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and performance of each project to which they are assigned. The PM will work with the Site Supervisor (SS) to acquire the PPE and ES&H supplies required by the project Safety Plans. The PM will coordinate with the SS to make available adequate project resources to acquire, store and maintain the equipment which site personnel will need to safely perform the electrical work identified in this ESHP. The PM will also take a lead role in the integration of the ES&H personnel and resources to the operational processes to assist in the identification and control of site and task hazards prior to and during the project.

4.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP, to include this ESHP. To accomplish this end, the CESHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary.
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to visitor entry and protective measures.
4. Periodically auditing PIKA work sites to determine their compliance with this ESHP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of this ESHP for those operations that involve personnel exposure to known or potential electrical safety hazards. The SS will also discuss relevant sections of this ESHP in the daily safety briefings and will record information related to the daily implementation of this ESHP in appropriate site documentation. The SS will also verify that personnel who conduct operations involving the control of hazardous energy sources are fully trained and qualified as outlined in this ESHP.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will provide assistance and consultation to the SS regarding the implementation of the requirements in this ESHP, and will provide oversight to personnel during project operations. The SSHO will discuss the safety and health hazards and control techniques associated with this ESHP during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to assess their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 DEFINITIONS

As used in this procedure, the following definitions apply:

1. **Ampacity -** The current in amperes a conductor can carry continuously under the conditions of use without exceeding its temperature rating.
2. **Attachment Plug** – A device which, by insertion in a receptacle, establishes connection between the conductors of the attached flexible cord and the conductors connected permanently to the receptacle.

3. **Circuit Breaker** – (600 volts nominal, or less) A device designed to open and close a circuit by non-automatic means and to open the circuit automatically on a predetermined over current without injury to itself when properly applied within its rating. (Over 600 volts, nominal) A switching device capable of making, carrying, and breaking currents under normal circuit conditions, and also making, carrying for a specified time, and breaking currents under specified abnormal circuit conditions, such as those of short circuits.
4. **Fitting** – An accessory such as a lock nut, bushing, or other part of a wiring system that is intended primarily to perform a mechanical rather than an electrical function.
5. **Fuse** – An over current protective device with a circuit opening fusible part that is heated and severed by the passageway of over current through it.
6. **Ground** – A conducting connection, whether international or accidental, between an electrical circuit or equipment and earth, or to some conducting body that serves in place of the earth.
7. **Grounded** – Connected to the earth or to some conducting body that serves in place of the earth.
8. **Grounding Conductor**– A conductor used to connect equipment or the grounded circuit of a wiring system to a grounding electrode or electrodes.
9. **Ground Fault Circuit Interrupter (GFCI)** – A device for the protection of personnel that functions to de-energize a circuit or portion thereof within an established period of time when a current to ground exceeds some predetermined value that is less than that required to operate the over current protective device of the supply circuit.
10. **Intrinsically Safe Equipment and Associated Wiring** – Equipment and associated wiring in which any spark of thermal effect, produced either normally or in specified fault conditions, is incapable, under certain prescribed test conditions, of causing ignition of a mixture of flammable or combustible material in air in its most easily ignitable concentration.
11. **Qualified Person** – One familiar with the construction and operation of the equipment and the hazards involved.

6.0 PROCEDURES

6.1 GENERAL REQUIREMENTS

Electrical installations must comply with the National Electrical Safety Code, the National Electrical Code, and applicable state codes, and Underwriters Laboratories (UL) or Factory Mutual Laboratories approval is required for electrical wire, conduit, apparatus, or equipment. Additionally, equipment shall be operated and maintained in accordance with the manufacturers' recommendations.

6.2 PROTECTION OF EMPLOYEES

Work shall be planned, assigned, and performed to avoid coming into physical contact with an electric power circuit. The circuit should be de-energized and grounded, and verified by a qualified person. If not possible, isolation, insulation, warning signs, and other methods shall be used. Additional protective measures shall be as follows:

1. Only qualified electricians shall be allowed to perform work on electrical circuits and equipment and energized lines and equipment. Live wiring and equipment shall be guarded to prevent accidental contact.
2. Prior to excavation and demolition activities, efforts must be made to note the exact location of buried electric power lines and other utilities.
3. High voltage equipment shall be isolated, guarded, and signed with "Danger, High Voltage" warnings.
4. Work adjacent to overhead power lines shall not be initiated until a survey has been made to ascertain the safe clearance from energized lines (see Table 11-3 of EM 385-1-1).
5. Any overhead line shall be considered to be energized unless, and until, the person owning such line assures that it is not energized and it has been visibly grounded.
6. Operations adjacent to overhead lines are prohibited unless the power to the line has been shut off and positive means taken to prevent it from being accidentally energized, or the required clearances can be met and the minimum clearance distance has been posted at the operator's position.
7. Personnel conducting installation, removal or maintenance operations involving electrical supplies will use proper lock out/tag out procedures to deenergize the systems where the work is being conducted.

6.3 TEMPORARY WIRING

Temporary wiring shall not be subject to physical damage and be handled in accordance with the following.

1. Non-metallic or insulated fasteners shall be used to fasten temporary wiring at intervals not to exceed 10 feet.
2. No temporary wiring shall be laid on the floor.
3. Receptacles shall be of the grounding type.
4. Temporary wiring shall be removed immediately upon completion of construction or the purpose for which the wiring was installed.
5. Temporary wiring shall be guarded, buried, or isolated (e.g., ten foot minimum vertical clearance above walkways) to prevent accidental contact, and shall not be fastened with staples, hung from nails or suspended by wires.
6. Patched, oil-soaked, worn, frayed, electrical cords, or cords that have the outer coating compromised shall not be used, and may only be repaired using approved replacement parts.

7. Outdoor wiring or wiring in tunnels, shafts, trenches, etc., shall be weatherproof. Note: Wiring/electrical installation in hazardous locations must meet NEC standards (see also OSHA 29 CFR 1926.407, "Hazardous Locations").
8. Wiring in conduits shall have bushings at outlets and terminals.
9. Extension cords shall be three-wire grounded type, UL listed.

6.4 TEMPORARY LIGHTING

Procedures for the use of temporary lighting procedures shall be as follows:

1. Portable hand lamps shall be of the molded composition or other type approved for the purpose, and hand lamps shall be equipped with a handle and a substantial guard over the bulb that is attached to the lamp holder or the handle. Temporary lamps that may be damaged by site operations shall be protected from breakage or accidental contact by the use of bulb guards.
2. Temporary lights shall not be suspended by their electric cords unless designed for this means of suspension.
3. Sharp corners and projections shall be avoided. Whenever flexible cords must pass through doorways, or other pinch points, protection shall be provided.
4. Receptacles available for uses other than temporary lighting shall not be installed on branch circuits that supply temporary lighting.

6.5 GROUNDING – GROUND FAULT PROTECTION

6.5.1 General requirements

At construction sites either ground fault circuit interceptors or an assured equipment-grounding program shall be in place. For ground fault protection, 115- and 120-volt, single-phase, 15- and 20-ampere receptacle outlets shall be protected by a UL listed ground-fault circuit interrupter. UL listed ground fault circuit interrupters (GFCIs), calibrated to trip with a threshold of 5 milli amps (ma) $\pm$ 1 ma, are required on circuits used for portable electric tools. Exception: Two-wire, single-phase, portable or vehicle-mounted generator rated 5 kW or less, where the circuit is insulated from the generator frame and other grounded parts.

6.5.2 Equipment Grounding Program

An assured equipment-grounding program requires a written program that sets forth specific procedures for compliance with OSHA 29 CFR 1926.404. To comply with this standard, the PIKA Equipment Grounding Program will include the following:

1. Wiring, electrical circuits, tools, and equipment shall be effectively grounded (the exception is double-insulated UL approved tools).
2. Each cord set, attachment cap, plug and receptacle of cord sets, and any equipment connected by cord and plug, except cord sets and receptacles which are fixed and not exposed to damage, shall be visually inspected before each day's use for external defects, such as deformed or missing pins or insulation

damage, and for indications of possible internal damage. Equipment found damaged or defective shall not be used until repaired.

3. The tests listed below shall be performed on cord sets, receptacles which are not a part of the permanent wiring of the building or structure, and cord- and plug-connected equipment required to be grounded.
4. Equipment grounding conductors shall be tested for continuity and shall be electrically continuous.
5. Each receptacle and attachment cap or plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.
6. Required tests shall be performed:
   a. Before first use;
   b. Before equipment is returned to service following any repairs;
   c. Before equipment is used after any incident which can be reasonably suspected to have caused damage (for example, when a cord set is run over); and
   d. At intervals not to exceed 3 months, except that cord sets and receptacles which are fixed and not exposed to damage shall be tested at intervals not exceeding 6 months.
7. PIKA shall not make available or permit the use by employees of any equipment that has not met the requirements of item 5 above.

Tests performed as required in this paragraph shall be recorded. This test record shall identify each receptacle, cord set, and cord- and plug-connected equipment that passed the test and shall indicate the last date it was tested or the interval for which it was tested. This record shall be kept by means of logs, color coding, or other effective means and shall be maintained until replaced by a more current record.

6.6 OVER-CURRENT PROTECTION

Switches, fuses, and circuit breakers shall be properly labeled to identify their circuits, and outdoor switches, fuses, and circuit breakers shall be protected from the elements. Additionally, fuses or circuit breakers shall protect feeder and branch circuits.

6.7 ELECTRICAL OUTLETS

Outlets must have a cover plate, no exposed or bare wires, and no loose connections. Cords should always be removed from an outlet by grabbing the plug, not by pulling on the cord, and a plug with a ground pin should be used to ground equipment to the facility ground.

6.8 LOCKOUT/TAGOUT

Prior to performing any work on a circuit or on equipment run by an electric circuit, the circuit shall be de-energized, locked out and tagged. Consult PIKA ESHP-521 Control of Hazardous Energy (Lockout/Tagout) for lockout procedures. Capacitors in the locked out circuit shall be disconnected and removed prior to work.

7.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The Daily Task and Safety Briefing Log (ESHF-502);
- The Documentation of Hazard Communication Training Form (ESHF-505);
- The Daily Safety Training Attendance Log (ESHF-503); and
- The Daily Inspection and Weekly Audit Report Form (ESHF-506).

8.0 ATTACHMENTS

No attachments are associated with this ESHP.

1.0 OBJECTIVE

The objective of this Environmental Safety & Health Procedure (ESHP) is to define the general requirements for the site-specific monitoring and sampling that may be required for project sites with airborne exposure potential. This ESHP will help direct personnel to effectively conduct monitoring and sampling to effectively protect the site workers, the environment and the general public from chemical and physical hazards. This ESHP is also intended to fulfill the requirements of the applicable sections of OSHA standards 29 CFR 1910.120 and 1910.1000, as well as other Federal, state and local regulations.

2.0 SCOPE

This ESHP applies to PIKA munitions and explosives of concern (MEC) and hazardous, toxic or radiological waste (HTRW) projects where site activities require the use of monitoring or sampling equipment under the provisions of OSHA 29 CFR 1910.120. This procedure may also apply to industrial processes where monitoring/sampling of chemical or physical hazards is conducted.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) and technical references apply to the conduct of operations associated with this ESHP. In the event that operational hazards are encountered when implementing this ESHP, consultation of other ESHPs and regulatory references may be needed.

1. OSHA. March 30, 1984. Industrial Hygiene Technical Manual. OSHA Instruction CPL 2-2.20A.
2. NIOSH Pocket Guide to Chemical Hazards, No. 97-140, (Current edition).
3. NIOSH/OSHA/USCG/EPA. 1985. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, Cincinnati, OH.
4. United States Army Corps of Engineers (USACE) Engineering Manual (EM) 385-1-1, Safety and Health Requirements Manual, 3 November 2003;
5. American Conference of Governmental Industrial Hygienist (ACGIH) 2007 Threshold Limit Values (TLVs) and Biological Exposure Indices;

4.0 DEFINITIONS

Approved Laboratory - is a laboratory which participates in an approved Quality Assurance and Quality Control (QA/QC) Program and is accredited by the American Industrial Hygiene Association (AIHA).

Breathing Zone (BZ) - an imaginary hemisphere, forward of the shoulders, with a radius of six to nine inches.

Direct Reading Instruments - Instruments that provide real-time readings of the chemical or physical hazards to which a worker may be exposed.

Personal Sampling - The sampling conducted to determine personnel exposure to chemical or physical hazards.

Point Source Monitoring - is conducted with the instrument intake placed near the potential contaminant source. This type of monitoring gives an indication of the potential for the source to cause an over exposure or IDLH situation.

Work Area Monitoring - is conducted in the immediate work area where exposures are likely to be the highest. Monitoring is usually conducted in the breathing or hearing zones of the workers.

Perimeter Monitoring - involves sampling along the down wind perimeter of the Exclusion and/or Contamination Reduction Zones to determine if contaminants are migrating from the site.

Hearing Zone (HZ) - is the area around the head where noise monitoring is conducted. It is defined as an imaginary globe of one-foot radius surrounding the ears.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

The Project Manager (PM) is responsible for the overall implementation of this ESHP for PIKA projects to which the PM has been assigned and to which this ESHP applies. In this role, the PM will be responsible for the acquisition and management of the PIKA personnel, equipment and training resources needed to implement this ESHP.

5.2 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development of this ESHP and for determining the proper implementation of its requirements. The CESHM is also responsible for the following:

- Development of the Site Sampling & Monitoring Plan (SSMP) to be incorporated in the SSHP;
- Providing consultation to and assisting the Site Safety and Health Officer (SSHO) with the selection and acquisition of monitoring and sampling equipment;
- Assisting the SSHO with the field implementation of the SSMP;

- Periodically reviewing new technologies to identify monitoring/sampling instruments or methods which could more effectively detect and quantify chemical or physical hazards;
- Periodically (every 30 - 45 days) inspecting site operations to determine if monitoring activities comply with the SSMP; and
- Annually reviewing this ESHP and providing updates as needed.

5.3 SITE SAFETY AND HEALTH OFFICER

The SSHO is responsible for the field implementation of this ESHP and the SSMP. To achieve this goal, the SSHO will also be responsible for the following:

- Acquiring, with assistance from the CESHM, the instruments and resources required for implementing the SSMP;
- Arranging for, or providing, training for PIKA personnel who will actively participate in conducting site monitoring;
- Conducting, or supervising PIKA personnel conducting, monitoring for chemical and physical hazards;
- Ensuring that instruments and equipment used for site monitoring and sampling are inspected, calibrated and maintained according to manufacturer specifications; and
- Ensuring that monitoring data is accurately recorded on the PIKA Site Monitoring Log.

6.0 SITE-SPECIFIC MONITORING PLAN DEVELOPMENT

Exposures to chemical and physical hazards during HTRW site activities can present a significant threat to the health and safety of site workers. Therefore, in order to control or limit potential exposures, the SSMP shall be designed to identify and, to the extent possible, quantify the site hazards. The information listed in this section will be used by the CESHM when designing the SSMP. An effectively designed SSMP will allow for the following:

- Identification of immediately dangerous to life or health (IDLH) conditions;
- Assessment of worker's exposure to chemical and physical hazards;
- Identification of high risk activities;
- Determination of the need and/or effectiveness of control methods and zones;
- Selection of appropriate personal protective equipment (PPE);
- Delineation of areas where PPE is required; and
- Determination of the need for site-specific medical surveillance monitoring.

6.1 EVALUATION OF SITE CHARACTERIZATION DATA

During the development of the SSHP, the CESHM will collect and review available site information to identify the chemical and physical hazards that may be encountered during site activities. This review should include, whenever possible, the following elements:

- A review of documents which identify materials placed or buried on site;
- Interviews of personnel who may have been involved in past disposal operations at the site;
- A review of data from previous environmental sampling conducted on or near the site;
- A reconnaissance of the site, conducted from outside the perimeter; and
- An examination of past photographs of the site, including aerial photos.

6.2 EVALUATION OF PLANNED SITE ACTIVITIES

Once site characterization data has been obtained, the CESHM will review the planned site activities to determine if they will increase the potential for worker exposure. The CESHM will also determine if the activities themselves will create a potential for exposures to safety and health hazards.

6.3 SELECTION OF MONITORING EQUIPMENT AND PROCEDURES

The CESHM will select site monitoring equipment and procedures that will most effectively detect, and when possible, quantify the site hazards. The principle method for qualifying the potential for personnel exposures is the use of real-time, direct reading instruments (DRI). The equipment used for quantifying worker exposures includes personal air sampling pumps and contaminant specific collection media. These, as well as other specific monitoring devices, will be discussed in detail in section 7.0 of this ESHP. Whenever possible and feasible, the CESHM will select DRIs capable of giving quantitative, real-time readings. This will allow for the rapid assessment of the worker's potential exposure. If contaminant or hazard specific, real-time DRIs are not available, then qualitative instruments may be used, provided that adequate allowances are made for ensuring employee protection.

6.4 DETERMINATION OF ACTION LEVELS

When designing the SSMP, the CESHM will define the monitoring Action Level (AL) for each contaminant or physical hazard. These levels will identify the values or concentrations where PPE will be up or down graded and determine when other forms of control are required. The ALS outlined in the SSMP will be based on the information collected during the site characterization phase, and will include when applicable, the following:

- The acute toxicity of the contaminant;
- The potential health affects caused by exposure;
- The amount of contamination present in soil/water;
- The volume of contaminants placed/buried on site;
- The potential for contaminant release during site activities;
- The impact site activities will have on the potential for exposure or release; and
- The ability to effectively quantify the airborne concentrations using DRIs.

In the event that an AL for a particular airborne contaminant is achieved when monitoring with a DRI, personal BZ samples may need to be collected to more accurately evaluate worker exposures. This requirement will be defined in the SSMP, and will be conducted IAW Section 8.0 of this ESHP.

6.5 SELECTION OF MONITORING LOCATIONS AND FREQUENCIES

The CESHM will define the locations where monitoring will be conducted for each contaminant or physical hazard. The basic locations are point source, work area, perimeter and breathing zone (BZ). The monitoring plan will usually contain provisions for monitoring each location to allow for complete coverage of the site, and to maintain a safe working environment. The procedures for conducting monitoring in each location will be discussed in Section 8.0 of this ESHP. The frequency for monitoring each contaminant or physical hazard will be selected by the CESHM and will be based on the type of site activities, the nature of the hazard and the potential for exposure.

7.0 SITE MONITORING EQUIPMENT

As specified above, monitoring with real-time, DRIs is the principle method used for screening, monitoring and assessing chemical and physical hazards found on site. Also used on site are integrated sampling devices and special air sample collection techniques such as evacuated flasks and cylinders and teldar collection bags. The following gives a brief description of the equipment and procedures for conducting site monitoring with DRIs.

7.1 DIRECT READING INSTRUMENTS

DRIs used on site are defined as portable instruments capable of providing real-time detection and monitoring of chemical or physical hazards. These instruments allow the SSHO to rapidly assess exposure levels and determine the necessary precautions needed for worker protection. The information from DRIs is also used in the continued development of the SSMP by indicating the chemical and/or physical hazards which may require additional monitoring/sampling. Use of DRIs will be conducted IAW Section 8.1 of this ESHP.

DRIs have inherent constraints in their ability to detect hazards. While some instruments may be used for full shift integrated sampling, many are non-specific and will detect a large range of chemical or physical hazards. The types of contaminants and physical hazards detectable with DRIs are limited by available technology. Examples of hazards which can be detected with DRIs include:

- Certain toxic organic and inorganic vapors and gases;
- Oxygen deficient/enriched atmospheres;
- Flammable or explosive atmospheres;
- Respirable dust and fibers;
- Ionizing radiation;
- Heat stress; and
- Noise level and dose.

Specific information related to the instruments used to detect the above mentioned hazards is presented in Appendices A and B of this ESHP. Non-specific DRIs, such as the Flame or Photo Ionization Detectors (FID or PID) and combustible gas monitors will respond positively in the presence of a large number of chemicals. Therefore, these types of instruments are to be used as screening devices only, and are not intended to measure a worker's 8-hour Time-weighted Average (TWA) exposure. Positive readings above the AL for a screening instrument, as defined in the SSHP, will require further investigation to determine the specific chemical(s) that caused the positive response.

7.2 INTEGRATED AIR SAMPLING DEVICES

If the potential for an over exposure exists, integrated personal sampling will be used. This type of sampling will allow for a direct comparison of the worker's exposure to the OSHA PELs, the ACGIH TLVs or other published exposure limits.

Integrated personal air sampling involves the use of either active sampling devices or contaminant specific passive diffusion devices. Active sampling devices use an air sampling pump, a contaminant specific collection media and tubing to connect the pump to the collection media. Passive diffusion sampling devices contain a contaminant specific collection media that passively adsorbs the contaminant. In the event that passive air sampling devices are used, the CESHM will specify the procedure for their use in the SSMP. Active air sampling will be conducted IAW the procedures specified in Section 8.2 of this ESHP.

Whenever active sampling collection media require laboratory analysis to determine the quantitative results, the CESHM will select a laboratory that has been approved by the

American Industrial Hygiene Association (AIHA) to conduct the analysis. The laboratory selected will be specified in the SSHP.

7.3 SPECIAL AIR SAMPLING DEVICES

Special contaminant or operation specific sampling devices, which do not come under the categories listed above, may be needed on site to sample and assess chemical hazards. If these devices are required, the CESHM will select these devices and outline the procedures for their use in the SSMP.

8.0 SITE MONITORING AND AIR SAMPLING PROCEDURES

Priorities for monitoring and sampling chemical and physical hazards on site will be based on the information gathered during the initial site characterization. This information will serve as the basis for selection of appropriate monitoring/sampling equipment and procedures. During site monitoring and sampling activities, the procedures found in this section, and the site specific information outlined in the SSHP/SSMP, will be utilized.

8.1 MONITORING DURING INITIAL SITE ENTRY

Personal protective equipment used during initial site entry will be selected by the CESHM and will comply with the provisions of the Personal Protective Equipment Program outlined in the PIKA CESHM. If indicated by site characterization data, or if characterization data is insufficient to make a determination, initial site entry monitoring will be conducted IAW with requirements listed below and any special requirements listed in the SSHP.

- Real-time, DRIs will be used to detect potential IDLH (toxic), explosive/flammable and/or oxygen deficient/enriched atmospheres.
- If the potential for exposure to ionizing radiation exists, monitoring for radiation will be conducted to determine the potential for contact with radioactively contaminated surfaces and to worker's radiation dose.
- The monitoring conducted during initial entry will include, as required, monitoring in the following locations:
  1. Along the perimeter of the site;
  2. In and/or around potential release sources identified during off site reconnaissance;
  3. Around/over standing pools of liquid;
  4. Inside naturally occurring or man-made depressions or structures;
  5. Around storage and disposal containers; and

6. At locations where dead vegetation or other biological indicators signify the potential for contamination.

Monitoring at the locations listed above will be conducted at the breathing zone height and/or at the point source.

8.2 MONITORING FOR CHEMICAL HAZARDS USING DRIS

When monitoring with DRIs is required, the SSHO, or a trained appointee (TA), will be responsible for conducting the site monitoring IAW the procedures listed in this section and the provisions outlined in the SSHP/SSMP. Prior to use, each DRI will be inspected by the SSHO/TA to determine if the instrument has been properly maintained/inspected IAW the manufacturer's specifications. Whenever calibration/response standards are available, each DRI will be field calibrated or response checked by the SSHO/TA, using the manufacturer's procedures. Instruments which do not function properly will not be used on site until serviced by the SSHO or the manufacturer. Information related to instrument maintenance and calibration will be maintained by the SSHO in the QA/QC Log. During the use of DRIs, the items listed below will be followed:

- DRIs used on site will be certified by the manufacturer as being safe for the atmosphere in which they will be used.
- When using DRIs to monitor potential contamination in the BZ, the instrument's inlet port will be placed as close to the worker's BZ as possible without interfering with worker's function or safety.
- If work area and/or perimeter monitoring are required, the monitoring locations and heights will be determined by the CESHM and will be specified in the SSMP. This determination will be made based upon the physical properties of the contaminant and the site.
- When DRIs are used in highly contaminated sites or in areas where the potential for contact with corrosive chemicals exists, the DRI will be encapsulated in plastic to limit the potential for contamination. If this method of contamination control is used, the inlet port of the DRI will not be covered, thereby allowing the inlet to monitor the ambient air.

8.3 USE OF ACTIVE INTEGRATED SAMPLING DEVICES

When active integrated air sampling is required, the SSHO, or a TA, will be responsible for conducting the sampling IAW the procedures listed in this section and the provisions outlined in the SSHP/SSMP.

8.3.1 Calibration of Sample Pump Flow Rate

The CESHM will utilize contaminant specific information from the NIOSH Analytical Guidelines and/or the OSHA Chemical Manual to determine the flow rate to be used during the sampling period. The SSHO or TA will be responsible for ensuring that the sample pump flow rate is set to within 5%, (plus or minus) of the flow rate specified by the CESHM. To calibrate the sample pump, the SSHO or TA will follow the steps outlined in Appendix A of this ESHP. These steps will also be used to conduct the post-sampling calibration check, which is required to show that the sampling pump functioned properly during the sample period.

8.3.2 Conducting Active Integrated Sampling

In order to obtain the most representative sample of the worker's exposure potential, full shift sampling will be conducted whenever possible and feasible. If full shift sampling cannot be conducted, the SSHO/TA will conduct the sampling during the period of highest exposure potential. Under sampling situations, the SSHO/TA will sample worker(s) assigned to tasks that involve the greatest risk of exposure. This "worst case" sampling strategy minimizes the risk of missing workers who are exposed to levels greater than those measured. During active integrated sampling, the requirements listed below will be followed:

- Air sampling pumps will pre and post-calibrated IAW with Appendix A of this ESHP.
- The intake for the sample collection device will be placed in the workers breathing zone, defined as an imaginary hemisphere forward of the shoulders, near the worker's face, with a radius of 6 - 9 inches.
- The SSHO/TA will be responsible for completing the information required in the PIKA Integrated Air Sampling Log and Report Form (ESHF-533).
- Once the samples have been collected, the SSHO/TA will handle, package and arrange transportation of the samples IAW the procedures and requirements outlined by the CESHM in the SSHP/SSMP.
- Sampling and sample handling will be conducted IAW applicable NIOSH/OSHA/EPA sampling and analytical techniques.
- After the samples that have been collected, sampling equipment used inside a potentially contaminated area will be cleaned prior to leaving the area.

8.4 CONDUCTING SITE AREA/PERIMETER MONITORING

When the potential exists for contaminants to be released during site operations, area/perimeter monitoring and/or sampling will be utilized. The type of area/perimeter monitoring or sampling to be conducted will be specified by the CESHM in the SSMP, with the locations, duration and frequency of each being specified. These specifications

may be changed by the SSHO upon approval of the CESHM if weather, or site operations and conditions dictate that a change be made. Whenever possible, DRI area/perimeter monitors will be used when contaminants may be released in quantities great enough to pose an immediate threat to the surrounding population/environment. If DRI monitors are not available, or if the contaminants on site do not pose an immediate threat to the surrounding populace, integrated air sampling may be conducted to verify the effectiveness of the site control boundaries. The type of area/perimeter monitoring to be conducted will be specified by the CESHM in the SSMP, with the location, duration and frequency being dependent upon site operations and conditions.

Real-time, direct reading area/perimeter monitors will be checked periodically to ascertain if they are continuing to work and to determine the peak and average readings. This will occur at a minimum of once every 30 minutes, with the exact frequency determined by the CESHM, and outlined in the SSMP. Area/perimeter samplers/monitors will always be placed down wind from the potential contamination source;

9.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The Daily Task and Safety Briefing Log (ESHF-502);
- The Documentation of Hazard Communication Training Form (ESHF-505);
- The Daily Safety Training Attendance Log (ESHF-503); and
- The Daily Inspection and Weekly Audit Report Form (ESHF-506).

10.0 ATTACHMENTS

Appendix 1: Calibration Procedure for Air Sampling Pumps

APPENDIX 1

CALIBRATION PROCEDURE FOR AIR SAMPLING PUMPS

CALIBRATION PROCEDURE FOR AIR SAMPLING PUMPS

1.0 INTRODUCTION

This procedure is to be used when air sampling pumps must be calibrated to a specific air flow rate. The air flow rate will be specified by the CESHM in the SSMP, and will be derived from the NIOSH or OSHA air sampling methodologies. This procedure applies to low, medium and high volume sampling pumps, used for area, perimeter or personal sampling.

2.0 MATERIALS NEEDED

The following materials and supplies will be needed for the calibration of air sampling pumps:

1. Air sampling pump, and the manufacturer-supplied flow adjustment tool;
2. Collection media (filter cassette, charcoal tube, etc.) required by sampling procedure;
3. 2 pieces of Tygon tubing cut to appropriate length;
4. Primary calibration device, with required supplies, as specified by the manufacturer; and
5. PIKA Personal Air Sampling Data Form.

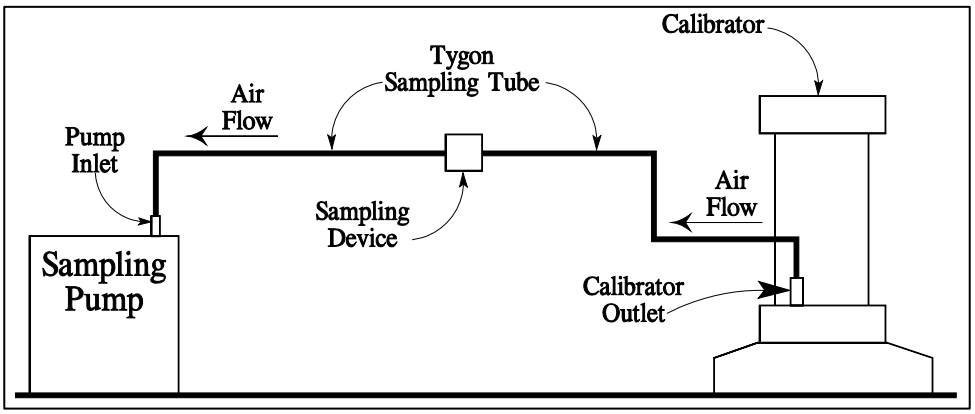
3.0 PROCEDURE

3.1 Set-up and Calibration

When preparing to calibrate an air sampling pump, the pump, collection media, and calibrator will be arranged as follows, unless otherwise specified by the CESHM.

1. Start the pump and allow it to run for approximately five minutes.
2. Set-up pump, sampling device, tubing and calibrator as outlined in Diagram 1, (below), or IAW the calibrator manufacturer's specifications if different from the diagram below.
3. For calibration, use a sampling device similar to the one to be used for the actual sampling. Do not use this sampling device for the actual sampling, but save it to perform the post calibration, which is performed at the end of the sampling period.
4. Using the calibrator and the flow adjustment on the pump, set the pump flow rate to within +/- 5% of the rate specified in the sampling procedure.

Diagram 1



5. Once the pump flow rate is set, take three readings from the calibrator and average the three to obtain the average pre-sampling flow rate. Record this rate on the Personnel Air Sampling Form, along with the pump serial number.
6. The pump may now be turned off and disconnected for the calibrator. Use the same sampling device to calibrate pumps to be used that day for the specified sampling procedure.

3.2 Post-sampling Flow Rate

Once sampling has been concluded for the day, obtain the post-sampling flow rate for each pump. To do this, follow the steps outlined below.

1. Connect the pump to the calibrator as specified in section 3.1 of this procedure.
2. Measure the flow rate three times, calculate the average, and record this information on the sampling form.

1.0 PURPOSE

PIKA International, Inc. (PIKA) recognizes that ensuring project safety requires a coordinated team effort in which each member of the team plays an integral part. While site personnel are tasked with ensuring their safety and the safety of their co-workers, the environment and the public, it is the Site Safety and Health Officer (SSHO) who is responsible for coordinating on-site safety and for maintaining a safe and healthful work environment. To assist the SSHO in this task, this Environmental Safety & Health Procedure (ESHP) outlines the procedures and requirements related to the position of the SSHO. This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP) associated with each project site.

2.0 SCOPE

2.1 GENERAL APPLICATION

This ESHP is applicable to PIKA projects where PIKA personnel are assigned to the role of the SSHO. This shall include both hazardous waste sites and non-hazardous waste sites where a SSHO is assigned provide oversight and help safeguard on-site personnel. The procedures in this program will be strictly adhered to unless otherwise amended within site-specific project plans. The purpose of this attachment is to supplement the PIKA CESHP, and act as a working tool toward the implementation of each site-specific SSHP.

2.2 SPECIALIZED APPLICATIONS

For those project sites where munitions and explosives of concern (MEC) hazards exist, an Unexploded Ordnance (UXO) Safety Officer (UXOSO) will also be assigned for the duration of the MEC operations. This requirement for an UXOSO to be assigned to MEC sites is required based upon the unique nature of the MEC hazards that may be encountered and is typically a client requirement. The assignment of the UXOSO will typically be conducted to supplement the SSHO who will have the responsibility for occupational and construction S&H matters other than MEC, with the UXOSO being responsible for S&H related to MEC issues only. On sites where an SSHO and UXOSO are co-assigned, the SSHO and UXOSO will work closely to compliment each other to provide coverage of on-site S&H issues. However, depending upon the nature of the occupational S&H issues versus the scope of the MEC issues, the UXOSO may also act in the role of the SSHO. Further detail related to roles and responsibilities of the UXOSO are contained in PIKA ESHP-208, UXO Safety Officer Procedures.

3.0 REFERENCES

The Occupational Safety and Health Administration (OSHA) standards listed below apply to the conduct of operations associated with this ESHP. Additionally, the responsibilities of the SSHO as outlined in this ESHP are also designed to meet U.S. Army Corps of Engineers (USACE), U.S. Department of Energy (DOE), and other current client requirements.

1. OSHA General Industry Standards, 29 CFR 1910 (current version);
2. OSHA Construction Standards, 29 CFR 1926 (current version);
3. Department of Energy (DOE) requirements in 10 CFR 707, Workplace Substance Abuse Programs at DOE Sites;
4. DOE Requirements of 10 CFR 835, Occupational Radiation Protection;
5. DOE Requirements of 10 CFR 851, Worker Safety and Health Program;
6. United States Army Corps of Engineers (USACE) Engineering Manual (EM) 385-1-1, Safety and Health Requirements Manual, 3 November 2003;
7. USACE Engineering Regulation (ER) 385-1-92, Safety And Occupational Health Requirements For Hazardous, Toxic And Radioactive Waste (HTRW) Activities, 01 May 2007;
8. USACE ER 385-1-95, Safety and Health Requirements for Munitions and Explosive of Concern (MEC) Operations, 1 April 2006;
9. USACE Engineering Pamphlet (EP) 385-1-95a, Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations; 27 August 2004;
10. National Institute of Safety & Health (NIOSH)/OSHA/U. S. Coast Guard (USCG)/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, October 1985;
11. NIOSH Pocket Guide to Chemical Hazards, No. 2005-151, (Current edition);
12. American Conference of Governmental Industrial Hygienist (ACGIH) 2007 Threshold Limit Values (TLVs) and Biological Exposure Indices;
13. DOE G 450.1-1, Implementation Guide for Use With DOE O 450.1, Environmental Protection Program, 18 February 2004; and
14. DOE G 450.1-2, Implementation Guide for Integrating Environmental Management Systems into Integrated Safety Management Systems, DRAFT, 12 February 2004.

4.0 RESPONSIBILITIES

4.1 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The PIKA Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development and implementation of this ESHP and the PIKA CESHP. To effectively implement this SSHO ESHP-525, the CESHM will take an active role in providing consultation, guidance, and training to those personnel assigned to the role of SSHO. To this end, the CESHM will:

1. Provide approval of those personnel proposed for the SSHO position at a PIKA project site.
2. Determine if the personnel assigned to the role of SSHO meet the requirements specified by PIKA and the client and that each SSHO has the specific training, knowledge, and experience necessary to implement the SSHP and verify compliance with applicable safety and health regulations.
3. Provide periodic review and update of this program and the CESHP to assess their continued integrity and compliance with applicable Federal, state and local regulations.
4. Consult with each SSHO to determine if site-specific safety and health issues are addressed and resolved.
5. Provide technical assistance and expertise to the SSHO regarding the implementation of the site safety and health related regulations.
6. When needed, assist the SSHO in providing mobilization and safety training.
7. Conduct periodic inspections (every 30 to 45 days) of project sites to assist the SSHO with the effective implementation of compliance measures and to determine the project compliance with this program, the SSHP and any other project related plans.

4.2 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the project resources needed to implement this ESHP. The PM will also verify that this ESHP is incorporated into site specific plans, procedures and training for those sites where this ESHP will be applied.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will implement this ESHP at those sites where an SSHO will be used for on-site management of S&H issues. The SS will work closely with the SSHO to utilize feasible controls to reduce the risk of personnel exposure to project hazards, and when possible, to eliminate the potential for an accident. While the SSHO is considered the primary point of contact for S&H issues, each SS must understand that they must maintain a positive safety culture that shows site personnel that their safety is paramount to operational issues.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO has the overall responsibility for assisting in the protection of the safety and health of PIKA, subcontractor, government, and visitor personnel while on site. In this role, the SSHO will evaluate the requirements of the SSHP to determine that implemented by site personnel for the duration of site activities. The SSHO will also assess personnel records, evaluate personnel performing tasks and determine that all

personnel are properly trained, qualified, equipped, and physically protected from the site and operational hazards to the greatest extent feasible.

During on-site project performance, the SSHO will report administratively to the SS with a functional responsibility to the CESHM. As such, the SS will be responsible for the day-to-day administrative supervision of the SSHO assigned at the site. However, the direct reporting and accountability of the SSHO will lie with the CESHM. To effectively implement PIKA's safety and health program, the SSHO will:

1. Initiate and authorize a "Stop Work" order for any imminent S&H concerns;
2. Implement and enforce the requirements outlined in this SSHP;
3. Conduct the safety portion of the daily tailgate briefings;
4. Conduct and document site training related to site-specific hazards;
5. Specify proper levels of PPE IAW the requirements of this SSHP;
6. Implement and enforce the PIKA Alcohol/Drug Abuse Policy;
7. In conjunction with the SS, investigate and report in a timely manner any injuries, illnesses, accidents, incidents, or near misses;
8. Conduct visitor orientation, daily safety inspections, and weekly safety audits;
9. Properly complete the requisite safety and health related forms to capture relevant safety and health data;
10. Immediately inform the CESHM when a SOW change occurs that effects the tasks addressed in the SSHP;
11. Provide the CESHM with task hazard data for any new tasks or any tasks that significantly change during the conduct of site operations;
12. Assess each task and assess the effective implementation of the safety and health provisions required by this ESHP;
13. Implement the SSHO requirements within each PIKA ESHP; and
14. Implement the pertinent and requisite requirements of the PIKA CESHP.

5.0 SSHO MOBILIZATION AND SITE SET-UP PROCEDURES

The SSHO will become completely familiar with the PIKA CESHP and the site-specific Work Plan (WP), which includes the SSHP and the PIKA ESHPs. These documents will be used by the SSHO as the basis for the mobilization training presented to site personnel and for ensuring the safe performance of site operations. Whenever possible, these documents will be given to the SSHO prior to departure to the site. Additionally, when feasible, the SSHO should be a member of the pre-mobilization team so that the SSHO can perform the site mobilization and set-up procedures prior to the arrival of the field team. The mobilization and set-up procedures performed by the SSHO will include:

1. Coordinating with applicable local agencies (i.e. Police, Sheriff, Hospital, Life Flight, Ambulance Service and Fire Department).

2. Determining if FAA or Marine Band notices need to be made.
3. Surveying the site for hazards and validating the accuracy of the Certification of Activity Hazard Assessment forms (ESHF-529) presented in the SSHP.
4. Validating, and if needed modifying, the medical evacuation routes presented in the SSHP and planning the personnel assembly points for emergency evacuations.
5. Inventorying the first aid, equipment, personal protective equipment (PPE), fire extinguishers, etc.
6. Validating the number, type, and location of toilet facilities.
7. Obtaining any local certificates required.
8. Preparing evacuation maps and confirming the contact list for hospital and ambulance services.

If the SSHO is not a member of the pre-mobilization team, or if no pre-mobilization is allowed, the SSHO will implement items 1 – 8 listed above during the first day's operations. If PIKA is acting as a subcontractor to a project, many of the above tasks will already have been completed by the prime contractor prior to the arrival of the PIKA SSHO on site. However, this does not relieve the SSHO of the responsibility of ensuring that the steps listed above have been accomplished. It is imperative that the SSHO establish a good rapport with applicable local authorities and emergency services to enable and enhance safe, uninterrupted site operation.

6.0 TRAINING REQUIREMENTS AND PROCEDURES

6.1 GENERAL TRAINING REQUIREMENTS

Site training required by the SSHP shall be conducted, or arranged for, by the SSHO. For the training topics required by the SSHP, the SSHO will work with the Site Supervisor to present the data specified in the following paragraphs is presented to affected workers. Unless otherwise specified in this section or the SSHP, training will be documented using the PIKA Safety Training Attendance Log (ESHF-503). At no time will PIKA personnel be permitted to conduct any site operations involving the potential for exposure to safety or health hazards until they have received appropriate training.

6.2 SITE-SPECIFIC AND HAZARD INFORMATION TRAINING

Prior to the initiation of site activities involving the potential for exposure to safety or health hazards, the SSHO, in conjunction with the SS will provide Site-specific and Hazard Information Training. The outline in Table 525-1 will be used as general guidance for this training and will cover the topics detailed below in paragraphs 6.2.1 and 6.2.2.

6.2.1 Site-specific Information Training

Site-specific Information Training shall be used to provide site personnel with important information related to site operations. This training shall apply to the three-day on-site training requirements outlined in section 6.3.3 of this ESHP, and shall cover site-specific training topics listed below:

1. Site history and background
2. Site organization and chain of command
3. Proper use, maintenance and cleaning of required PPE
4. Emergency response procedures, assignments, and contacts
5. Facility-specific requirements

6.2.2 Hazard-Specific Information Training

Hazard information training shall be presented utilizing the PIKA Hazard Information Program that meets the requirements specified in 29 CFR 1910.120 (i). This training shall be presented to personnel involved in site operations and shall be used to inform personnel as to the degree, nature, and level of exposure likely to occur as a result of participation in site activities. This training, as a minimum, will cover the following topics:

1. A complete description of physical and toxicological properties of any hazardous materials or chemicals expected to be found on site.
2. A complete description of the physical hazards associated with site operations, including those hazards listed for the site tasks outlined in the SSHP.
3. A description of the biological hazards which may be encountered on site, to include identification and protective methods, and what to do if exposure occurs.
4. A description of any MEC hazards that may be encountered and the safety procedures used to safeguard on-site personnel.
5. The SWPs or other hazard control techniques that will be used to minimize exposure.

6.3 EQUIPMENT TRAINING

Equipment operation training will be conducted for site personnel who will be responsible for the operation of monitoring instruments, earth moving equipment (EMM), power tools or hand tools. This training will be documented using the Safety Training Attendance Log (ESHF-503) and will include the following:

1. Calibration procedures (as required);
2. Starting equipment;
3. Safety precautions;
4. Proper operating techniques;
5. Shutting down equipment; and
6. Care, inspection and maintenance.

TABLE 525-1: SITE-SPECIFIC TRAINING TOPICS

TOPIC	SUB-TOPICS TO BE COVERED
Welcome and Introduction	
Work Plan	A. Safety And Health Chain-Of-Command B. Implications Of The Proposed Work/Project Schedule C. Methods For On- And Off-Site Communications D. Logs & Records
History of Facility	Brief Overview of Facility History
SSHP	A. Site Description B. Site-Specific Hazard Information 1. Chemical Contaminants 2. Physical Hazards 3. Biological Hazards C. Task-Specific Hazard Analysis D. Engineering Controls E. PPE Requirements and Decontamination F. General Safety Precautions G. Prohibited Activities H. Site Access Control I. The Buddy System Procedures J. MEC Awareness and Avoidance (if applicable) NOTE: If MEC is an issue at the site, an UXOSO will be at the site and will be responsible for any MEC training given to both UXO and non-UXO personnel (see ESHP-208 for UXOSO Procedures at MEC contaminated sites). K. Safe Equipment Use 1. Mechanical/Hand Tools 2. Heavy Equipment 3. Vehicles L. Contingency and Emergency Response Plan 1. Potential Accidents Associated with Site Operations 2. Emergency Evacuation Routes and Assembly Points 3. Emergency Communications and Reporting Requirements 4. Potential/Actual Fire/Explosion Hazards and Response Procedures 5. Personnel Injury Treatment/Decontamination Procedures 6. Adverse Weather Conditions 7. Chemical Spills (when applicable)

6.4 PERSONAL PROTECTIVE EQUIPMENT TRAINING

As specified by 29 CFR 1910.132 and PIKA ESHP-514 Personal Protective Equipment, site personnel required to use PPE shall be given training in the use, care, and limitations of the PPE they are to use. Prior to using the designated PPE on site, affected personnel shall demonstrate an understanding of the training and their ability to properly use the assigned PPE. PPE training shall be documented using the PIKA Personal Protective Equipment Training Log (ESHF-530), and will address the following topics:

1. PPE selection decisions;
2. When PPE is needed;
3. What PPE is needed;
4. How to properly don, doff, adjust, and wear PPE;
5. The limitations of specific pieces/types of PPE; and
6. The proper care, maintenance, useful life, and disposal of PPE.

6.5 HAZARD COMMUNICATION TRAINING

In order to comply with the requirements of the OSHA Hazard Communication (HAZCOM) Standard, 29 CFR 1910.1200, training shall be provided for site personnel who will use products that contain hazardous substances. This training shall be provided upon initial assignment to the site and prior to use of the product containing the hazardous substance. The SSHO will consult PIKA ESHP-509, Hazard Communication, to obtain additional details regarding HAZCOM compliance and training. Supplemental HAZCOM training shall be scheduled and presented whenever a new hazardous substance is introduced into the work area or an employee changes job location where new products are encountered.

6.5.1 General Information Provided

To enhance personnel knowledge of the general requirements of the OSHA HAZCOM standard, the following shall be maintained on site and the site personnel shall be familiarized with the relevant information presented in the following:

1. The basic OSHA HAZCOM Standard, including employee rights under the regulation;
2. A listing of the operations/processes where hazardous chemicals are used and the potential for exposure exists; and
3. The location and basic elements of the PIKA HAZCOM Program, an inventory of the hazardous substances used on site, and the location and availability of the MSDSs.

6.5.2 Product-specific Information Provided

To enhance personnel knowledge of the chemical and physical hazards associated with hazardous substances used on site, personnel shall be trained to recall, in simple language, the following basic information about each hazardous substance to which they are exposed:

1. Chemical hazards, including the toxic effects a chemical has on the body (long and short term) and the routes of exposure;
2. Physical hazards (i.e., flammability, reactivity);
3. How chemicals may be detected/monitored (instrumentation, color, odor, state);

4. How workers can protect themselves from overexposure or emergency situations (engineering controls, work practices, PPE, and emergency procedures);
5. Steps that have been taken to lessen or prevent exposure to hazardous substances;
6. Spill response procedures for chemical emergencies;
7. Emergency and first aid procedures to follow if employees are over exposed to any hazardous chemicals; and
8. How to generate and read hazard warning labels and review MSDSs.

6.5.3 Documentation of Hazard Communication Training

HAZCOM training shall be documented by the SSHO using the PIKA Documentation of Hazard Communication Training Form (ESHF-505). This documentation shall be maintained on site for the duration of the project, and later incorporated into the employee's personal training file.

6.6 VISITOR TRAINING

Site visitors are defined as persons (1) who are not employed at the project site, (2) who do not routinely enter restricted work areas and, (3) whose presence is of short duration (i.e., 1 to 2 days per visit). Site visitors may include client personnel, PIKA personnel, commercial vendors, political representatives, and auditors or inspectors from Federal, state or local regulatory agencies. It is the responsibility of site personnel to watch for visitors approaching the site and to immediately notify the SSHO or SS of the visitor's arrival. Visitors will be required to comply with the general requirements listed within each project SSHP.

6.7 THREE-DAY ON-SITE TRAINING

The SSHO, along with the SS, will be responsible for conducting and documenting the OSHA required three-day on-site training for site personnel. Part of this training is covered when the site-specific and hazard information training is conducted. The balance of this training involves the SSHO and the SS instructing site personnel on the site-specific procedures related to the safety and health chain of command, PPE donning and doffing, decontamination, general safe work practices, emergency notification and response, and evacuation routes. Once site personnel have been given this instruction and been supervised on site for three days, the SSHO will have the site personnel sign the PIKA Three-day On-site Training Log (see ESHF-511).

6.8 DAILY AND WEEKLY SAFETY BRIEFINGS

6.8.1 Daily Safety Briefing

It is essential that the SSHO be involved in the Daily Task and Safety Brief given each day prior to commencing work. This briefing must be pertinent and informative, and

documented using the PIKA Daily Task and Safety Briefing Log Form (see ESHF-502). The items to be covered include, but are not limited to:

- Expected weather conditions (Heat Stress/Cold Stress, possible storm conditions, etc.);
- Driving conditions/hazards;
- Working conditions
- Required PPE, to include PPE decontamination or PPE hygiene procedures;
- Site-specific hazards (chemical, physical or biological hazards);
- Buddy system procedures;
- Emergency notification procedures and evacuation route; and
- Review any safety violations noted the previous day.

6.8.2 Weekly Safety Briefing

At the beginning of each work week, which is normally Monday, a 10-15 minute Weekly Safety Briefing (WSB) will be presented to highlight and discuss a site-specific safety or health topic. Site personnel will be required to attend the training and the SSHO will document this training in the PIKA Daily Task and Safety Briefing Form (ESHF-502). The training will be presented by the SSHO, or a designated representative, and will be used to cover topics specified by either the CESHM or a topic relevant to site-specific hazards such as chemicals, ordnance, heat stress, etc.

7.0 LOGS, FORMS, REPORTS AND RECORDS

An essential role of the SSHO is the continued maintenance of logs, reports and records which are used to document the on-site safety and health process and to log any significant events which may occur on site. The logs, records and reports which the SSHO will maintain are described below.

7.1 DAILY SAFETY LOG

A daily Safety Log will be maintained on site by the SSHO. This log will be recorded in a bound book with numbered pages, and will as a minimum the include: weather conditions, inspections conducted, results of the inspections, safety issues addressed each day, and any significant occurrences related to site safety.

The SSHO must understand that the Daily Safety Log is an integral part of ensuring and maintaining the safety and health of on-site personnel. The data contained in the log should be of sufficient detail so as to fully document any incidents that could impact the manner in which operations are conducted or have any type of impact on safety and health policies/procedures used on site. Of special importance is the use of the log to document any guidance or directives given to either the SSHO or the SS by an on-site contractor representative. The log can also be used to record statements/suggestions

made by site personnel. When logging events within the log it is also of importance to log not only the initial elements of the event, but also the final disposition and outcome of the event. The SSHO should periodically review the log to determine if there is closure for each significant event logged.

7.2 TRAINING LOG

The SSHO is responsible for verifying that the training conducted on site is recorded daily, and that the PIKA documentation of training logs are properly completed each day that training/briefings are given. Depending upon the number of personnel on site, the SSHO may record the site training in the bound site Safety Log.

7.3 VISITOR LOG

A visitor record will be kept at the entrance to PIKA work sites to record when off-site personnel visit the work site. Visitors to the site must be given a safety briefing and must be logged in and out by the SSHO as soon as they enter the Support Zone. Again, depending upon site size and conditions, the PIKA Site Visitors Entry and Exit Log (ESHF-526) may be used to initially record the entry and exit of site visitors. However, details of the visit, to include the purpose of the visit, and the personnel involved, should be recorded in the bound Safety Log.

7.4 DAILY SAFETY INSPECTIONS AND WEEKLY SITE AUDITS

The SSHO will conduct daily inspections and weekly audits. The SSHO will use the PIKA Daily/Weekly Safety Inspection and Audit Log (see ESHF-506) and will communicate the results to the SS. Copies of inspections shall be maintained at the site, and at the conclusion of the weekly audit, a copy of the inspection checklist will be forwarded to the CESHM for review. Additionally, any daily checklist with deficiencies noted will also be forwarded to the CESHM. Once a deficiency has been corrected, the SSHO will notify the CESHM of the resolution. It is imperative that for each deficiency noted, there is documentation (both on the inspection/audit form and in the Daily Safety Log) of the remedial actions taken to correct the deficiency.

7.5 VEHICLE INSPECTION LOG

The SSHO will verify that the PIKA Vehicle Inspection Checklist and the Equipment Inspection Checklist and Report Form (ESHF-507 and ESHF-508, respectively) are completed on a weekly basis for each site vehicle and piece of heavy equipment used on site. The vehicle inspection form will also be used daily for any vehicle used to transport explosives. Copies of the inspection logs will be maintained on-site and categorized by vehicle. The CESHM will be faxed a copy of any vehicle checklist that has a deficiency noted. For any deficiencies noted, additional documentation will be added to the checklist outlining the remedial actions taken to correct the deficiency. The

CESHM will also be faxed a copy of the checklist when the remedial action is implemented.

7.6 ACCIDENT/ILLNESS/NEAR MISS REPORT

In the event of an emergency, illness, injury, or property accident, the SSHO will be responsible for completing and submitting appropriate forms in a timely fashion. The PIKA Accident/Injury/Near Miss Report Form (ESHF-514) will be completed by the SSHO for:

1. Any injury or illness requiring on-site first aid or assistance at a medical facility.
2. An accident involving property damage in excess of $100.00.
3. A near miss where personnel were nearly injured or property was nearly damaged.

A copy of this report will be faxed to the CESHM within 24-hours of the incident occurrence with the original maintained on site. If required by the client's scope of work (SOW), the CESHM will either complete the client's accident forms or forward a copy of the PIKA form to the client's representative. The CESHM will also be responsible for any necessary reporting to Federal or state OSHA offices. For an accident or illness where the individual is treated at a medical facility, copies of the medical evaluation and treatment forms will be included with the accident report when it is forwarded to the CESHM. For property accidents involving site vehicles, a copy of the police report and repair estimates will also be forwarded to the CESHM with the accident report.

If the project involves a USACE work site, and the injury/illness involves first aid, or a greater level of care, or property damage in excess of $2,000.00, the USACE Accident Investigation report (Eng Form 3394) will be completed. If the Eng 3394 form is required, the PIKA Accident/injury/Illness/Near Miss Report Form (ESHF-514) need not be completed. To complete the Eng 3394 form, follow the instructions provided, and send it to the CESHM prior to submission to the USACE. Once the form has been approved, it should be signed by the SS, submitted to the CESHM for signature, and forwarded by the CESHM to the USACE. Prior to completion of the Eng Form 3394, verbal notification will be given to the USACE on-site representative and the CESHM within 24-hours of the incident occurrence. A preliminary copy of the Eng 3394 form will be forwarded to the CESHM within three working days, with the final version presented to the CESHM within 10 working days.

7.7 CERTIFICATE OF ACTIVITY HAZARD ASSESSMENT FORMS

During the performance of site operations, there is always a potential for changes to the assigned tasks. This may occur because the prime contractor PM changes or adds to the SOW, or a task or operation may be needed that was not anticipated during the development of the SSHP. Additionally, actual on-site conditions related to a task

addressed by the SSHP may effect the anticipated degree or nature of hazards. If any task is added or changes, the SSHO will immediately notify the CESHM of the change and complete a new Certification of Activity Hazard Assessment (CAHA) form (ESHF-529) outlining the hazards. The CESHM will then finalize the CAHA and if required, submit it to the client for approval. If client approval is required, the effected task will be halted until approval is obtained. This is especially true for new tasks added to the SOW. At no time should a new task be initiated on-site until the new task has been evaluated by the CESHM and relevant changes to the SSHP have been integrated and approved.

7.8 EXCLUSION ZONE ENTRY/EXIT LOG

The SSHO will be responsible for ensuring that the PIKA Exclusion Zone Entry and Exit Log (ESHF-532) is maintained. This log is required at hazardous waste sites where an exclusion zone (EZ) is established to control personnel exposures to both HTRW and UXO hazards. If this log is required, the SSHO, or a designated appointee, will log personnel working in the EZ in and out of the EZ. This will be required to provide accountability for EZ personnel in the event of an emergency.

7.9 PERSONAL AIR SAMPLING DATA SHEET

Whenever personal breathing zone or other on-site airborne samples are collected, the SSHO will be responsible for completing the PIKA Integrated Air Sampling Log and Report Form (ESHF-531). This log is required to record relevant information related to the sampling, and the SSHO will complete the form with as much information as possible. Once the sample results have been received, the SSHO will forward a copy of the sampling form and the sample results to the CESHM who will then calculate the sample concentration, excursion concentration (if needed) and the 8-hour time-weighted average. These results will then be sent to the SSHO who will enter them on the sampling form. A copy of the completed sampling form will then be sent to the CESHM who will work with members of the Human Resource Department to include a copy of the sampling results in the employee's medical and exposure files.

7.10 SITE MONITORING LOG

The SSHO, or a designated appointee, will be responsible for ensuring that all information related to on-site monitoring will be recorded in the PIKA Site Monitoring Log (ESHF-533). This log is required at all sites where real-time and/or direct-reading instruments are used to measure the levels of chemical and physical hazards. This form contains headings and columns for recording some of the most frequently monitored hazards, as well as several blank header columns where the SSHO can fill in site-specific hazards to be monitored. The Site Monitoring Log (ESHF-533) also contains a section for recording the instruments used and the calibration dates, as well as a remarks column to note any unusual occurrences.

7.11 HEAT STRESS MONITORING LOG

The SSHO will be responsible for ensuring that the PIKA Heat Stress Monitoring Log (see ESHF-527) is maintained during all site activities conducted in high heat environments. This log is required to track the physiological stress experienced by site personnel working in hot weather.

7.12 SITE-SPECIFIC CHEMICAL INVENTORY

The SSHO will be responsible for ensuring that all chemicals used on site are recorded on the PIKA Chemical Inventory Report Form (see ESHF-528). This log is required under the OSHA Hazard Communication standard for all products containing known or potentially hazardous substances that are used during site activities. The information required by this form can be found on the material safety data sheet for each product.

8.0 SAFETY AND PPE REQUIREMENTS

The SSHO will follow the safety and PPE requirements applicable for each area of the site where such measures are required to safeguard site personnel. The CAHA forms in the SSHP or APP will be used by the SSHO to assist the with the proper selection and use of PPE prior to entering a work area for the first time.

9.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The Daily Task and Safety Briefing Log (ESHF-502);
- The Safety Training Attendance Log (ESHF-503);
- The Daily Inspection and Weekly Audit Report Form (ESHF-506); and
- The Documentation of hazard Communication Training Form (ESHF-505).

10.0 ATTACHMENTS

No attachments are associated with this ESHP.

1.0 PURPOSE

PIKA International, Inc. (PIKA) recognizes that the development of an effective safety culture requires a coordinated team effort in which each member of the team plays an integral part. All PIKA personnel are tasked with ensuring their safety and the safety of their co-workers, the environment and the public. Therefore, this Environmental, Safety and Health Procedure (ESHP) will be used in conjunction with the PIKA Corporate Environmental, Safety and Health Program (CESHP) to help provide safety and health (S&H) orientation to new PIKA employees or new/promoted supervisors. The goal of this program is to improve employee S&H knowledge and to promote PIKA's S&H culture.

2.0 SCOPE

2.1 GENERAL APPLICATION

This ESHP is applicable to all PIKA projects where PIKA personnel may be exposed to occupational S&H hazards. This shall include hazardous waste sites, demolition sites, construction sites and any other project sites associated with PIKA contracts. All newly hired field or supervisory personnel will be given the Phases I and II of the General Orientation training as outlined in paragraph 5.0 of this ESHP. Orientation required for newly hired or promoted supervisors is presented in Paragraph 6.0 of this ESHP.

2.2 SPECIALIZED APPLICATIONS

For those project sites where specialized hazards may be encountered such as munitions and explosives of concern (MEC) or radiological hazards, the employees will be provided with specialized orientation training according to the Site Safety and Health Plan (SSHP) written for the site. This training will be documented at the project site and will be documented using the PIKA Safety Training Attendance Log [Environmental, Safety and Health Form (ESHF)-503] and this form will be maintained at the site and b become a part of the permanent project records.

3.0 REFERENCES

The Occupational Safety and Health Administration (OSHA) standards listed below apply to the conduct of operations associated with this ESHP. Additionally, the responsibilities of the SSHO as outlined in this ESHP are also designed to meet U.S. Army Corps of Engineers (USACE), Department of Energy (DOE), and other current client requirements.

- OSHA General Industry Standards [especially OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standard 29 CFR 1910.120];
- OSHA 29 CFR 1926 Construction Standards (notably 29 CFR 1926.65);
- Client specific S&H manuals, directives, standards, and/or regulations.

4.0 RESPONSIBILITIES

4.1 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The PIKA Corporate Safety and Health Manager (CESHM) is responsible for the continued development and implementation of this ESHP and the PIKA CESHP. To effectively implement this ESHP, the CESHM will:

1. Provide periodic review and update of this program and the CESHP to assess the continued integrity and compliance of the CESHP with applicable Federal, state and local regulations.
2. Consult with PIKA project and site management personnel to assess the effectiveness of this program.
3. Provide consultation to newly hired or promoted supervisors, to include periodic discussions to assess and guide their safety attitude and behavior.
4. Conduct periodic inspections (every 30 to 45 days) of project sites to evaluate the documentation and effectiveness of new employee knowledge of PIKA CESHM requirements.
5. During site visits, conduct interviews with newly hired employees or newly promoted supervisors to evaluate their safety and health values and provide guidance as needed.

4.2 PROJECT MANAGER

The Project Manager (PM) shall be responsible for the availability of the project resources needed to implement this ESHP, and will verify that this ESHP is utilized for all new personnel assigned to projects for which the PM has responsibility. This shall include both newly hired field personnel and supervisors that are either newly hired or promoted.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) is the primary point of contact at each PIKA site that has the overall responsibility for the safe conduct of site operations. As such, the SS will implement this ESHP for new employees before they are allowed to participate in site operations unsupervised. New field personnel complete Phase I of the orientation as defined in this ESHP prior to being allowed to participate in Phase II of the orientation. During the Phase II, the SS will:

1. Supervise the new employee at all times;
2. Assist the new employee in the use of all personal protective equipment (PPE) required by the SSHP or other site safety plan;
3. Provide any additional training that the employee might need to safely perform the assigned tasks;
4. Obtain documentation of successful completion for any training the employee may have had previously and determine if any updates or refresher courses are required; and

5. Evaluate the use of all feasible controls to reduce the risk of personnel exposure to project hazards.

The SS will implement the requirements of paragraph 6.0 of this ESHP for newly hired or recently promoted supervisors. At no time will a newly hired or promoted supervisor be allowed to start work at a PIKA site without an experienced supervisor having conducted the orientation outlined in paragraph 6.0.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO is the S&H authority on the site and is intended to assist the SS in the implementation of S&H requirements and the oversight of S&H procedures. In this role, the SSHO will verify that the requirements of this ESHP are implemented for all new employees to determine that all personnel are properly trained, qualified, equipped, and physically protected from site and operational hazards to the greatest extent feasible. To affect this, the SSHO will assist the SS with employee orientation by:

1. Briefing all new employees on the PIKA S&H program mission, values, and policies;
2. Documenting the Phase I and II orientation training;
3. Specifying the proper levels of PPE IAW the requirements of this SSHP for the Phase II orientation;
4. Implementing the S&H provisions required by this ESHP and the SSHP prior to employee performance of site tasks.

5.0 GENERAL ORIENTATION

5.1 PHASE I

5.1.1 Baseline knowledge

Under contract to multiple Federal, state and commercial clients, PIKA conducts a large variety of operations involving many different tasks-related hazards. This includes the performance of work involving Uncontrolled Hazardous Waste sites. Therefore, PIKA requires all of its site personnel to provide documentation of having completing the OSHA required 40-Hour HAZWOPER course. This requirement also has the benefit of making sure all PIKA personnel have a baseline safety orientation and background knowledge of the topics taught in the 40-hour HAZWOPER course, to include:

1. PPE use, limitations and maintenance;
2. Basic hazard assessment and control measures;
3. General contamination control and decontamination procedures;
4. Medical surveillance requirements;
5. The types and affects of chemical exposure;
6. Identification and control of physical hazards such as heat/cold stress and noise;
7. Identification and control of biological hazards; and
8. Employee Hazard Communication (HAZCOM) Right-to-Know regulations.

5.1.2 Review of the Project Safety Plan

As a mater of corporate policy presented in the PIKA CESHM, PIKA requires the development of either a Site Safety and Health Plan (SSHP) for HAZWOPER sites, or an Accident Prevention Plan (APP) for non-HAZWOPER sites. Prior to being allowed to participate in site activities where an exposure to safety or health hazards exists, new field personnel and supervisors will read the project Safety Plan (i.e., either a SSHP or APP). As required in the plans, the employees will sign the appropriate plan review form indicating that they have read and understand the S&H provisions and requirements outlined in the plan.

5.1.3 Required Site and Task Hazard Training

Regardless of the plan required, Site-specific and Hazard Information Training will be specified in each plan based upon the tasks anticipated and the hazards associated with the site and the tasks. All new employees will be provided this training and all site training required by the project plans shall be conducted, or arranged for, by the SS or SSHO. Unless otherwise specified in this section or the SSHP, all training will be documented using the PIKA Safety Training Attendance Log (ESHF-503) and the PIKA New Employee Safety Orientation Checklist form (ESHF-534). At no time will new PIKA personnel be permitted to conduct any site operations involving the potential for exposure to safety or health hazards until they have received appropriate training.

5.1.3.1 Site-specific Information Training

Site-specific Information Training shall be used to provide site personnel with important information related to site operations. This training shall apply to the Three-day On-site Training outlined below in paragraph 3.1.3.3, and shall cover the topics listed below:

1. PIKA's Corporate S&H mission statement, values, policies, and roles/responsibilities
2. Site history and background
3. Site organization and chain of command
4. Emergency response procedures, assignments, and contacts
5. Site or facility-specific requirements

5.1.3.2 Hazard-Specific Information Training

Hazard information training shall be presented utilizing the PIKA Hazard Information Program that meets the requirements specified in 29 CFR 1910.120 (i). This training shall be presented to all personnel involved in site operations and shall be used to inform personnel as to the degree, nature, and level of exposure likely to occur as a result of participation in site activities. This training, as a minimum, will cover the following topics:

1. A description of physical and toxicological properties of any chemical hazards expected to be found on site.

2. A description of the physical hazards associated with site operations.
3. A description of the biological hazards which may be encountered on site.
4. A description of any specialized hazards that may be encountered (i.e., MEC, radiological contaminants, chemical warfare material, etc.) and the safety procedures to be used for the safety of on-site personnel.
5. The safe work practices, engineering controls, or other hazard control techniques that will be used to minimize exposure to chemical, biological or physical hazards.
6. A review of the Activity Hazards Analysis developed for each task.
7. The use, limitations, cleaning, and maintenance of the PPE that will be required to reduce the risk and degree of physical or chemical exposure.

5.2 PHASE II – ADDITIONAL TRAINING AND ON-SITE ORIENTATION

5.2.1 Additional training

Each project safety plan will outline the task-specific training required for specific job titles and assignments. Additionally, Chapter 6 of the PIKA CESHM contains PIKA's Training Program. These resources will be used by the SS and SSHO to help provide for the requisite training employees will need for task-specific operations as outlined and defined in the above referenced documents. Examples of additional training required include: Equipment operation training will be conducted for site personnel who will be responsible for the operation of monitoring instruments, earth moving equipment (EMM), power tools or hand tools. This training will be documented using the Safety Training Attendance Log (ESHF-503) and will include the following:

1. Heavy Equipment Operations;
2. Hazard Communication for hazardous substance use;
3. Confined Space Entry;
4. Hearing Conservation;
5. Control of hazardous energy (Lockout/Tagout);
6. Crane operations and material rigging; and
7. Fall Protection.

5.2.2 Three-day On-site Orientation Training

As part of the new employee's orientation to a HAZWOPER site, the SS and SSHO will conduct and document the OSHA required three-day on-site training as outlined in paragraph 6.1.1.2 of the PIKA CESHP. Part of this training is covered during the site-specific and hazard information training. The balance of this training involves the SSHO and the SS instructing the new employee on the site-specific procedures related to the S&H chain of command, PPE donning/doffing, safe work practices, decontamination, emergency notification and response, and evacuation routes. Once site personnel have been given this instruction and been supervised on site for three days, the SSHO will verify that personnel have signed the PIKA Three-day On-site Training Log (see ESHF-511).

6.0 NEWLY HIRED OR PROMOTED SUPERVISOR ORIENTATION

6.1 BASELINE TRAINING REQUIREMENT

Again, based upon the nature of PIKA's operations and the need to perform HAZWOPER activities, PIKA requires that all project supervisors (as well as all personnel in a management or supervisory position) have attended and completed not only the 40-Hour HAZWOPER course, but also the HAZWOPER 8-Hour Management and Supervisor Training. As such, all PIKA supervisory personnel obtain the general S&H knowledge required for daily field operations, but also the programmatic issues required by OSHA in 1910.120(e)(4) or 1926.65(e)(4). This includes as a minimum the following requirements:

1. The Safety and Health Program;
2. Employee training and toolbox meetings;
3. Personal protective equipment;
4. Emergency response, fire protection and spill containment;
5. Health hazard monitoring procedures and techniques;
6. New worker orientation procedures.

6.2 ADDITIONAL SUPERVISOR ORIENTATION

Newly hired or promoted supervisors are required to meet additional orientation and training requirements. This includes a thorough review of the PIKA CESHM with all of its attached ESHPs and all client required standards, directives, and regulations. Included in this additional orientation are the following topics:

1. PIKA's Safe, Accident-free Environment (SAFE) program;
2. Behavior Based Safety procedures;
3. Safe work practices;
4. Daily and weekly safety briefings and meetings;
5. Emergency and first aid procedures;
6. Accident investigation;
7. Fire prevention, protection and response procedures; and
8. New Worker Orientation Program.

6.3 SUPERVISOR MENTORING PROGRAM

It is the belief of PIKA management that all newly hired or promoted supervisors should possess the requisite knowledge and experience needed to safeguard site personnel from the hazards associated with the project to which they are assigned. As such, it is the policy of PIKA to assign a mentor to newly hired or promoted supervisors. The mentor assigned to a newly hired or promoted supervisor will be a senior site supervisor or project manager who will perform the supervisory duties while the new supervisor becomes oriented to and accustomed to the supervisory tasks to which they have been assigned. The duration of this mentorship will vary depending upon the knowledge and experience of the newly hired or promoted supervisor, but will not be less than one full

work week. At no time will a new supervisor be assigned to a project without an experienced PIKA mentor being assigned to assist in the supervisor's orientation. When possible and feasible, the mentor will work on-site with the newly hired or promoted supervisor.

7.0 SAFETY AND PPE REQUIREMENTS

The SS and SSHO will verify that new employees are wearing the appropriate PPE whenever they are engaged in orientation or training associated with the implementation of this ESHP. The SSHO will utilize associated S&H plans to assess and assign the PPE for personnel involved with on-site orientation.

8.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Training Attendance Log (ESHF-503) for the initial site hazard training;
3. The PIKA New Employee Safety Orientation Checklist form (ESHF-534);
4. The PIKA Three-day Supervised Training From (ESHF-511); and
5. The Daily Safety Inspection and Weekly Safety Audit Checklists (ESHF-506).

9.0 ATTACHMENTS

None.

ATTACHMENT 4

PIKA SSHP ES&H FORMS

I. GENERAL PROJECT AND SITE INFORMATION			
Date:	Instructor(s):	Time:	Log No.:
Site Name & Location:			
Contract No.:		Contract No.:	
Site Supervisor or SUXOS:		SSHO:	

II. SAFETY AND HEALTH TOPICS COVERED

Tasks Being Conducted:

Applicable CTHA/AHA's Reviewed for Today's Tasks:

Additional Safety Concerns:

Permits Required: ❒ Safe Work Permit ❒ Excavation Permit ❒ Penetration Permit ❒ Other: _____
❒ Hot Work Permit ❒ Lift Plan ❒ Lockout / Tagout _____

Heavy Equipment to be Used Today:

Site Control and Buddy Procedures:

Sub Contractors Working On-site Today and Their Tasks:

Emergency Procedures:

Assembly Locations:

Scheduled Deliveries for Today:

III. DAILY SAFETY BRIEFING ATTENDEES		
Name (printed)	**Signature**	**Organization**

I certify that the personnel listed on this roster have received the safety and health training described above.

Site Safety and Health Officer

Sr. UXO Supervisor or Site Supervisor

Date:	Instructor(s):	Time:	Log No.:
Site Name & Location:			
Contract No.:		Task Order Number:	
Site Supervisor or SUXOS:		SSHO:	

I. TRAINING PROVIDED

❒ Initial Site Hazard Training	❒ Weekly Safety Training	❒ Other:
❒ Task/Hazard-specific Training (list task/hazard):		

II. TRAINING TOPICS COVERED

Description of the S&H Topics Covered:

III. TRAINING COURSE ATTENDEES

Name (printed)	Signature	Organization

IV. TRAINING VERIFICATION

I certify that the personnel listed on this roster have received the safety and health training described above.

Site Safety and Health Officer

Sr. UXO Supervisor or Site Supervisor

Assigned Safety Observer:	Date:
PIKA Project #:	Report #:
Site Name and Location:	

Description Of Work Performed : _____

Slips, Trips, Falls: _____

Struck By/Against: _____

Strains/Sprains: _____

Fire/Explosion: _____

Burns, Chemical/Heat: _____

Exposure To Contaminants: _____

Unsafe Acts Observed: _____

Unsafe Conditions Observed: _____

Safe Behavior Observed and Recognized: _____

Other/Comments: _____

Signature of Safety Observer: _____

Safety Observer Reviewed By: (Supervisor): _____

GENERAL SITE INFORMATION			
CONTRACT NO.:	**DATE:**	**TIME:**	**LOG NO.:**
SITE NAME AND LOCATION:			
SITE SUPERVISOR:		**SSHO:**	

WEATHER CONDITIONS: _____

AREAS INSPECTED: (List by location, team, or task) _____

INSPECTION RESULTS

Item Description	Pass	Item Description	Pass
1. Personal Protective Equipment (PPE) per SSHP	Y / N	9. OE Detection Equipment Use/Calibration	Y / N
2. Work Practices Follow SSHP/WP	Y / N	10. Monitoring/Sampling Equip. Calibration/Use	Y / N
3. Site Control established per SSHP	Y / N	11. Heavy Equipment Insp./Maintenance/Use	Y / N
4. First Aid Kit(s)/Eyewash Station(s)	Y / N	12. Hand and Power Tool Insp./Maintenance/Use	Y / N
5. Fire Extinguisher(s)	Y / N	13. Site House Keeping & Sanitation	Y / N
6. Flammable Storage Areas	Y / N	14. Explosives / OE / Other Storage Areas	Y / N
7. MSDSs and Container Labeling per SSHP	Y / N	15. Other: (list)	Y / N
8. On- and Off-Site Communications	Y / N	16. Other: (list)	Y / N

SUMMARY OF DEFICIENCIES NOTED: (If Required) _____

CORRECTIVE ACTIONS RECOMMENDED: (If required) _____

RE-INSPECTION RESULTS: (If required) _____

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	_____ Site 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 PIKA Corporate Safety and Health Manager.

Site Name / Location: _____

Site Supervisor: _____ **Vehicle:** _____
(MAKE AND LICENSE PLATE #)

Date Inspected: _____ **Mileage:** _____ **Owner:** _____
(RENTAL, PIKA, GFE, CONTRACT)

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

1. DOCUMENTATION:	Pass	Fail	5. BRAKES:	Pass	Fail
Registration and License Plate			Hand/Emergency		
Insurance			Service		
Emergency Route Map & Phone #s					
2. TIRES:	**Pass**	**Fail**	**6. BELTS:**	**Pass**	**Fail**
Pressure			Proper tension		
Condition			Condition		
3. EQUIPMENT:	**Pass**	**Fail**	**7. GENERAL:**	**Pass**	**Fail**
Fire extinguishers			Windshield		
First Aid/CPR/Burn Kits			Windshield Wipers		
Bloodborne Pathogen Kit			Windows (Condition/Operation)		
Eyewash Kits			Seat Belts		
Spare Tire			Steering		
Tire Changing Equipment			Horn		
Tie downs ✳			Gas Cap		
Chocks ✳			Mirrors		
Placards ✳			Door/Window Handles/Latches		
Other (list):			Cleanliness		
Other (list):			Exhaust System ✳		
4. FLUID LEVELS:	**Pass**	**Fail**	**8. LIGHTS:**	**Pass**	**Fail**
Oil			Headlights (high & low)		
Coolant			Brake Lights		
Brake			Parking		
Steering			Back-up		
Transmission			Turn Signals		
Windshield Wiper			Emergency Flashers		
Fluid Leaks			Interior Lights		
Last Oil Change					

(Notes: 1. Items marked with an ✳ are required for explosive carriers and must be inspected prior to each use.
2. Vehicle inspection forms with failures are to have the deficiencies noted and copy of the form forwarded within two working days to the PIKA PM and the Corporate Safety and Health Manager.)

Description of Deficiencies: _____

_____

_____

_____

Corrective Actions to be Taken: _____

_____

_____

Inspection Conducted By: _____ _____
Name Printed Signature

Deficiencies Corrected By: _____ _____ Date: _____
Name Printed Signature

Site Name & Location:					
Contract No.:			**Task Order Number:**		
Site Supervisor or SUXOS:			**SSHO:**		
Log #:	**Date:**	**Time:**	**Odometer Reading:**	**Hour Meter Reading:**	**Fuel Level:**

Make/Description: _____ **Model:** _____ **Serial No.:** _____

Mark the "Pass" column to indicate that the item is present and in proper working condition. If required but absent or deficient check "Fail" and describe the deficiency and the required corrective action in the "Discrepancy/Comments" box. If an item does not apply to the equipment being inspected, enter "NA". All listed items must have a response.

Item	Pass	Fail	NA	Deficiency and Required Corrective Action
Service Brakes				
Emergency Brakes				
Parking Brake				
Brake Lights				
Back-up Alarms				
Horn				
Tires				
Spare Tire & Tire Changing Equip.				
Steering				
Seat Belt				
Operating Control				
Fire Extinguisher				
Head and Tail Lights				
Mirrors				
Windshield				
Windshield Wipers and Washers				
Coupling Devices				
Guards for Moving Parts				
Brake – Hydraulic				
Brake Fluid				
Hydraulic Oil				
Engine Oil and Coolant				
Roll Over Protection System				
Falling Object Protection System				
Other:				
Other:				
Other:				

Inspection conducted by: _____ _____
Name Printed Signature

Deficiencies corrected by: _____ Date: _____

Note: Forms with deficiencies are to be faxed to the PM and the Safety/Health Manager within two working days of inspection.

Site personnel shall sign this form after having read the SSHP, and will do so prior to being allowed to perform operations on site involving known or potential exposures to safety of health hazards.

EMPLOYEE STATEMENT

My signature below indicates that I have read the SSHP and have received answers to any questions that I had related to the SSHP. My signature further indicates my willingness to comply with the provisions and requirements of the SSHP.

Project Name/Location:			
Date:	Organization	Printed Name	Signature

Site Name & Location:	
Contract No.:	**Task Order Number:**
Site Manager or SUXOS:	**SSHO:**

The site personnel listed below have received Site Hazard Information Training as specified in 29 CFR 1910.120(i) and have participated in three-days of supervised on-site training as required by 29 CFR 1910.120(e)(3)(i). The Site Hazard Information Training included information related to the nature, level, and degree of exposure likely to result during participation in site operations. The 3-Day Training has included: a description of the site chain-of-command; use/care/maintenance of PPE; personnel and equipment decon procedures; safe work practices; medical/training requirements; and emergency response procedures.

Name (printed)	Signature	Organization	Date Training Started	Date Training Completed

SECTION 1 - GENERAL SITE AND PERSONNEL INFORMATION			
Employee Name:	SSN:		Case No.:
Job Title:	D.O.B.:	Sex:	Age:
Site Name and Location:			
Site Supervisor	Site Safety and Health Officer		
Date of Report:	Date of Incident:	Time of Incident:	
Task/Operation Being Conducted:			
PPE Worn:			

SECTION 2 - CONDITIONS AT TIME OF INCIDENT

Temperature: _____°F Relative Humidity: _____% Degree of Cloud Cover: _____%
Wind Speed: _____MPH Direction: _____ Other: _____

Type of Incident: Personal Injury Personal Illness Chemical Exposure
Motor Vehicle Heavy Equipment Property Damage Near Miss

If chemical exposure, what material(s) was(were) involved: _____
What was the nature of exposure (contact, inhalation, etc.):_____

Other Individual(s) Involved: _____

SECTION 3 - PERSONAL INJURY/ILLNESS INFORMATION

Nature/Type of Injury/Illness (laceration, strain, etc.): _____

Cause of Injury/Illness: _____

Body Part(s) Affected: Primary: _____ Secondary: _____

Injury/Illness Required: On Site First Aid Treatment Emergency Room Treatment Hospitalization

Injury/Illness Resulted In: Loss of Work Time Restriction / Limitation of Duties Fatality
Other: (Explain): _____

Status at Time of Report: Returned to Work: (Date: _____) Hospitalized: (Anticipated Stay:_____)
Convalescing: (Anticipated Length of Convalescence:_____
Other: _____

On-site First Aid Treatment Given (use additional paper if needed): _____

Off-site Medical Treatment (attach documentation, including Physician statement): _____

SECTION 3 - MOTOR VEHICLE/HEAVY EQUIPMENT ACCIDENT INFORMATION

Type of Vehicle/Equipment	Type of Collision	Seat Belt Use
Car/Van Van/Truck	Side Swipe Rear End Backing	Front Seat Yes No
Heavy Equip. Other:	Head On Broadside Roll	Back Seat Yes No

Property/Material/Items Involved

Name of Item	Owner	$ Amount of Damage

SECTION 4 - POST ACCIDENT/INJURY/ILLNESS REVIEW

Has the PIKA Home Office been notified? Yes No, If Yes, When? _____ By Whom? _____

Were operations conducted using approved PIKA ESHP or a SSHP?
Yes Reference: _____
No Explain: _____

Accident Description (Use additional paper if needed): _____

SSHO's Comments (use additional paper if needed): _____

Employee Comments (use additional paper if needed): _____

Corrective Actions Taken (use additional paper if needed): _____

Witnesses

Name	Organization	Phone Number

SECTION 5 - SIGNATURES

Employee Signature: _____ Date: _____

SSHO Signature: _____ Date: _____

Corrective Actions Completed By: _____ Date: _____

PIKA Corp. Review By: _____ Date: _____

PROJECT NAME PROJECT LOCATION:					CONTRACT NO.:		
Date	Name	Company	Reason for Visit	Safety Briefing Given By	Time		PIKA Escort Req'd (Y / N)
					In	Out	

Site Name/Location:	**Contract No.:**	**Delivery Order No.:**

Date	Product Name	Supplier's Name and Address	Hazardous Substances in the Product	Training Given	MSDS On-site

Site Name & Location:	
Contract No.:	Task Order Number:
Employee Name:	
Site Supervisor or SUXOS:	SSHO:
Date Orientation Started:	Date Orientation Completed:
During new employee orientation the following items will be discussed and reviewed with the employee prior to the employee being working on site. Each item will be initialed by the person conducting or supervising the review or discussion. If a given topic is not applicable to the employee's duties, write "NA" in the space and initial the "NA."	

Initial	Training Topic
	General safety and health policies and procedures and pertinent provisions of any client specific safety and health documents.
	Requirements outlined in the site-specific APP and SSHP.
	Procedures for the PIKA Safety Observer Program.
	Requirements for the daily Task and Safety Briefings and Weekly Safety Meetings.
	Requirements and responsibilities for accident prevention and maintaining safe and healthful work environments.
	Employee and supervisor responsibilities for reporting all accidents.
	Provisions for medical facilities and emergency response, including emergency evacuation procedures, evacuation routes and assembly points.
	The location of emergency phone numbers, and medical facilities/treatment procedures.
	Procedures for reporting and correcting unsafe conditions or practices.
	Job hazards and the means to control/eliminate those hazards, including applicable AHA Forms and PPE requirements.
	Safe use of PPE including hand, eye, head, hearing, and respiratory protective devices applicable to the job.
	Requirements for the use of fall protection and ladder use and safety.
	Procedures regarding "Stop Work" authority.
	Applicable provisions of the hazard communication program and location of MSDSs.
	Identified confined spaces and their general entry requirements and restrictions.
	Procedures for immediately reporting all accidents to include injuries or property damage to the SSHO.
	Fire prevention and protection, to include the location of fire extinguishers and fire reporting procedures.
	Location of the job trailer, office trailer, vehicle parking areas, and designated smoking areas.
	Location of project bulletin board.
	Rules prohibiting the use or possession of intoxicants, drugs, guns, weapons, ammo on the job site.
	Rules prohibiting horseplay and other unsafe behavior.
	Good house keeping requirements for the job site and break areas.
	Local traffic regulations, permits, and speed limits.
	Safe clearance distances, use of safety vest, and safe procedures for working around heavy equipment.
	"Buddy" procedures and the need for looking out for others.
	Identification/control of toxic substances related to either on-site contamination or products used on-site.
	Requirement to maintain safety awareness at all times and to be responsible for your safety and the safety of those working around you.
	General Lockout/Tagout (LO/TO) procedures including identification of LO/TO devices.
	Employee requirement to notify the SSHO of any known medical problems or conditions that could affect their safety or which need to be known in the event of an emergency to include use of medications.
	Employee requirement to notify the SSHO of medications being used that could affect employee's safety.

ATTACHMENT 5

PIKA EMPLOYEE HEALTH AND SAFETY QUALIFICATIONS

Certificate of Training

This Document Certifies That

BRIAN A. STOCKWELL

Has Successfully Completed The OSHA Required 40 Hour
HEALTH AND SAFETY TRAINING
Complying with OSHA STANDARD 29CFR 1910.120
INITIAL TRAINING

B. f. Stuart, CSP
Course Director

EPT inc.
Environmental Protection Training, inc.

NOVEMBER 1, 1990
Date of Completion

001257

PIKA INTERNATIONAL, INC.

Certificate of Completion

Presented to

Brian Stockwell

For Successful Completion of

OSHA 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response 8-Hour Refresher Course

January 18, 2011

Presented by *Joseph Frydenger*

Joseph Frydenger, PIKA CSHM

WORKCARE™
Making Health Count

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

EMPLOYEE:	Stockwell, Brian A.	**COMPANY:**	PIKA International, Inc.
ID:		**POSITION:**	Project Manager
DATE OF EXAM:	04/28/2010	**LOCATION:**	PIKA-Ravenna
EXPIRATION DATE:	04/28/2012	**SITE:**	Ohio

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☒	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☒	☐

STATUS

1. ☒ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

3. ☐ **NOT QUALIFIED**

4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS:

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 05/04/10

Signature: Peter P Greaney MD

New Environment, Inc.

This is to certify that

Chuck Morjock

has satisfactorily completed NEI's

HAZWOPER
[29CFR1910.120]
40-Hour Worker Program

3/7/2007		
Date		Course Administrator
Sanford, TX	800.732.3073	31385
Location		Student ID Number

PIKA INTERNATIONAL, INC.

Certificate of Completion

Presented to

Chuck Morjock

For Successful Completion of

OSHA 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response 8-Hour Refresher Course

January 18, 2011

Presented by *Joseph Frydenger*

Joseph Frydenger, PIKA CSHM

WORKCARE™
Making Health Count

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

EMPLOYEE:	Morjock, Chuck	**COMPANY:**	PIKA International, Inc.
ID:		**POSITION:**	Operator - Foreman
DATE OF EXAM:	03/01/2010	**LOCATION:**	PIKA-Indiana
EXPIRATION DATE:	03/01/2011	**SITE:**	Ohio

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☒	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☒	☐

STATUS

1. ☒ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.
2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:
3. ☐ **NOT QUALIFIED**
4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS:

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 03/08/10

Signature: Peter P Greaney MD

New Environment, Inc.

This is to certify that

Lewis A. Kovarik

has satisfactorily completed NEI's

HAZWOPER

[29CFR1910.120]

40-Hour Worker Program

06/29/00
Date

Independence, OH
Location

Timothy E. Smith

16639
Student ID Number

800/732-3073

PIKA INTERNATIONAL, INC.

Certificate of Completion

Presented to

Lew Kovarik

For Successful Completion of

OSHA 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response 8-Hour Refresher Course

January 18, 2011

Presented by *Joseph Frydenger*

Joseph Frydenger, PIKA CSHM

WORKCARE™
Making Health Count

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

EMPLOYEE:	Kovarik, Lewis A.	**COMPANY:**	PIKA International, Inc.
ID:		**POSITION:**	UXO Supervisor
DATE OF EXAM:	04/29/2010	**LOCATION:**	PIKA-Indiana
EXPIRATION DATE:	04/29/2011	**SITE:**	Ohio

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☒	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☒	☐

STATUS

1. ☒ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

3. ☐ **NOT QUALIFIED**

4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS:

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 05/05/10

Signature: Peter P Greaney MD

PIKA
INTERNATIONAL, INC.

PIKA International, Inc. ESHF-518
Documentation of Qualitative Fit Testing Form

Employee Name: Lew Kovarik	SSN: N/A	Age: 40
Job Title: UXO Safety / QC	D.O.B.: 10/09/70	Sex: M
Site Name and Location: Ravenna AAP		
Site Supervisor: MEL LAU	SSHO: LEW KOVARIK	

This record represents a factual account of the Qualitative Fit-test(s) conducted on the named individual, and specifies the type of test which was conducted. This Fit-Test was conducted according to the qualitative fit test protocols in Appendix A of 29 CFR 1910.134.

1/18/11

Name of Fit Tester: Joe Frydenger	Signature of Fit Tester:	
Fit Test Protocol ☒ Irritant Fume ☐ Saccharine	☐ Isoamyl Acetate ☐ Bitrex™	
Type of Mask: Full FACE	Manufacturer: NORTH	
Model Number: 7600	Size: MED / LARGE	☒ Pass / ☐ Fail

Name of Fit Tester:	Signature of Fit Tester:	
Fit Test Protocol ☐ Irritant Fume ☐ Saccharine	☐ Isoamyl Acetate ☐ Bitrex™	
Type of Mask:	Manufacturer:	
Model Number:	Size:	☐ Pass / ☐ Fail

Name of Fit Tester:	Signature of Fit Tester:	
Fit Test Protocol ☐ Irritant Fume ☐ Saccharine	☐ Isoamyl Acetate ☐ Bitrex™	
Type of Mask:	Manufacturer:	
Model Number:	Size:	☐ Pass / ☐ Fail

Name of Fit Tester:	Signature of Fit Tester:	
Fit Test Protocol ☐ Irritant Fume ☐ Saccharine	☐ Isoamyl Acetate ☐ Bitrex™	
Type of Mask:	Manufacturer:	
Model Number:	Size:	☐ Pass / ☐ Fail

Comments:

Certificate of Training

Presented To

Melvin Lau

For Having Successfully Completed
the Training Requirements for the

OSHA 29 CFR 1910.120 40-Hour Hazardous Waste
Operations and Emergency Response Equivalency Certification

Drew Bryson, CIH, MPH
Corporate Safety and Health Mgr.

MKM

July 7, 2004
Date

PIKA INTERNATIONAL, INC.

Certificate of Completion

Presented to

Mel Lau

For Successful Completion of

OSHA 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response 8-Hour Refresher Course

January 18, 2011

Presented by *Joseph Frydenger*

Joseph Frydenger, PIKA CSHM

WORKCARE™
Making Health Count

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

EMPLOYEE:	Lau, Melvin R.	**COMPANY:**	PIKA International, Inc.
ID:		**POSITION:**	Site Supervisor
DATE OF EXAM:	07/29/2010	**LOCATION:**	PIKA-Indiana
EXPIRATION DATE:	07/29/2011	**SITE:**	Ohio

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

The following recommendations includes review of the following exam components:

- *Blood Lead/ZPP*
- *Blood Lyme Disease Antibodies*

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☒	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☒	☐

STATUS

1. ☒ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.
2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:
3. ☐ **NOT QUALIFIED**
4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS:

Examination in accordance with OSHA 1910.120, 1926.1101 (Asbestos Certification).

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 08/07/10

Signature: Peter P Greaney MD

Compliance Solutions

"Today's Training... Tomorrow's Solution"

8515 E 46th Ave, Suite 116, Denver Colorado 80238 800-711-2766

Student Affiliation:
Pilot International, Inc.
99175786

Certificate of Completion

This is to certify that

Shahram Taherinia

has successfully completed the classroom requirements for

40 Hour HAZWOPER

29 CFR 1910.120(e)

Presented

Friday, October 08, 2004

Compliance Solutions Occupational Trainers, Inc.

Certificate Number: *62824*

Neval Gupta
Vice President

Bobby Pinkerton CECM
Instructor

PIKA INTERNATIONAL, INC.

Certificate of Completion

Presented to

Shahram Taherinia

For Successful Completion of

OSHA 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response 8-Hour Refresher Course

January 18, 2011

Presented by *Joseph Frydenger*

Joseph Frydenger, PIKA CSHM

WORKCARE™
Making Health Count

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

EMPLOYEE:	Taherinia, Shahram	**COMPANY:**	PIKA International, Inc.
ID:		**POSITION:**	Engineer
DATE OF EXAM:	12/08/2010	**LOCATION:**	PIKA-Ravenna
EXPIRATION DATE:	12/08/2011	**SITE:**	Texas

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☒	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☒	☐

STATUS

1. ☒ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.
2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:
3. ☐ **NOT QUALIFIED**
4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS:

Examination In accordance with OSHA 1910.120, 1926.1101 (Asbestos Certification).

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 12/14/10

Signature: Peter P Greaney MD

ATTACHMENT 6

PIKA MEDICAL SURVEILLANCE PROGRAM

PIKA INTERNATIONAL, INC.

Memorandum

To: Mr. Jay Trumble, USACE Project Engineer

From: Brian Stockwell, PIKA International, Inc.

Date: February 7, 2011

Re: Certification of Medical Surveillance Program Participation – Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services, Ravenna Army Ammunition Plant, Ravenna, Ohio, Contract No. W912QR-10-P-0058

Dear Mr. Trumble:

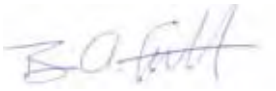
This memorandum is to certify that all the personnel listed below, are enrolled in a medical surveillance program that complies with OSHA standards 29 CFR 1910.120 (f) and 29 CFR 1926.65 (f).

Name	Date of last examination	Name of examining physician(s)
1) Brian Stockwell	04/28/2010	Peter P. Greaney M.D.
2) Chuck Morjock	03/01/2010	Peter P. Greaney M.D.
3) Lewis Kovarik	04/29/2010	Peter P. Greaney M.D.
4) Mel Lau	07/29/2010	Peter P. Greaney M.D.
5) Shahram Taherinia	12/08/2010	Peter P. Greaney M.D.

We are providing the compliance files for all the personnel as part of this memorandum.

Please let me know if you have any questions or need any additional information.

Sincerely,



Brian Stockwell
Project Manager

Encl: Certifications for Personnel

APPENDIX E

SAMPLING AND ANALYSIS PLAN

Final Sampling and Analysis Plan For the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services Addendum No. 1

Ravenna Army Ammunition Plant Ravenna, Ohio

Contract No. W912QR-10-P-0058

Prepared for:

U.S Army Corps of Engineers
600 Dr. Martin Luther King Place, Room 821
Louisville, KY 40202-2230

Prepared By:

PIKA International Inc.
12723 Capricorn Dr. Suite 500
Stafford, TX 77477-4104

February 25, 2011

TABLE OF CONTENTS

1.0 PROJECT DESCRIPTION 1-1
1.1 INTRODUCTION 1-1
1.2 FACILITY BACKGROUND 1-1
1.3 CC-RVAAP-80 GROUP 2 PROPELLANT CAN LID AREA BACKGROUND 1-2
1.4 SUMMARY OF EXISTING DATA 1-3
2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES 2-1
2.1 PROGRAM MANAGER 2-1
2.2 PROJECT MANAGER 2-1
2.3 TECHNICAL MANAGER 2-1
2.4 PIKA SITE SAFEETY AND HEALTH OFFICER 2-2
2.5 FIELD OPERATIONS MANAGER 2-2
2.6 SAMPLING MANAGER 2-2
2.7 UNEXPLODED ORDNANCE (UXO) CONSTRUCTION SUPPORT 2-2
2.8 FIELD PERSONNEL 2-3
3.0 SCOPE AND OBJECTIVES 3-1
3.1 PROJECT OBJECTIVES 3-1
3.2 SITE SPECIFIC DATA QUALITY OBJECTIVES (DQO) 3-1
3.3 CONCEPTUAL SITE MODEL 3-2
3.4 IDENTIFY DECISIONS 3-2
3.5 DEFINE THE STUDY BOUNDARIES 3-2
3.6 IDENTIFY DECISION RULES 3-3
3.7 INPUTS TO THE DECISION 3-3
3.8 SPECIFY LIMITS ON DECISION ERROR 3-3
3.9 SAMPLE DESIGN 3-3
4.0 FIELD SAMPLING METHODS AND PROCEDURES 4-1
4.1 GEOPHYSICAL DELINEATION 4-2
4.2 MULTI-INCREMENT® SURFACE SOIL SAMPLING 4-2
4.3 FIELD QC SAMPLING PROCEDURES 4-3
4.4 DECONTAMINATION PROCEDURE 4-4
4.5 SITE SURVEY AND MAPPING 4-4
4.6 LABORATORY ANALYSIS 4-5
5.0 SAMPLE CHAIN OF CUSTODY/DOCUMENTATION 5-1
5.1 FIELD LOG BOOK 5-1
5.2 PHOTOGRAPHS 5-1
5.3 SAMPLE NUMBERING SYSTEM 5-1
5.4 SAMPLE DOCUMENTATION 5-1
5.5 DOCUMENTATION PROCEDURES 5-1
5.6 CORRECTIONS TO DOCUMENT 5-1
5.7 MONTHLY REPORTS 5-2
5.8 FIELD QUALITY CONTROL 5-2
6.0 SAMPLE PACKAGING AND SHIPPING REQUIREMENTS 6-1
6.1 PACKING AND SHIPPING PROTOCOL 6-1
7.0 DELIVERABLES 7-1
7.1 DATA VALIDATION 7-1
7.2 INVESTIGATION REPORT 7-1
8.0 INVESTIGATION-DERIVED WASTE 8-1

9.0 REFERENCES.....9-1

LIST OF FIGURES

Figure 1 General Location and Orientation of RVAAP
Figure 2 Compliance Restoration Site CC-RVAAP-08 Group 2 Propellant Can Tops and RVAAP- 09 Load Line 2 Building DB-802 within RVAAP
Figure 3 CC-RVAAP-80 Group 2 Propellant Can Tops Site Map
Figure 4 Project Organization Chart

ABBREVIATIONS

ASTM	American Society for Testing and Materials
BRACD	U.S. Army Base Realignment and Closure Division
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COR	Contracting Officers Representative
DQO	Data Quality Objective
DoD	Department of Defense
EP	Engineering Pamphlet
FCO	Field Change Orders
FSP	Field Sampling Plan
GOCO	Government-owned contractor operated
HTRW	Hazardous, Toxic and Radioactive Waste
IDW	Investigation-Derived Waste
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
MI	Multi-Increment
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NGB	National Guard Bureau
OE	Ordnance and Explosives
Ohio EPA	Ohio Environmental Protection Agency
QA	Quality Assurance
OHARNG	Ohio Army National Guard
QAPP	Quality Assurance Project Plan
QC	Quality Control
RVAAP	Ravenna Army Ammunition Plant
SAP	Sampling and Analysis Plan
SSHP	Site-Specific Safety and Health Plan
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCLP	Toxicity Characteristic Leaching Procedure
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USP&FO	United States Property & Fiscal Officer
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound

1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

This Sampling and Analysis Plan (SAP) Addendum has been developed under contract number W912QR-10-P-0058 with the U.S. Army Corps of Engineers (USACE).

This plan is developed to tier under and supplements the final Facility-Wide Sampling and Analysis Plan (Facility-Wide SAP) for the Ravenna Army Ammunition Plant (RVAAP), Ravenna, Ohio (USACE 2001). The Facility-Wide SAP provides the base documentation (i.e., technical and investigative protocols) for conducting an investigation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) at RVAAP, whereas this SAP includes all of the specific sampling and analysis objectives, rationale, planned activities, and criteria. Consequently, both documents are necessary in order to perform this task. Where appropriate, this SAP Addendum contains references to the Facility-Wide SAP for base procedures and protocols.

The Facility-Wide SAP and this SAP Addendum have been developed following the USACE guidance document, Requirements for the Preparation of Sampling and Analysis Plans, EM 200-1-3, February 2001 (USACE 2001a), to collectively meet the requirements established by the Ohio Environmental Protection Agency (Ohio EPA) Northeast District, and the U.S. Environmental Protection Agency (EPA).

1.2 FACILITY BACKGROUND

Past Department of Defense (DoD) activities performed at the former RVAAP date back to 1940 and include manufacturing, loading, handling and storing of military explosives and ammunition. Until 1999, the RVAAP was identified as a 21,419-acre installation. The Ohio Army National Guard (OHARNG) resurveyed the property boundary, finishing in 2003, and the actual total acreage was found to be 21,683.289 acres. As of February 2006, a total of 20,403 acres of the former 21,683-acre RVAAP has been transferred to the National Guard Bureau (NGB) via the United States Property and Fiscal Officer (USP&FO) for Ohio and subsequently licensed to the OHARNG for use as a training site. Currently, RVAAP consists of 1,280 acres in several distinct parcels scattered throughout the confines of the OHARNG Camp Ravenna Joint Military Training Center (Camp Ravenna). RVAAP's remaining parcels of land are located completely within the Camp Ravenna perimeter fence. The RVAAP facility is controlled by the U.S. Army Base Realignment and Closure Division (BRACD).

Camp Ravenna/RVAAP is located in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 kilometers (three miles) east/northeast of the city of Ravenna and approximately 1.6 kilometers (one mile) northwest of the Village of Newton Falls. The RVAAP portions of the property are solely located within Portage County. Camp Ravenna (inclusive of RVAAP) is a parcel of property approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garret, McCormick, and Berry roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east. Camp Ravenna is surrounded by several communities: Windham on the north; Garrettsville 9.6 kilometers (6 miles) to the northwest; Newton Falls 1.6 kilometers (1 mile) to the south east; Charlestown to the southwest; and Wayland 4.8 kilometers (3 miles) to the south.

When RVAAP was operational, Camp Ravenna did not exist and the entire 21,683-acre parcel was a government-owned contractor operated (GOCO) industrial facility. The RVAAP BRACD site encompasses investigation and cleanup of past activities over the entire 21,683 acres. Therefore, references to the RVAAP in this document shall include the historical extent of the RVAAP, inclusive of the combined acreages of the current Camp Ravenna and RVAAP, unless otherwise specifically stated. A regional map indicating the location of the RVAAP is presented as Figure 1. A facility map of the RVAAP is presented as Figure 2.

1.3 CC-RVAAP-80 GROUP 2 PROPELLANT CAN LID AREA BACKGROUND

CC-RVAAP-80 consists of the Group 2 Propellant Can Tops area. Propellant can lids or tops were identified on the ground surface/near surface at the southern end of the former Group 2 Ammunition Storage Area. These materials are typically classified as Range-Related Debris (RRD) (similar to munitions packaging materials). This site was never classified as an operational range. Therefore, it is believed that the discarded propellant can tops might qualify as inert scrap metal.

The propellant can tops located at the south end of Group 2 were initially identified by OHARNG trainees in the winter of 2008. The propellant can tops were observed in the vegetated cover area located immediately south of the ammunition storage magazines in the vicinity of the southern railroad spur lines. This area consists of approximately 539,572 square ft (12.4 acres). Figure 2 shows the location of the Group 2 Ammunition Storage Area within the RVAAP. A site map showing the location of the propellant can lid area within Group 2 is presented as Figure 3.

1.4 SUMMARY OF EXISTING DATA

Following discovery of the propellant can tops by the OHARNG, the Louisville District USACE performed an emergency survey with a metal detector of a portion of the southern area ground surface at the Group 2 Ammunition Storage Area. Results of the initial investigation revealed multiple magnetic anomalies in the surface and near surface soils. On-site personnel visually identified the surface anomalies as propellants can lids or tops. During the emergency survey it was noted that the ground surface had been disturbed and contained hummocks (mounds) ranging in height from 1' to 2' throughout the survey area.

As such, the propellant can tops (or RRD) are of environmental concern for the subject area. A geophysical survey is necessary to identify the anomalies and anomalous areas within the subject area, and to characterize the subject area boundary(s).

The anomalies and anomalous areas should be clearly marked during the field survey in order to facilitate a limited soil investigation, and possible future clean up activities. The limited soil investigation is warranted to assess possible releases of propellants (MC) to the surface soils in the vicinity of the can tops.

PIKA INTERNATIONAL, INC.
12723 CAPRICORN DR. STE#500
STAFFORD, TX 77477

Ravenna Army Ammunition Plant
Ravenna, OH

FIGURE 1 - GENERAL LOCATION AND ORIENTATION OF RVAAP

Drawn On: 10/30/2007 Drawn By: QX Reviewed By: SAK

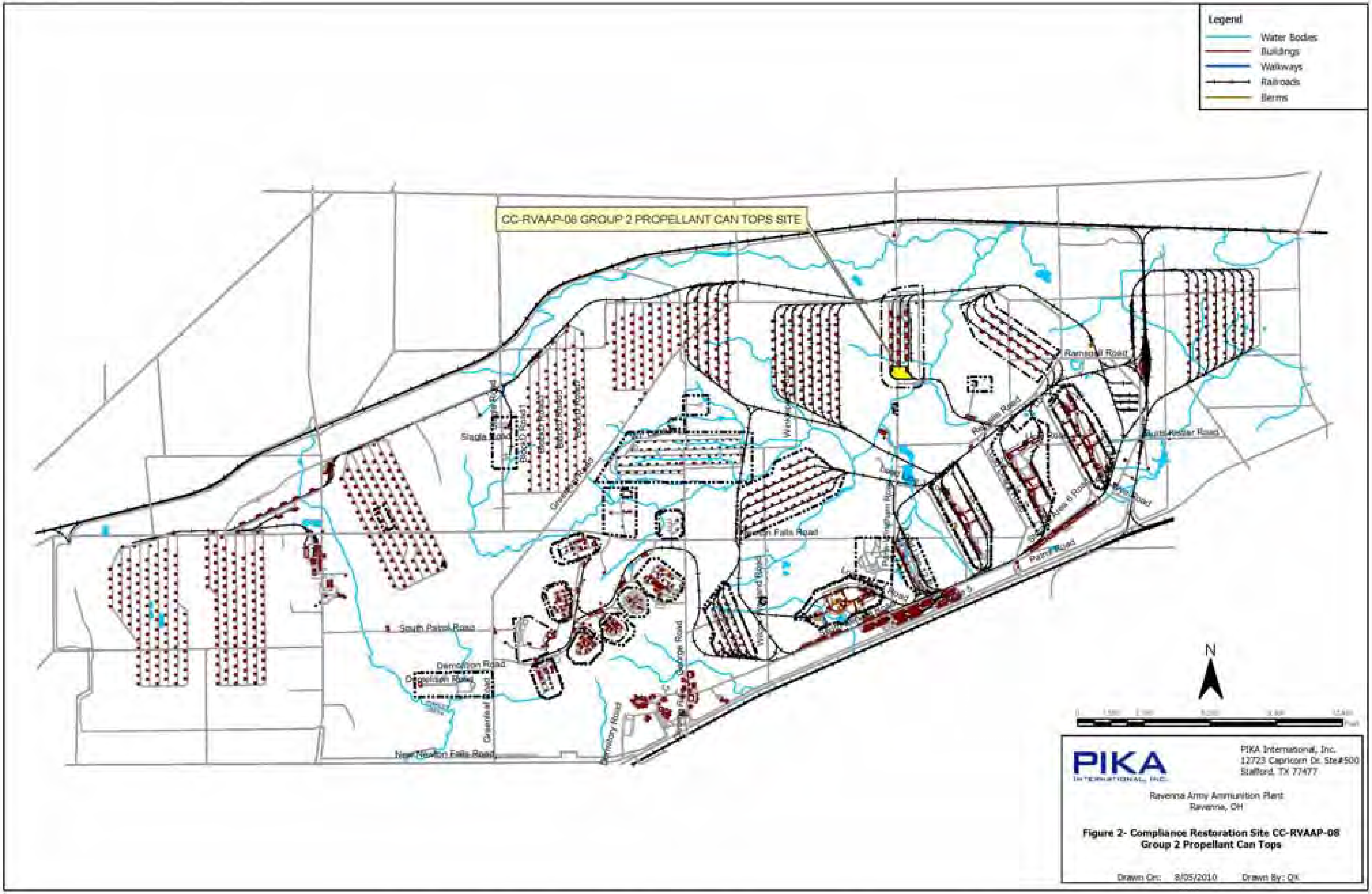
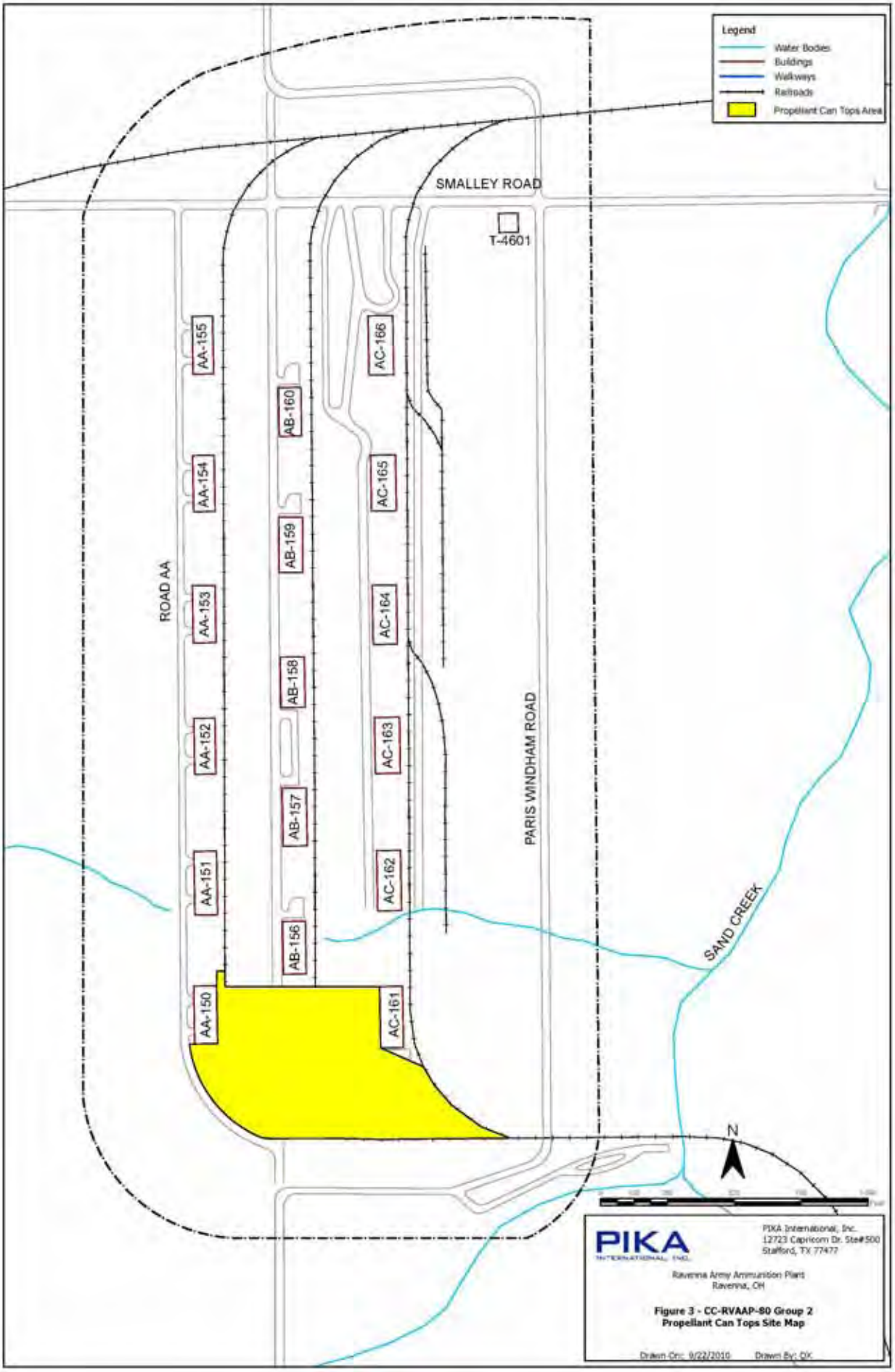


Figure 2- Compliance Restoration Site CC-RVAAP-08 Group 2 Propellant Can Tops


Legend
Water Bodies
Buildings
Walkways
Railroads
Propellant Can Tops Area
SMALLEY ROAD
T-4601
ROAD AA
PARIS WINDHAM ROAD
SAND CREEK
AA-150
AA-151
AA-152
AA-153
AA-154
AA-155
AB-156
AB-157
AB-158
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N
PIKA
PIKA International, Inc.
12723 Capricorn Dr. Ste#500
Stafford, TX 77477
Ravenna Army Ammunition Plant
Ravenna, OH
Figure 3 - CC-RVAAP-80 Group 2
Propellant Can Tops Site Map
Drawn On: 9/22/2010
Drawn By: DK

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The organization chart shown in Figure 4 outlines the management structure that will be used to implement the investigation at Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops. The functional responsibilities of key personnel are also described in brief.

2.1 PROGRAM MANAGER

The Program Manager ensures the overall management and quality of all projects performed at RVAAP under the general contract. This individual will ensure that all project goals and objectives are met in a high-quality and timely manner. This individual, in coordination with the Project Manager, will address quality assurance and non-conformance issues for corrective action.

2.2 PROJECT MANAGER

The Project Manager has direct responsibility for implementing a specific project, including all phases of work plan development, field activities, data management and report preparation. This individual will also provide the overall management of the project, and serve as the technical lead and principal point of contact with the RVAAP Environmental Coordinator. These activities will involve coordinating all personnel working on the project, interfacing with RVAAP personnel, and tracking project budgets and schedules. The Project Manager will also develop, monitor, and fill project staffing needs, delegate specific responsibilities to project team members, and coordinate with administrative staff to maintain a coordinated and timely flow of all project activities. The Project Manager will also serve in the capacity of Laboratory Coordinator for this project and will coordinate sample collection and subsequent laboratory analysis. The Project Manager reports directly to the Program Manager.

2.3 TECHNICAL MANAGER

The Technical Manager is responsible for the project Quality Assurance/Quality Control (QA/QC) in accordance with the requirements of the Facility-Wide Quality Assurance Project Plan (Facility-Wide QAPP), the project-specific QAPP addendum, and appropriate management guidance. This individual, in coordination with the Field Operations Manager, will be responsible for the technical aspects of all field operations; all field sampling activities; adherence to required sample custody and other related QA/QC field procedures; coordination of field subcontractor personnel activities; and management of project

investigation-derived wastes (IDW). The Technical Manager is also responsible for coordinating the sampling activities with the Sampling Manager.

2.4 PIKA SITE SAFEETY AND HEALTH OFFICER

The PIKA Site Safety and Health Officer will ensure that health and safety procedures designed to protect personnel are maintained throughout all field activities conducted at RVAAP. This will be accomplished by strict adherence to the Site-Specific Safely and Health Plan (SSHP), which has been prepared as a companion document to the Facility-Wide SAP, and the project-specific Accident Prevention Plan, which has been prepared as an addendum to the Facility-Wide SSHP for each investigation. This individual will have the authority to halt field work if health and/or safety issues arise that are not immediately resolvable in accordance with the Facility-Wide SSHP and the project-specific APP addendum. This individual will report to the Program and Project Managers.

2.5 FIELD OPERATIONS MANAGER

The Field Operations Manager is responsible for implementing all field activities in accordance with the Facility-Wide FSP, site specific FSAP and QAPP. This individual will be responsible for ensuring technical performance of all field activities; coordination of field subcontractor personnel activities; and preparation of Field Change Orders (FCOs), if required. This individual reports directly to the Project Manager.

2.6 SAMPLING MANAGER

The Sampling Manager is responsible for planning and executing all sampling activities on site and coordinating the laboratory activities for sample analysis and associated QC parameters. This individual will be responsible for obtaining required sample containers from the laboratory for use during field sample collection, resolving questions the laboratory may have regarding QAPP requirements and deliverables, and preparing a quality assessment report for sample data package deliverables received from the laboratory. This individual reports directly to the Project Manager.

2.7 UNEXPLODED ORDNANCE (UXO) CONSTRUCTION SUPPORT

The site is a low probability site in regards to encountering munitions and explosives of concern (MEC). Therefore, only unexploded ordnance (UXO) construction support (1 UXO Technician III and 1 UXO Technician II) will be needed for the project. However, if prior to this project or during any phase of this project MEC are found at the site, the project may be stopped and the site will need to be re-evaluated and potentially assigned a new

probability rating. The UXO Team Leader (i.e., UXO Technician III) will report directly to the Project Manager.

2.8 FIELD PERSONNEL

Other field personnel participating in the implementation of field activities, in coordination with field subcontractor personnel will be responsible for performing all field activities in accordance with the Facility-Wide SAP and Facility-Wide SSHP and their project-specific addenda. These individuals report directly to the Field Operations Manager.

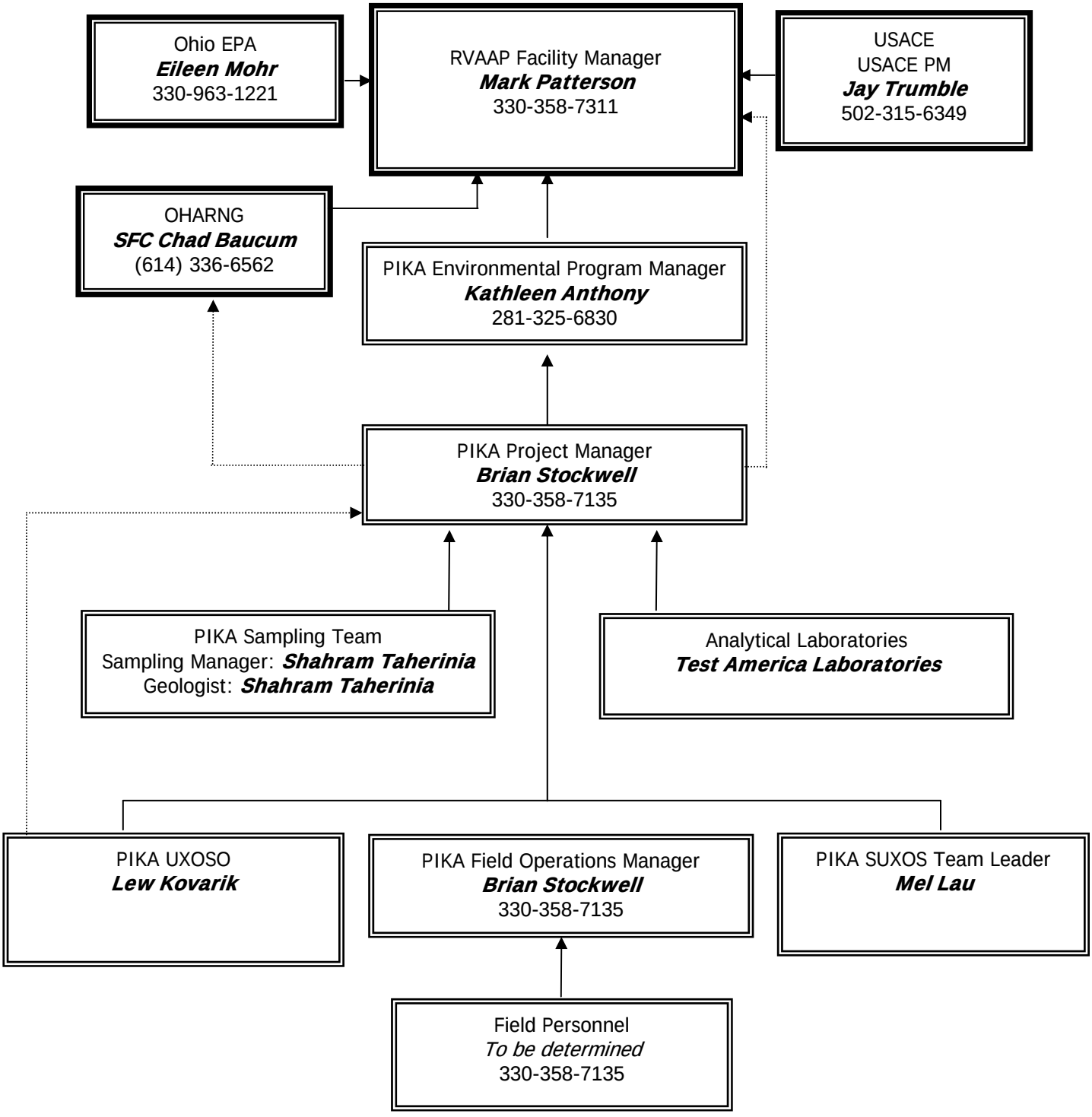

Figure 4 - Project Organization Chart

3.0 SCOPE AND OBJECTIVES

3.1 PROJECT OBJECTIVES

The objective of this project is to conduct an initial investigation of the CC-RVAAP-80-Propellant Can Tops Area. The investigation operations will achieve the following objectives:

- Delineate the boundaries of the propellant can lid areas;
- Confirm the presence or absence of releases of propellants and/or other munitions constituents (MC) to the surface soils at the site;
- Prepare an investigation report to document the process and procedures used to delineate the boundaries of the propellant can tops area and document all details pertaining to the soil sampling activities conducted during the investigation.

PIKA will perform the following tasks to meet these objectives:

- Perform geophysical delineation of the buried or near surface materials (propellant can tops, etc.) in the designated Group 2 Area;
- Collect surface soil samples based upon the results of the geophysical delineation;
- Analyze soil samples for the common propellants used by the DoD including Nitroglycerine, Nitrocellulose, Nitroguanidine, and Perchlorate. One of the samples will also be analyzed for the RVAAP full suite; and
- Dispose of all Investigation Derived Waste (IDW).

The specific methods and sampling procedures are provided in Section 5 of this document.

3.2 SITE SPECIFIC DATA QUALITY OBJECTIVES (DQO)

The project DQO is to provide sufficient high-quality data to delineate the extent of the propellant can top anomalies and provide information on the nature and extent of contaminants to the surface soils to aid in scoping possible future clean up activities. The specific DQO for CC-RVAAP-80 will be accomplished by performing the following activities:

- Provide sample data of sufficient quality for a data review on 100% of the data collected;

- Provide sample data of sufficient quality for third-party data validation on a minimum of 10% of the data collected; and
- Field duplicate samples will be collected at a frequency of 10%;
- Field equipment rinsates will be collected at a frequency of 10% for any sample collected with non-dedicated equipment;
- One of the soil samples will be analyzed for the RVAAP full suite of constituents (i.e., VOCs, SVOCs, TAL Metals, Explosives, Propellants, Pest/PCB and Cyanide).

3.3 CONCEPTUAL SITE MODEL

Based on current data, the conceptual site model presented in the Facility-Wide SAP is applicable to this element of the CC-RVAAP-80 investigation. The samples collected during this investigation will serve to update the site-specific conceptual model.

Geophysical Survey - A geophysical survey will be conducted to delineate and record the extent of the propellant can lid anomalies and anomaly areas within the study area.

Soil Samples—Based upon the results of the geophysical delineation, a total of three (3) (3 maximum plus QA samples) biased Multi Increment® (MI) surface soil samples will be collected within those areas that are identified to include near surface propellant can tops or other possible waste materials.

3.4 IDENTIFY DECISIONS

Data generated by the investigation activities will be used to determine:

- Are the boundaries of the propellant can tops area within Group 2 Ammunition Storage Area (i.e., CC-RVAAP-80) that were identified during the emergency survey by the Louisville District USACE accurate? If not, what are the actual boundaries of CC-RVAAP-80?
- Have propellants and/or other munitions constituents (MC) contamination been released to the surface soils within the defined limits of the propellant tops area(s)?
- If so, is contamination present at levels that warrant cleanup?

3.5 DEFINE THE STUDY BOUNDARIES

The investigation area boundary for Group 2 Propellant Can Tops Area is presented as Figure 3. The boundary was established based upon results of the emergency survey that was conducted at the site by the Louisville District USACE.

3.6 IDENTIFY DECISION RULES

Decision rules used to guide remediation decisions are provided in Section 3.2.6 of the Facility-Wide SAP. The data obtained through this investigation will be used to determine the need for future remedial action, if any.

3.7 INPUTS TO THE DECISION

The inputs to the decision include the results of the investigation and data analysis. The data will be obtained by conducting a geophysical survey to determine extent of anomalies and anomaly areas within the study area and collecting biased MI® surface samples.

3.8 SPECIFY LIMITS ON DECISION ERROR

Limits on decision errors are addressed in Section 3.2.8 of the Facility-Wide SAP.

3.9 SAMPLE DESIGN

Sample design rationale is provided in Section 3.2.9 of the Facility-Wide SAP. The purpose of the sampling for this investigation is to provide sufficient data such that future actions can be efficiently planned and accomplished. The types of data to be collected for this investigation include: geophysical data, boundary survey data, surface soil analytical results, and QA/QC analytical results. The investigation data needs to fall into two major categories:

- Data to delineate the boundaries of the propellant can tops anomalies within Group 2;
- Data to assess possible releases of propellants (MC) to the surface soils within the defined study boundaries relative to the need for future cleanup operations.

The data requirement identified during the DQO process ensure that adequate, representative, and reliable data are collected, and are available to assess possible releases of contamination to surface soils.

To fulfill the data needs described in the previous paragraph, the investigation will use the following approach to assess potential contamination to surface soils within the study boundaries:

- A digital electromagnetic survey will be conducted to identify the physical boundary of the propellant can tops area(s) within the Group 2 Propellant Can Tops Site.

- Based upon the results of the geophysical delineation, a total of three (3) (3 maximum plus QA samples) biased Multi Increment® (MI) surface soil samples will be collected within the boundaries of the propellant can tops area(s) to assess possible releases of propellants (MC) to the surface soils.
- An investigation report will be prepared following completion of the investigation to document the process and procedures used to delineate the boundaries of the propellant can tops area and document all details pertaining to the soil sampling activities conducted during the investigation.

These data will be used to determine if site contamination exists at levels that warrant follow-on cleanup operations.

4.0 FIELD SAMPLING METHODS AND PROCEDURES

The field sampling activities must be performed in a well-defined and consistent manner to ensure that the resulting data are comparable between sampling locations and can be validated against all applicable QA/QC requirements. This section defines field methods and/or procedures applicable to the following field activities.

- Geophysical Delineation
- Multi-increment Soil Sampling
- Field QC Sampling Procedures
- Decontamination Procedures
- Site Survey and Mapping
- Laboratory Analysis

The methods and procedures are written with the intent of providing specific details so as to ensure consistent data quality, while providing sufficient flexibility to allow for unexpected or changing geologic, environmental, or sampling conditions. Occasionally, modifications to the field procedures are required for reasons of safety or practicality. Any modifications will be reviewed and approved by the PIKA Program Manager and presented to the Ohio EPA and USACE for approval. All variances to the procedures presented in this Work Plan will be documented.

All field activities will be under the overall supervision of the Project Manager or his designees. Specific sampling activities will be performed or controlled by the Sampling Manager. Subcontractors performing specific activities will be required to comply with all project procedures and requirements. All sampling procedures will be consistent with the RVAAP 2010 Draft Facility-Wide SAP. A PIKA UXO Team consisting of one UXO Technician III and one UXO Technician II will provide construction support/anomaly avoidance procedures in accordance with the requirements of Engineering Pamphlet (EP) 75-1-2 *MUNITIONS AND EXPLOSIVES OF CONCERN (MEC) SUPPORT DURING HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW) AND CONSTRUCTION ACTIVITIES* throughout all of the field sampling operations.

Table 1-1 in the QAPP provides a summary of the investigative sampling and analysis. The following sections discuss the field protocols and procedures to be used for the sampling activities to be conducted for this investigation.

4.1 GEOPHYSICAL DELINEATION

PIKA will implement and complete a geophysical delineation of the buried or near surface materials (propellant can tops, etc.) in the designated Group 2 areas. The geophysical equipment will be appropriate and capable of identifying horizontal and vertical anomalies caused by buried waste. PIKA will perform a Ground Penetrating Radar and Electromagnetic survey using sensors and Software Noggin 250 MHz and a 500 MHz GPR system. An Electromagnetic EM-61, a portable time domain instrument with a coincident transmitter/receiver coil and second parallel receiver coil will be utilized as well. The designated survey area (approximately 13 acres total) will be surveyed into 200 feet by 200 feet grids. The spacing within the grids will be 3 feet and the EM 61 will cover the area 100%. Ground Penetrating Radar will be used to quantify unknown anomalies seen within the processed data. The Noggin GPR instrumentation generates real-time images on a LCD, which can later be uploaded to a computer. Geophysical data analysis will consist of an evaluation of anomaly density concentrations and an interpretation of contamination boundaries. Maps that display the geophysical anomalies with annotated, interpreted, and identified physical features will be provided in geo-referenced image file format. The rationale for selection of the specific geophysical equipment to be used on this project is provided in the GeoSearches informational letter memo located in Appendix I.

The geophysical survey personnel will be capable of producing working maps in the field or be capable of transmitting data back to the office and receiving a map back from the office prior to beginning work the next day.

4.2 MULTI-INCREMENT® SURFACE SOIL SAMPLING

PIKA will collect Multi Increment® (MI) surface soil samples based on the results of the geophysical delineation in order to assess possible releases of propellants (MC) to the surface soils. Up to three (3) (3 maximum plus QA samples) biased MI surface soil samples will be collected within those areas that are identified to include near surface propellant can tops or other possible waste materials.

The MI surface soil sample will be approximately one quarter of an acre or less in size and the MI sample will be obtained from 0 to 1 foot below ground surface (bgs). Based upon the results of the geophysical delineation, multiple smaller areas where anomalies are found may be combined into one designated MI sample area after consultation with and approval from USACE and Ohio EPA. In accordance with the requirements of Engineering Pamphlet (EP) 75-1-2 *Munitions and Explosives of Concern (MEC) Support During Hazardous, Toxic,*

and Radioactive Waste (HTRW) and Construction Activities, anomaly avoidance will be used during sampling to ensure soils around the anomalies can be collected to the desired depth.

For each sampling location, a minimum of 30 random aliquots will be collected, placed in a plastic lined container and mixed in the field. The aliquot locations will be selected by sample personnel walking over the entire area randomly selecting aliquot locations, which will be marked with flagging. All aliquots collected from each MI sample area will be placed in a labeled container for transport to the laboratory. At the laboratory, the sample will be dried, sieved, and finely ground for specific constituent analysis. All MI® samples will be analyzed for Nitrocellulose, Nitroglycerine, Nitroquanidine and Perchlorate. One of the samples will also be analyzed for the RVAAP full suite. The MI sampling method will not be utilized for VOC analysis. If a sample is designated for volatile organic compounds (VOC) analysis such as for the RVAAP full suite, one discrete sample will be collected from within the MI area using the bucket hand auger method as described in Section 4.5.2.1.1 of the Facility-Wide SAP. The specific location of the discrete sample will be biased toward the area most likely to contain volatile compounds, or if no such area is observed, the location will be randomly chosen. Soil portions designated for VOC analysis will be placed directly in the sample container and will not be composited or further processed in the field, or laboratory. Table 5-1 of the project specific QAPP lists the sample container, preservation, and holding time requirements for soil samples for the CC-RVAAP-80 Group 2 Propellant Can Tops.

4.3 FIELD QC SAMPLING PROCEDURES

QA/QC samples will be collected during implementation of this SAP Addendum for investigation of the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops. QC duplicate samples will be collected at a frequency of 10 percent, field equipment rinsates at a frequency of 10 percent for samples collected with non-dedicated equipment, Matrix Spike/Matrix Spike Duplicate (MS/MSDs) will be collected at a frequency of 5 percent. QA split samples will be submitted to the USACE contract laboratory for independent analyses at a frequency of 10%. Trip blanks will accompany all shipments containing VOCs. No field blanks will be collected during this project.

The field duplicates and split samples are samples taken from the same source that equally represent the medium at a given time and location. The field duplicate samples are to be submitted as “blind” to the laboratory and are used to determine whether the field sampling technique is reproducible and is an indicator of sample heterogeneity. Matrix spikes and matrix spike duplicates will be used to verify accuracy of the laboratory results. The QC sample will be sent to the laboratory under contract with PIKA. The QA split samples will be

sent to a U.S. Army QA laboratory for independent analysis and evaluation of analytical results by the contracted laboratory.

To statistically evaluate sampling precision, QA and QC samples will be collected as completely separate replicate incremental samples. The QA and QC samples will be collected from a set of random locations that are different from those used for the initial incremental sample. Aliquots for QA and QC samples will be collected into separate containers for transport to the laboratory. These QA QC samples will be prepared and analyzed in the same manner as the initial incremental sample

The MI sampling method will not be utilized for VOC analysis. If a sample is designated for volatile organic compounds (VOC) analysis such as for the RVAAP full suite, one discrete sample will be collected from within the MI area using the bucket hand auger method as described in Section 4.5.2.1.1 of the Facility-Wide SAP. The specific location of the discrete sample will be biased toward the area most likely to contain volatile compounds, or if no such area is observed, the location will be randomly chosen. Soil portions designated for VOC analysis will be placed directly in the sample container and will not be composited or further processed in the field, or laboratory.

Field QC/QA sample types, numbers, and frequencies are identified in Section 2.5 of the QAPP Addendum.

4.4 DECONTAMINATION PROCEDURE

The decontamination procedure for non-dedicated surface equipment used for surface soil will be as described in Section 4.4.2.8 of the Facility-Wide SAP. All non-dedicated equipment will be decontaminated at the completion of the sampling activities at each sampling location. A final decontamination inspection of any equipment leaving RVAAP at the end of field activities will be conducted to ensure proper decontamination.

4.5 SITE SURVEY AND MAPPING

Survey maps will be provided in the investigation report, which delineate the boundaries of the survey site, the boundaries and locations of the metal anomalies, and the corners of each of the designated MI sample areas. All data submitted will be in the Universal Transverse Mercator (UTM) coordinate system. All coordinates will be collected with applicable equipment capable of gauging field surveys within an accuracy of one meter or

less of error. All survey and mapping will be provided in accordance with Section 3.4 (Electronic Data Files) of the SOW.

4.6 LABORATORY ANALYSIS

The quality of the investigation sample results becomes the cornerstone on which all site evaluations and data interpretations are based. It is essential that the laboratory conducting the analysis receive clear, detailed instructions on all aspects of the analytical task from sample receipt through sample analysis and on to data reporting and deliverables. All laboratory analysis will be conducted by an independent off-site laboratory subcontracted to the contractor. The laboratory analysis and reporting are critical path items, which directly affect the schedule for the subsequent tasks of data validation and final report preparation. The laboratory will use analytical methods and procedures based on USEPA SW-846 methods. These procedures are defined in the CC-RVAAP-80 Group 2 Propellant Can Tops Site QAPP. The types of samples that will be submitted for laboratory analysis include soil and the associated field Quality Control samples.

5.0 SAMPLE CHAIN OF CUSTODY/DOCUMENTATION

PIKA will follow the guidelines set forth in the Facility-Wide SAP for project document requirements and QA/QC Sampling Requirements.

5.1 FIELD LOG BOOK

All field logbook information will follow structures identified in Section 5.1 of the Facility-Wide SAP, where appropriate, field forms will be used to record specific sampling or investigational data to ensure consistency across sampling locations.

5.2 PHOTOGRAPHS

Photographic documentation of field efforts will be performed in accordance with Section 4.3.2.4.3 of the Facility-Wide SAP. Representative photographs of field activities and any significant observations will be taken during the field operations. Photographs will be suitable for presentation in a public forum, as well as for documenting scientific information.

5.3 SAMPLE NUMBERING SYSTEM

The sample numbering system that will be used to identify samples collected during the investigation is explained in Section 5.3 and Figure 5-1 of the Facility-Wide SAP. Samples will be identified sequentially using the identification number system consistent with the remedial investigations. If a sample is not collected or is reassigned to a different location, a specific reason and notation will be noted in the project field books.

5.4 SAMPLE DOCUMENTATION

All sample label, logbook, field records, chain of custody forms and field form information will follow procedures identified in Section 5.4 of the Facility-Wide SAP.

5.5 DOCUMENTATION PROCEDURES

Documentation involves the tracking of samples through the receipt of a final laboratory data package for the investigation. Documentation procedures will be performed in accordance with Section 5.5 of the Facility-Wide SAP.

5.6 CORRECTIONS TO DOCUMENT

This procedure is required to ensure that all field/sampling records are correct and legally defensible. Corrections to documentation will follow the protocol established in Section 5.6 of the Facility-Wide SAP.

5.7 MONTHLY REPORTS

Monthly reports will be submitted to the USACE – Louisville District every month by the fifth (5^{th}) day of the following month. The monthly reports will include an accurate and current account of all work completed and deliverables furnished to the government. The content will meet the requirements as presented in Section 5.7 of the Facility-Wide SAP.

5.8 FIELD QUALITY CONTROL

The Project Manager will monitor the quality control of the data collection activities on a daily basis. This process will ensure that data is collected in a manner, which is consistent with the Group 2 Propellant Can Tops SAP and Facility-Wide SAP. Field quality control will be maintained as follows:

- Review of all Project Plans by project personnel;
- Training of project personnel on the sampling documentation and field procedures;
- Daily safety and technical briefings of project staff;
- Daily review of all field data collection forms by the Project Manager;
- Enter the Environmental and Quality Control into the sample tracking spreadsheet daily;
- Confirm laboratory receipt, integrity and login with the laboratory Project Manager;
- Daily monitoring and management of subcontractors;
- Conduct ongoing field audits of the data collection procedures and implement corrective measures; and
- Complete daily reports summarizing the work completed and decision points.

6.0 SAMPLE PACKAGING AND SHIPPING REQUIREMENTS

Sample packaging and shipping will generally follow the protocols in Section 6.0 of the Facility-Wide SAP. Exceptions to the Facility-Wide SAP procedures include:

- No tape of any kind will be placed on the volatile sample containers;
- All VOC sample containers will be placed in either foam bubble wrap or paper towels to reduce the potential for breakage during shipping; and
- The field laboratory (if used) will comply with the procedural requirements presented in the forms in Figures 6-2 and 6-3 of the Facility-Wide SAP.

6.1 PACKING AND SHIPPING PROTOCOL

As per protocols of the contracted laboratory, MI sample packaging and shipping will be conducted as follows:

- Place packing material on the bottom of the cooler,
- Place 55-gallon plastic bag (included in sample kit) in the cooler,
- Pack the sample containers (included in sample kit), protective padding and wet ice inside the bag and seal the bag,
- Place additional packing material on top of the bag to keep containers from shifting during shipment,
- Place chain of custody inside a small, separate plastic bag and then place inside cooler on top of sealed 55-gallon plastic bag."

7.0 DELIVERABLES

Prior to start-up of the work, the Work Plan, Health and Safety Plan, and Sampling and Analysis Plan will be submitted to RVAAP Stakeholders for necessary approvals. The Sampling and Analysis Plan and Quality Assurance Project Plan for this site will follow the guidelines established in the Facility-Wide Plans established for the RVAAP.

Daily field reports and Weekly reports will be submitted to the RVAAP at regular intervals. Photo Documentation of the work will also be furnished to the RVAAP at regular intervals. Analytical results will be tabulated and conclusions will be provided.

7.1 DATA VALIDATION

The laboratory analysis for all of the samples from this investigation will be reviewed and or validated. As per the Facility-Wide SAP, 100% of the laboratory reports will be verified for completeness of the data collected. Validation of a minimum 10% of the data will follow the direction provided in the Facility-Wide QAPP, the DoD QSM for Environmental Laboratories, and the Louisville QSM Supplement. An independent data validation subcontractor qualified by USACE, Louisville District will perform this data validation.

Completeness, representativeness, and comparability goals identified in Section 3.4 and Tables 3-1 and 3-2 of the Facility-Wide QAPP will be imposed for this investigation. Data quality will be assessed using the procedures provided in Section 9.4 of the Facility-Wide QAPP.

7.2 INVESTIGATION REPORT

PIKA will prepare and submit a Preliminary Draft investigation report within 90 calendar days following the completion of the field investigation activities. The report will document the process and procedures used in conducting the geophysical delineation, and describe all soil sampling activities conducted during this project. The report will include details about pre-mobilization, mobilization, site preparation, the geophysical delineation, sample collection, decontamination, analytical results, waste management, event chronology, final site inspection, and mapping. The investigation report maps will include the delineation of known and/or suspected buried waste materials, and the locations of MI sample area boundaries.

Upon receipt of USACE comment responses, PIKA will submit a Draft investigation report for stakeholder review and approval. PIKA will submit the Draft investigation report within 30 calendar days of receipt of Contracting Officers Representative (COR) comments on the draft document or in compliance with the schedule specified by the Ohio EPA. Schedules specified by the Ohio EPA will take precedence over the USACE schedule. Army approval is achieved through the COR.

8.0 INVESTIGATION-DERIVED WASTE

All IDW, including soil cuttings, personal protective equipment, disposable sampling equipment, and decontamination fluids, will be properly segregated handled, labeled, characterized, managed and disposed in accordance with Section 7.0 of the Facility-Wide SAP. At the conclusion of the field activities, all IDW will be documented as to characterization, classification and disposition of all IDW. All shipments of IDW off site will be coordinated through the RVAAP Facility Manager. The following specific protocols will be followed during the field operations:

The following types of IDW are anticipated. The different types of IDW will be contained separately:

- Soil, derived from the surface soil sampling activities (estimated one 55—gallon drum).
- Decontamination fluids, derived from decontamination of any non-dedicated surface soil sampling equipment (e.g., acid, alcohol rinsate – estimated two approved safety cans).
- Expendables/solid waste, including PPE and disposable sampling equipment (estimated one 55-gallon drum).

Each of the three types of IDW will be contained separately. Characterization and classification of the different types of IDW will be based on the specific protocols described below. Expendable solid waste will not be sampled for characterization purposes.

- **Soil**, Any left over soils from the surface soil sampling operations will be placed in a 55-gallon drum. Disposition of the drummed soil will be based upon analytical results from a toxicity characteristic leaching procedure (TCLP) sample collected.
- **Decontamination fluids**, Due to the small number of samples being collected during this investigation, the decontamination fluids derived from any non-dedicated surface soil sampling equipment will be placed in approved safety cans. Disposition will be based upon the collection and analysis of TCLP liquid sample(s).

Drummed soil will be transported to a location designated by the Facility Manager, where it will be staged on wooden pallets. Decontamination fluids will also be staged at a designated location within approved secondary containment structures.

9.0 REFERENCES

Ohio EPA 2004. Director's Final Finding and Orders (DFFO) for RVAAP, dated June 10, 2004.

USACE 2001. Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, OH. DACA 62-00-0-0001, DO CY02. March.

USACE 2001 Requirements for the Preparation of Sampling and Analysis Plans, EM 200-1-3. February.

USACE 2010. Draft Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, OH, Revision 0, W912QR-08-D-0008. November.

APPENDIX F

QUALITY ASSURANCE PROJECT PLAN

PART II

Final

Quality Assurance Project Plan Addendum for the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services

Ravenna Army Ammunition Plant Ravenna, Ohio

Contract No. W912QR-10-P-0058

Prepared for:

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TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS IV
1.0 INTRODUCTION 1
2.0 PROJECT DESCRIPTION 2
2.1 Site History/Background Information 2
2.2 Past Data Collection Activity/Current Status 3
2.3 Project Objectives and Scope 4
2.4 Sample Network Design and Rationale 4
2.5 Parameters to be Tested and Frequency 5
3.0 PROJECT ORGANIZATION AND RESPONSIBILITY 7
4.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT 8
4.1 Data Quality Objectives 8
4.2 Level of Quality Control Effort 8
4.3 Accuracy, Precision, and Sensitivity of Analysis 8
4.4 Completeness, Representativeness, and Comparability 9
5.0 SAMPLING PROCEDURES 16
6.0 SAMPLE CUSTODY 18
7.0 CALIBRATION PROCEDURES AND FREQUENCY 19
7.1 Field Instrument/Equipment 19
7.2 Laboratory Instruments 19
8.0 ANALYTICAL PROCEDURES 20
8.1 Laboratory Analysis 20
8.2 Field Screening Analytical Protocols 20
9.0 INTERNAL QUALITY CONTROL CHECKS 22
9.1 Field Sample Collection 22
9.2 Field Measurement 22
9.3 Laboratory Analysis 22
10.0 DATA REDUCTION, VALIDATION, AND REPORTING 23
10.1 Data Reduction 23
10.2 Data Validation 23
10.3 Data Reporting 24
10.4 Data Quality Assessment 24
11.0 PERFORMANCE AND SYSTEM AUDITS 25
11.1 Field Audits 25

11.2 Laboratory Audits 25
12.0 PREVENTIVE MAINTENANCE PROCEDURES 26
13.0 SPECIFIC ROUTINE PROCEDURES TO ASSESS DATA PRECISION, ACCURACY, AND COMPLETENESS 27
14.0 CORRECTIVE ACTIONS 28
15.0 QA REPORTS TO MANAGEMENT 29
16.0 REFERENCES 30

TABLES

Table	Title	Page
1-1	Sampling and Analytical Requirements	6
3-1	Volatile Organic Compounds (VOCs) - Analysis/Extraction Method: 8260B/5030	10
3-2	Semivolatile Organic Compounds (SVOCs) - Analysis/Extraction Method: 8270C/3500B	11
3-3	Organochlorine Pesticides - Analysis/Extraction Method: 8081A/3500B	12
3-4	Polychlorinated Biphenyls (PCBs) - Analysis/Extraction Method: 8082/3500B	13
3-5	Explosives - Analysis/Extraction Method: 8330	13
3-6	Propellants - Nitroguanidine - Analysis/Extraction Method: 8330/3500B, Nitrocellulose - Analysis/Extraction Method 353.2	13
3-7	Perchlorate - Analysis/Extraction Method: 6860	14
3-8	Target Analyte List (TAL) ICP Metals - Analysis/Extraction Method: 6010B/3050B	14
3-9	Mercury - Analysis/Extraction Method: 7471A	14
3-10	Cyanide - Analysis/Extraction Method: 9012A	14
3-11	Total Solids - Analysis/Extraction Method: 160.3	15
5-1	Container Requirements for Soil and Sediment Samples	17

ACRONYMS AND ABBREVIATIONS

ADR	Automated Data Review
bgs	Below ground surface
CLP	Contract Lab Program
CX	Center of Expertise
DoD	Department of Defense
DQO	Data Quality Objectives
EDD	Electronic Data Deliverable
EPA	U.S. Environmental Protection Agency
FSAP	Facility Wide Sampling and Analysis Plan
FQAPP	Facility Wide Quality Assurance Project Plan
HTRW	Hazardous, Toxic, and Radioactive Waste
LCS	Laboratory Control Samples
MEC	Munitions and Explosives of Concern
MI	Multi-increment
MRL	Method Reporting Level
MS/MSD	Matrix Spike/Matrix Spike Duplicate
OHARNG	Ohio Army National Guard
PCBs	Polychlorinated Biphenyls
QA	Quality Assurance
QC	Quality Control
QAMP	Quality Assurance Management Plan
QAPP	Quality Assurance Project Plan
QSM	Quality Systems Manual
RDX	Royal Demolition Explosive (cyclotrimethylene-trinitramine)
RI	Remedial Investigation
RVAAP	Ravenna Army Ammunition Plant
SOP	Standard Operating Procedure
SVOCs	Semivolatile Organic Compounds
TAL	Target Analyte List
USACE	U.S. Army Corps of Engineers

USAEC	U.S. Army Environmental Command
USP&FO	United States Property & Fiscal Officer
WP	Work Plan

1.0 INTRODUCTION

This investigation-specific Quality Assurance Project Plan (QAPP) Addendum addresses supplemental project specific information and tiers under the Facility-Wide QAPP for RVAAP (USACE 2001). Each QAPP section documents adherence to the Facility-Wide QAPP or stipulates project specific requirements

2.0 PROJECT DESCRIPTION

2.1 Site History/Background Information

Past Department of Defense (DoD) activities performed at the former RVAAP date back to 1940 and include manufacturing, loading, handling and storing of military explosives and ammunitions. Until 1999, the RVAAP was identified as a 21,419-acre installation. The Ohio Army National Guard (OHARNG) resurveyed the property boundary, finishing in 2003, and the actual total acreage was found to be 21,683.289 acres. As of February 2006, a total of 20,403 acres of the former 21,683-acre RVAAP has been transferred to the National Guard Bureau (NGB) via the United States Property and Fiscal Officer (USP&FO) for Ohio and subsequently licensed to the OHARNG for use as a training site. Currently, RVAAP consists of 1,280 acres in several distinct parcels scattered throughout the confines of the OHARNG Camp Ravenna Joint Military Training Center (Camp Ravenna). RVAAP's remaining parcels of land are located completely within the Camp Ravenna perimeter fence. The RVAAP facility is controlled by the U.S. Army Base Realignment and Closure Division (BRACD)

Camp Ravenna/RVAAP is located in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 kilometers (three miles) east/northeast of the city of Ravenna and approximately 1.6 kilometers (one mile) northwest of the Village of Newton Falls. The RVAAP portions of the property are solely located within Portage County. Camp Ravenna (inclusive of RVAAP) is a parcel of property approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garret, McCormick, and Berry roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east. Camp Ravenna is surrounded by several communities: Windham on the north; Garrettsville 9.6 kilometers (6 miles) to the northwest; Newton Falls 1.6 kilometers (1 mile) to the south east; Charlestown to the southwest; and Wayland 4.8 kilometers (3 miles) to the south.

When RVAAP was operational, Camp Ravenna did not exist and the entire 21,683-acre parcel was a government-owned contractor operated (GOCO) industrial facility. The RVAAP BRACD site encompasses investigation and cleanup of past activities

over the entire 21,683 acres. Therefore, references to the RVAAP in this document shall include the historical extent of the RVAAP, inclusive of the combined acreages of the current Camp Ravenna and RVAAP, unless otherwise specifically stated. A regional map indicating the location of the RVAAP is presented in Appendix B as Figure 1. A facility map of the RVAAP is presented in Appendix B as Figure 2.

2.2 Past Data Collection Activity/Current Status

CC-RVAAP-80 consists of the Group 2 Propellant Can Lids area. Propellant can lids or tops were identified on the ground surface/near surface at the southern end of the former Group 2 Ammunition Storage Area. These materials are typically classified as RRD (similar to munitions packaging materials). This site was never used as classified as operational range. It is believed that the discarded propellant can lids might qualify as inert scrap metal.

The propellant can lids located at the southern end of Group 2 were initially identified by OHARNG trainees in the winter of 2008. The propellant can lids were observed in the vegetated area located immediately south of the ammunition storage magazines in the vicinity of the southern railroad spur lines. This area consists of approximately 539,572 square ft (12.4 acres).

The Louisville District USACE performed an emergency survey with a metal detector of a portion of the southern area ground surface. Results of the initial investigation revealed multiple magnetic anomalies in the surface and near surface soils. On-site personnel visually identified the surface anomalies as propellants can lids or tops. During the emergency survey it was noted that the ground surface had been disturbed and contained hummocks (mounds) ranging in height form 1' to 2' throughout the survey area.

As, such the propellant can lids (or RRD) are of environmental concern for the subject area. A geophysical survey is necessary to identify the anomalies and anomalous areas within the subject area, and to characterize the subject area boundary(s).

The anomalies and anomalous areas will be clearly marked during the field survey in order to facilitate a limited soil investigation, and possible future clean up activities. The limited soil investigation is warranted to assess possible releases of propellants (MC) to the surface soils in the vicinity of the can lids.

The site is a low probability site in regard to encountering munitions and explosives of concern (MEC). Therefore, only unexploded ordnance (UXO) construction support will be needed for the project. However, if prior to this project or during any phase of this project MEC are found at the site, the project may be stopped and the site will need to be re-evaluated and potentially assigned a new probability rating.

2.3 Project Objectives and Scope

The objective of this project is to conduct an initial investigation of the above-described Group 2 Propellant Can lids area. The investigation shall achieve the following objectives:

- Delineate the boundaries of the propellant can lid area;
- Confirm the presence or absence of releases of propellants and/or other MC to the surface soils at the AOC; and
- Prepare an investigation report to document the process and procedures used to delineate the boundaries of the propellant can lids area and document all details pertaining to the soil sampling activities conducted during the investigation.

2.4 Sample Network Design and Rationale

PIKA will collect Multi Increment® (MI) surface soil samples based on the results of the geophysical delineation in order to assess possible releases of propellants (MC) to the surface soils. Up to three (3) (3 maximum plus QA samples) biased MI surface soil samples will be collected within those areas that are identified to include near surface propellant can lids or other possible waste materials.

The MI surface soil samples will be approximately one quarter of an acre or less in size and will obtained from 0 to 1 foot below ground surface (bgs). Based upon the results of the geophysical delineation, multiple smaller areas where anomalies are found may be combined into one designated MI sample area. In accordance with the requirements of Engineering Pamphlet (EP) 75-1-2 *Munitions and Explosives of Concern (MEC) Support During Hazardous, Toxic, and Radioactive Waste (HTRW) and Construction Activities*, anomaly avoidance will be used during sampling to

ensure soils around the anomalies can be collected to the desired depth.

For each sampling location, a minimum of 30 random aliquots will be collected, placed in a plastic lined container and mixed in the field. The resultant MI® sample from each area will be forwarded to the offsite laboratory identified in Section 2.0 of this document where they will be air dried, sieved, and ground (except for the VOC sample) to homogenize the sample prior to analysis. One MI® sample will be analyzed for the RVAAP full suite plus perchlorates and total phosphorus. The VOC component of the RVAAP full suite will be collected using an En Core® sampler. Table 5-1 lists the sample container, preservation, and holding time requirements for soil samples for the Group 2 Propellant Can Lids.

For the waste characterization samples, one composite sample will be collected and will be analyzed TCLP analysis plus explosives, propellants, reactivity, flash point and pH.

2.5 Parameters to be Tested and Frequency

Soil samples will be collected and analyzed for the parameters and analyses listed in Table 1-1 of this Quality Assurance Project Plan (QAPP) addendum. Table 3-1 also lists the anticipated sample numbers, quality assurance (QA) sample frequencies, and field quality control (QC) sample frequencies.

Table 1-1
Sampling and Analytical Requirements
CC-RVAAP-80 Group 2 Propellant Can Tops Area

SAMPLE ID CC-RVAAP-80 Group 2 - Propellant Can Tops Area	VOCs 8260B	SVOCs 8270C	Pesticides 8081A	PCBs 8082	Explosives 8330	Nitrocellulose 353.2	Nitroguanidine 8330 Modified	Nitroglycerine 8330	Perchlorate 6860	TAL Metals 6010B	Mercury 7471A	Cyanide 9012A	Solids 160.3	Full TCLP, Reactivity, pH & Flash Point	FIELD QC SAMPLES[1]		
															Duplicate Sample[2]	Trip Blank	MS/MSD
PROPELLANT CAN TOPS AREA - WASTE CHARACTERIZATION SAMPLES																	
PCTss-WC001-SO														1			
PROPELLANT CAN TOPS AREA SOIL CONFIRMATION SAMPLES																	
PCTss-001M-0001-SO						1	1	1	1						1		
PCTss-002M-0001-SO	1	1	1	1	1	1	1	1	1	1	1	1	1				
PCTss-003M-0001-SO						1	1	1	1								
TOTAL NUMBER OF SOIL SAMPLES	1	1	1	1	1	3	3	3	3	1	1	1	1	1	1	0	1

Notes:

[1] Field QC Samples - QC samples will be analyzed for the same parameters as the associated primary

[2] Duplicate Samples will be numbered PCTss-002M-0001-DUP (Full Suite)

3.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The functional project organization and responsibilities are described in Section 2.7 of the C. Analytical support for this work has been assigned to Test America Laboratories, Inc. The U.S. Army Corps of Engineers (USACE) Hazardous, Toxic, and Radioactive Waste (HTRW) Center of Expertise (CX), Omaha, Nebraska has certified these laboratories. Test America's Quality Assurance Management Plans (QAMP) are available for review upon request. Qualifications include U.S. EPA Contract Laboratory Program (CLP) contracts for both inorganic and organic analyses, U.S. Army Environmental Command (USAEC), U.S. Army Corps of Engineers (USACE), U.S. Navy (NFESC), and U.S. Air Force Center for Environmental Excellence (AFCEE) certifications, and National Environmental Laboratories Accreditation Program (NELAP) certification, DoD ELAP accreditation under the Department of Defense Environmental Laboratory Approval Program (ELAP). The laboratories' organizational structure, roles, and responsibilities are identified in their QAMPs and facility-specific appendices. Addresses and telephone numbers for the laboratories are as follows:

Test America, Inc.
4101 Shuffel Drive NW
North Canton, 60466
Tel: (330) 497-9396
Fax: (330) 497-0772

Test America, Inc.
880 Riverside Parkway
West Sacramento, CA 95605
(916) 373-5600 Fax: (916) 372-1059

4.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT

4.1 Data Quality Objectives

Data Quality objectives (DQO) summaries for this investigation will follow Tables 3-1 and 3-2 in the Facility-Wide QAPP. All QC parameters stated in the specific U.S. Environmental Protections Agency (USEPA) SW-846 methods will be adhered to for each chemical listed. The SW-846 method references found in the Facility-Wide QAPP have been revised to the Update III method, as appropriate. Laboratories are required to comply with all methods as written: recommendations are considered requirements. Concurrence with the DoD QSM for Environmental Laboratories (DoD 2006), and the Louisville QSM Supplement is expected.

The contract laboratory will deliver an electronic data deliverable (EDD) that is automated data review (ADR) compatible. The contract laboratory must identify variances to the established library prior to any analysis being performed. No variances to the DoD QSM Environmental Laboratories and the Louisville QSM Supplement are anticipated.

4.2 Level of Quality Control Effort

QC efforts will follow Section 3.2 of the Facility-wide QAPP. Field Measurements will include field source water blanks, trip blanks, field duplicates, surrogates, and equipment rinsate blanks. Laboratory QC measurements will include method blanks, laboratory control samples (LCSs), laboratory duplicates, and matrix spike/matrix spike duplicate (MS/MSD) samples. LCS measurements will include the standard mid-level analyte concentration, plus QC method reporting level (MRL) low-level concentration. It is recognized that the laboratory will routinely perform and monitor the QC/MRL; however, guidance check limits will be utilized, as advisory and corrective action will not be required for individual analyte variances. The QC/MRL will be successfully analyzed at the beginning of the analytical sequences as required by the QSM. Additionally, the lab will analyze the QC/MRL sample at the close of the analytical sequence.

4.3 Accuracy, Precision, and Sensitivity of Analysis

Accuracy, precision, and sensitivity goals indentified in the DoD QSM version 4.1 for Environmental Laboratories and the Louisville QSM Supplement will be imposed for

this investigation. As stated above, some of the analytical methods numbers have been updated (refer to Table 2-1 of this QAPP). Quality objectives related to individual method QC protocol will also follow requirements given in the DoD QSM for Environmental Laboratories and the Louisville QSM Supplement.

Laboratories will make all reasonable attempts to meet the program and project reporting levels in Tables 3-1 through 3-9 of the Facility-Wide QAPP for each individual sample analysis. When samples require dilution, both the minimum dilution and quantified dilution must be reported. All samples will be screened to determine optimum dilution ranges. Dilution runs will be performed to quantify high target analyte concentrations within the upper half of the calibration range, thus reducing the degree of dilution as much as possible. In addition, a five times less diluted run will the be performed to report other target analyte reporting levels as low as possible without destroying analytical detectors and instrumentation. If there are matrix interferences, non-target analyte, or high target analyte concentrations that preclude analysis of an undiluted sample, the laboratory project manager will contact PIKA, USACE Louisville District, and Ohio EPA, forward analytical and chromatographic information from diluted runs and obtain direction on how to proceed.

The analyte lists and detection limits for the analyses listed in Table 1-1 are included in Tables 3-1 through 3-11.

4.4 Completeness, Representativeness, and Comparability

Completeness, representativeness and comparability goals identified in Section 3.4 and Tables 3-1 and 3-2 of the Facility-Wide QAPP will be imposed for this investigation.

Table 3-1

Volatile Organic Compounds (VOCs) - Analysis/Extraction Method: 8260B/5030

Compound	RL	Units	MDL	Units
Acetone	20	ug/kg	6.3	ug/kg
Benzene	5	ug/kg	0.23	ug/kg
Bromodichloromethane	5	ug/kg	0.28	ug/kg
Bromoform	5	ug/kg	0.33	ug/kg
Bromomethane	5	ug/kg	0.54	ug/kg
2-Butanone	20	ug/kg	1.4	ug/kg
Carbon disulfide	5	ug/kg	0.44	ug/kg
Carbon tetrachloride	5	ug/kg	0.37	ug/kg
Chlorobenzene	5	ug/kg	0.33	ug/kg
Dibromochloromethane	5	ug/kg	0.55	ug/kg
Chloroethane	5	ug/kg	0.86	ug/kg
Chloroform	5	ug/kg	0.29	ug/kg
Chloromethane	5	ug/kg	0.41	ug/kg
1,1-Dichloroethane	5	ug/kg	0.36	ug/kg
1,2-Dichloroethane	5	ug/kg	0.34	ug/kg
1,1-Dichloroethene	5	ug/kg	0.52	ug/kg
1,2-Dichloroethene (total)	10	ug/kg	0.77	ug/kg
1,2-Dichloropropane	5	ug/kg	0.69	ug/kg
cis-1,3-Dichloropropene	5	ug/kg	0.34	ug/kg
trans-1,3-Dichloropropene	5	ug/kg	0.54	ug/kg
Ethylbenzene	5	ug/kg	0.26	ug/kg
2-Hexanone	20	ug/kg	0.63	ug/kg
Methylene chloride	5	ug/kg	0.67	ug/kg
4-Methyl-2-pentanone	20	ug/kg	0.54	ug/kg
Styrene	5	ug/kg	0.15	ug/kg
1,1,2,2-Tetrachloroethane	5	ug/kg	0.34	ug/kg
Tetrachloroethene	5	ug/kg	0.52	ug/kg
Toluene	5	ug/kg	0.27	ug/kg
1,1,1-Trichloroethane	5	ug/kg	0.56	ug/kg
1,1,2-Trichloroethane	5	ug/kg	0.39	ug/kg
Trichloroethene	5	ug/kg	0.42	ug/kg
Vinyl chloride	5	ug/kg	0.39	ug/kg
Xylenes (total)	10	ug/kg	0.67	ug/kg

Table 3-2

Semivolatile Organic Compounds (SVOCs) - Analysis/Extraction Method: 8270C/3500B

Compound	RL	Units	MDL	Units
Acenaphthene	6.67	ug/kg	1.3	ug/kg
Acenaphthylene	6.67	ug/kg	1.2	ug/kg
Anthracene	6.67	ug/kg	1.3	ug/kg
Benzo(a)anthracene	6.67	ug/kg	0.95	ug/kg
Benzo(b)fluoranthene	6.67	ug/kg	1.2	ug/kg
Benzo(k)fluoranthene	6.67	ug/kg	1.7	ug/kg
Benzo(ghi)perylene	6.67	ug/kg	1.3	ug/kg
Benzo(a)pyrene	6.67	ug/kg	1.3	ug/kg
bis(2-Chloroethoxy)methane	100	ug/kg	22	ug/kg
bis(2-Chloroethyl) ether	100	ug/kg	2	ug/kg
bis(2-Ethylhexyl) phthalate	50	ug/kg	18	ug/kg
4-Bromophenyl phenyl ether	50	ug/kg	21	ug/kg
Butyl benzyl phthalate	50	ug/kg	19	ug/kg
Carbazole	50	ug/kg	19	ug/kg
4-Chloroaniline	150	ug/kg	17	ug/kg
4-Chloro-3-methylphenol	150	ug/kg	21	ug/kg
2-Chloronaphthalene	50	ug/kg	22	ug/kg
2-Chlorophenol	50	ug/kg	26	ug/kg
4-Chlorophenyl phenyl ether	50	ug/kg	24	ug/kg
Chrysene	6.67	ug/kg	0.9	ug/kg
Dibenz(a,h)anthracene	6.67	ug/kg	1.3	ug/kg
Dibenzofuran	50	ug/kg	20	ug/kg
Di-n-butyl phthalate	50	ug/kg	19	ug/kg
1,2-Dichlorobenzene	50	ug/kg	29	ug/kg
1,3-Dichlorobenzene	50	ug/kg	23	ug/kg
1,4-Dichlorobenzene	50	ug/kg	21	ug/kg
3,3'-Dichlorobenzidine	100	ug/kg	18	ug/kg
2,4-Dichlorophenol	150	ug/kg	20	ug/kg
Diethyl phthalate	50	ug/kg	19	ug/kg
2,4-Dimethylphenol	150	ug/kg	20	ug/kg
Dimethyl phthalate	50	ug/kg	21	ug/kg
4,6-Dinitro-2-methylphenol	150	ug/kg	13	ug/kg
2,4-Dinitrophenol	330	ug/kg	83	ug/kg
2,4-Dinitrotoluene	200	ug/kg	18	ug/kg
2,6-Dinitrotoluene	200	ug/kg	21	ug/kg
Di-n-octyl phthalate	50	ug/kg	18	ug/kg
Fluoranthene	6.67	ug/kg	1.2	ug/kg
Fluorene	6.67	ug/kg	1.2	ug/kg
Hexachlorobenzene	6.67	ug/kg	2.1	ug/kg
Hexachlorobutadiene	50	ug/kg	26	ug/kg
Hexachlorocyclopentadiene	330	ug/kg	16	ug/kg
Hexachloroethane	50	ug/kg	28	ug/kg
Indeno(1,2,3-cd)pyrene	6.67	ug/kg	1.5	ug/kg

Isophorone	50	ug/kg	21	ug/kg

Table 3-2 (continued)

2-Methylnaphthalene	6.67	ug/kg	1.5	ug/kg
2-Methylphenol	200	ug/kg	28	ug/kg
4-Methylphenol	200	ug/kg	22	ug/kg
Naphthalene	6.67	ug/kg	1.6	ug/kg
2-Nitroaniline	200	ug/kg	22	ug/kg
3-Nitroaniline	200	ug/kg	16	ug/kg
4-Nitroaniline	200	ug/kg	26	ug/kg
Nitrobenzene	100	ug/kg	2.2	ug/kg
2-Nitrophenol	50	ug/kg	19	ug/kg
4-Nitrophenol	330	ug/kg	110	ug/kg
N-Nitrosodiphenylamine	50	ug/kg	21	ug/kg
N-Nitrosodi-n-propylamine	50	ug/kg	23	ug/kg
Pentachlorophenol	150	ug/kg	82	ug/kg
Phenanthrene	6.67	ug/kg	2	ug/kg
Phenol	50	ug/kg	25	ug/kg
2,2'-Oxybis(1-Chloropropane)	100	ug/kg	26	ug/kg
Pyrene	6.67	ug/kg	1.1	ug/kg
1,2,4-Trichlorobenzene	50	ug/kg	24	ug/kg
2,4,5-Trichlorophenol	150	ug/kg	25	ug/kg
2,4,6-Trichlorophenol	150	ug/kg	21	ug/kg

Table 3-3

Organochlorine Pesticides - Analysis/Extraction Method: 8081A/3500B

Compound	RL	Units	MDL	Units
Aldrin	1.7	ug/kg	1.2	ug/kg
alpha-BHC	1.7	ug/kg	0.73	ug/kg
beta-BHC	1.7	ug/kg	1.1	ug/kg
delta-BHC	1.7	ug/kg	1.2	ug/kg
gamma-BHC (Lindane)	1.7	ug/kg	0.74	ug/kg
alpha-Chlordane	1.7	ug/kg	0.94	ug/kg
gamma-Chlordane	1.7	ug/kg	0.42	ug/kg
4,4'-DDD	1.7	ug/kg	0.62	ug/kg
4,4'-DDE	1.7	ug/kg	0.39	ug/kg
4,4'-DDT	1.7	ug/kg	0.63	ug/kg
Dieldrin	1.7	ug/kg	0.47	ug/kg
Endosulfan I	1.7	ug/kg	0.52	ug/kg
Endosulfan II	1.7	ug/kg	0.82	ug/kg
Endosulfan sulfate	1.7	ug/kg	0.87	ug/kg
Endrin	1.7	ug/kg	0.5	ug/kg
Endrin aldehyde	1.7	ug/kg	1	ug/kg
Endrin ketone	1.7	ug/kg	0.63	ug/kg
Heptachlor	1.7	ug/kg	1.1	ug/kg
Heptachlor epoxide	1.7	ug/kg	0.8	ug/kg
Methoxychlor	3.3	ug/kg	1.5	ug/kg
Toxaphene	67	ug/kg	19	ug/kg

Table 3-4

Polychlorinated Biphenyls (PCBs) - Analysis/Extraction Method: 8082/3500B

Compound	RL	Units	MDL	Units
Aroclor 1016	50	ug/kg	6.7	ug/kg
Aroclor 1221	50	ug/kg	9.9	ug/kg
Aroclor 1232	50	ug/kg	5.2	ug/kg
Aroclor 1242	50	ug/kg	10	ug/kg
Aroclor 1248	50	ug/kg	4.8	ug/kg
Aroclor 1254	50	ug/kg	4.3	ug/kg
Aroclor 1260	50	ug/kg	8	ug/kg

Table 3-5

Explosives - Analysis/Extraction Method: 8330B

Compound	RL	Units	MDL	Units
4-Amino-2,6-dinitrotoluene	0.25	mg/kg	0.02	mg/kg
2-Amino-4,6-dinitrotoluene	0.3	mg/kg	0.1	mg/kg
1,3-Dinitrobenzene	0.25	mg/kg	0.05	mg/kg
2,4-Dinitrotoluene	0.25	mg/kg	0.02	mg/kg
2,6-Dinitrotoluene	0.25	mg/kg	0.03	mg/kg
HMX	0.25	mg/kg	0.03	mg/kg
Nitrobenzene	0.25	mg/kg	0.05	mg/kg
Nitroglycerin	0.5	mg/kg	0.13	mg/kg
3-Nitrotoluene	0.25	mg/kg	0.07	mg/kg
4-Nitrotoluene	0.25	mg/kg	0.08	mg/kg
2-Nitrotoluene	0.25	mg/kg	0.08	mg/kg
PETN	0.5	mg/kg	0.16	mg/kg
RDX	0.25	mg/kg	0.04	mg/kg
Tetryl	0.25	mg/kg	0.05	mg/kg
1,3,5-Trinitrobenzene	0.25	mg/kg	0.02	mg/kg
2,4,6-Trinitrotoluene	0.25	mg/kg	0.02	mg/kg

Table 3-6

Propellants - **Nitroguanidine Analysis/Extraction Method: 8330 Mod / 8332 Mod**

Compound	RL	Units	MDL	Units
Nitroguanidine	0.25	mg/kg	0.02	mg/kg

Propellants - **Nitrocellulose Analysis/Extraction Method: 353.2**

Compound	RL	Units	MDL	Units
Nitrocellulose	5	mg/kg	0.78	mg/kg

Table 3-7

Perchlorate - Analysis/Extraction Method: 6860

Compound	RL	Units	MDL	Units
Perchlorate	0.6	ug/kg	0.21	ug/kg

Table 3-8

Target Analyte List (TAL) ICP Metals - Analysis/Extraction Method: 6010B/3050B

Compound	RL	Units	MDL	Units
Aluminum	20	mg/kg	9.6	mg/kg
Antimony	10	mg/kg	0.39	mg/kg
Barium	1	mg/kg	0.071	mg/kg
Beryllium	1	mg/kg	0.043	mg/kg
Cadmium	1	mg/kg	0.036	mg/kg
Calcium	100	mg/kg	16	mg/kg
Chromium	2	mg/kg	0.2	mg/kg
Cobalt	2	mg/kg	0.16	mg/kg
Copper	2	mg/kg	0.74	mg/kg
Iron	20	mg/kg	4.9	mg/kg
Magnesium	100	mg/kg	5.1	mg/kg
Manganese	1	mg/kg	0.074	mg/kg
Nickel	2	mg/kg	0.27	mg/kg
Potassium	500	mg/kg	6.2	mg/kg
Silver	2	mg/kg	0.1	mg/kg
Sodium	100	mg/kg	66	mg/kg
Vanadium	2	mg/kg	0.12	mg/kg
Zinc	4	mg/kg	1	mg/kg
Arsenic	1	mg/kg	0.3	mg/kg
Lead	1	mg/kg	0.19	mg/kg
Selenium	1	mg/kg	0.45	mg/kg
Thallium	2	mg/kg	0.55	mg/kg

Table 3-9

Mercury - Analysis/Extraction Method: 7471A

Compound	RL	Units	MDL	Units
Mercury	0.1	mg/kg	0.015	mg/kg

Table 3-10

Cyanide - Analysis/Extraction Method: 9012A

Compound	RL	Units	MDL	Units
Total Cyanide	0.5	mg/kg	0.1	mg/kg

Table 3-11

Total Solids - Analysis/Extraction Method: 160.3

Compound	RL	Units	MDL	Units
Percent Solids	10	%	10	%

5.0 SAMPLING PROCEDURES

Sampling Procedures are described in Section 4.0 of the Facility-Wide SAP as referenced in Section 4.0 of the FSP of this SAP addendum

Table 5-1 summarizes sample container, preservation and holding time requirements for the soil and investigation-derived waste (IDW) for this investigation.

As noted in the Facility-Wide QAPP, additional samples volumes will be provided, when necessary, for the express purpose of performing associated laboratory QC (MS/MSD). These laboratory QC samples will be designated by the field and identified for the laboratory on respective chain of custody (COC) documentation.

Table 5-1 Sample Containers, Preservation, and Holding Times

Analyte Group	Method	Sample Size	Preservative	Holding Time
VOCs	8260B	5 grams	Cool, 4º C	48 hours (14 days if frozen upon arrival at the laboratory) (analysis)
SVOCs	8270C	100 grams	Cool, 4º C	14 day 40 days (analysis) 40 days (analysis)
Pesticides	8082	100 grams	Cool, 4º C	14 day 40 days (analysis) 40 days (analysis)
PCBs	8081A	100 grams	Cool, 4º C	14 day 40 days (analysis) 40 days (analysis)
Explosive Compounds	8330	100 grams	Cool, 4º C	14 day 40 days (analysis) 40 days (analysis)
Nitrocellulose	353.2	100 grams	Cool, 4º C	14 day 40 days (analysis) 40 days (analysis)
Nitroguanidine	8330 Mod.	100 grams	Cool, 4º C	14 day 40 days (analysis) 40 days (analysis)
Perchlorate	6860	100 grams	Cool, 4º C	28 days (analysis)
TAL Metals	6010B	100 grams	Cool, 4º C	180 days
Mercury	7471A	100 grams	Cool, 4º C	28 days
Cyanide	9012A	100 grams	Cool, 4º C	14 days
Solids	160.3			7 days

QC = Quality Control

6.0 SAMPLE CUSTODY

Sample custody procedures will follow those identified in section 5.0 of the Facility-Wide QAPP.

7.0 CALIBRATION PROCEDURES AND FREQUENCY

7.1 Field Instrument/Equipment

Field instruments and equipment calibrations will follow procedures described in Section 6.1 of the Facility-Wide QAPP.

7.2 Laboratory Instruments

Calibration of Laboratory equipment will follow procedures identified in Section 6.2 of the Facility-Wide QAPP, the contract Laboratory QAPP, Laboratory-specific standard operating procedures (SOPs), and corporate and facility specific operating procedures.

8.0 ANALYTICAL PROCEDURES

8.1 Laboratory Analysis

Analytical methods, parameters and quantitation or detection limits are listed in Tables 3-1 through 3-12 of this amendment. The SW-846 method references found in the Facility-Wide QAPP have been revised to the Update III methods as appropriate. Laboratory analysis procedures are provided in Section 7.1 of the Facility-Wide QAPP.

The laboratories will maintain a safe and contaminant free environment for the analysis of samples. The laboratories will demonstrate, through instrument blanks, holding blanks, and analytical method blanks that the laboratory environment and procedures do not impact analytical results.

The laboratories will implement all reasonable procedures to maintain project-reporting levels for all sample analyses. Where contaminant and sample matrix analytical interferences impact the laboratories' ability to obtain project-reporting levels, the laboratory will institute sample clean-up processes, minimize dilutions, adjust instruments operational parameters, or propose alternative analytical methods or procedures. Elevated reporting levels will be kept to a minimum throughout the execution of this work. When samples require dilution, both the minimum dilution and quantified dilution must be reported. The contract laboratory will screen all samples to determine optimum dilution ranges. Dilution runs will be performed to quantify high target analyte concentrations within the upper half of the calibration range, thus reducing the degree of dilution as much as possible. In addition, a five times less diluted run will then be performed to report other target analyte reporting levels as low as possible without destroying analytical detectors and instrumentation. If there are matrix interferences, non-target analyte, or high target analyte concentrations that preclude analysis of an undiluted sample, the laboratory project manager will contact PIKA, USACE Louisville District, and Ohio EPA, forward analytical and chromatographic information from diluted runs, and obtain direction on how to proceed.

8.2 Field Screening Analytical Protocols

Procedures for instrument calibration, calibration frequency, and field analysis are

identified in Section 6.0 of the Facility-Wide FSP, and in Section 4.0 of the FSP of this SAP addendum. A photoionization detector will be used to screen samples for organic vapors. Head space analysis will not be conducted.

9.0 INTERNAL QUALITY CONTROL CHECKS

9.1 Field Sample Collection

Field QC/QA sample types, numbers, and frequencies are identified in Section 2.5 of this document. In general, field duplicates will be collected at a frequency of 10 percent, field equipment rinsates at a frequency of 10 percent for samples collected with non-dedicated equipment, Matrix Spike/Matrix Spike Duplicate (MS/MSDs) will be collected at a frequency of 5 percent. No field blanks will be collected during this project.

9.2 Field Measurement

Refer to Section 4.0 of the FSP of this SAP addendum for details regarding field measurements.

9.3 Laboratory Analysis

Analytical QC procedures will follow those identified in the referenced U.S. Environmental Protection Agency (USEPA) methodologies. These will include method blanks, LCS, MS, MSD, Laboratory duplicate analysis, calibration standards, internal standards, surrogate standards and calibration check standards.

The contract laboratory facilities will conform to their QAPP and implement their established SOPs to perform the various analytical methods required by the project. QC frequencies will follow those identified in Section 8.3 of the Facility-Wide QAPP.

10.0 DATA REDUCTION, VALIDATION, AND REPORTING

10.1 Data Reduction

Data Reduction will follow the established protocols defined in Section 9.1 in the Facility Wide QAPP. Sample collection and field measurements will follow the established protocols defined in the Facility-Wide QAPP, Facility-Wide SAP and the SAP addendum. Laboratory data reduction will follow the contract Laboratory QAPP guidance and will conform to general direction provided by the Facility-Wide QAPP; the USACE Shell for Analytical Chemistry Requirements, Appendix I EM2001-3, February 2001; the DoD QSM for Environmental Laboratories; and the Louisville QSM Supplement.

10.2 Data Validation

Project data verification and validation will follow direction provided in the Facility-Wide QAPP Section 9.2 and diagramed in 9-1. Protocol for analytical data verification and validation has been updated to the following references:

- DoD QSM for Environmental Laboratories, January 2006;
- Louisville QSM Supplement;
- USEPA National Functional Guidelines for Organic Data Review, EPA-540/R-99/008, October 1999; and
- USEPA National Functional Guidelines for Inorganic Data Review, EPA-540/R-94/004, October 2004.

All data will be reviewed and verified by PIKA according to the Facility-Wide QAPP.

Validation of a minimum of 10% of the data will follow the direction provided in the Facility-Wide QAPP, the DoD QSM for Environmental Laboratories, and the Louisville QSM Supplement. An independent data validation subcontractor qualified by USACE, Louisville District will perform this data validation. The validator shall document the findings of the review using the checklists in Attachment B of the Louisville Chemistry Guideline (LCG), Rev. 5, June 2002, Samir Mansy. These checklists may be modified to implement QSM criteria.

10.3 Data Reporting

Data reporting will follow the established protocols defined in Section 9.3 in the Facility-Wide QAPP. The contract laboratory will deliver an electronic data deliverable (EDD) that is automated data review (ADR) compatible. All data will be processed by ADR Environmental Data Management System (EDMS) software using the RVAAP specific data library. All errors in the ADR/EDD found must be corrected by the laboratory prior to submittal. EDDs with errors will not be accepted.

10.4 Data Quality Assessment

Data quality will be accessed using the procedures provided in Section 9.4 of the Facility-Wide QAPP.

11.0 PERFORMANCE AND SYSTEM AUDITS

11.1 Field Audits

One field surveillance for the investigation will be performed by the PIKA QA/QC Officer, the PIKA Field Operations Manager or another properly trained PIKA auditor. This surveillance will encompass the performance of sampling of any environmental medium. The surveillance will follow PIKA Quality Assurance Administrative Procedures (QAAP).

USACE, USEPA Region 5, or Ohio EPA audits may be conducted at the discretion of the respective agency.

11.2 Laboratory Audits

Routine USACE Hazardous, Toxic, and Radioactive Waste (HTRW) Center of Expertise (CX) on-site laboratory audits may be conducted by USACE, while audits by USEPA Region 5 or Ohio EPA may be conducted at the discretion of the respective agency.

Internal performance and systems audits will be conducted by the contract laboratory's staff as defined in their QAPP.

More information regarding laboratory audits can be found in Section 10.2 of the Facility-Wide QAPP.

12.0 PREVENTIVE MAINTENANCE PROCEDURES

Maintenance of all field sampling and laboratory analytical equipment will follow direction provided in Section 11.0 of the Facility-Wide QAPP. Routine and preventative maintenance for all laboratory instruments and equipment will follow the direction of the contract laboratory QAPP.

13.0 SPECIFIC ROUTINE PROCEDURES TO ASSESS DATA PRECISION, ACCURACY, AND COMPLETENESS

Field and laboratory data will be assessed as outlined in Sections 12.1 and 12.2, respectively, of the Facility-Wide QAPP.

14.0 CORRECTIVE ACTIONS

Field and laboratory activity corrective action protocol will follow directions provided in Sections 13.1 and 13.2, respectively of the Facility-Wide QAPP. Laboratory corrective actions will also follow the procedures in the contract laboratory QAPP.

15.0 QA REPORTS TO MANAGEMENT

Procedures and reports will follow the protocol identified in Section 14.0 of the Facility-Wide QAPP and those directed by the contract laboratory QAPP.

16.0 REFERENCES

Additional references to the FQAPP are:

- DoD (U.S. Department of Defense) 2009. *Quality Systems Manual for Environmental Laboratories,* Environmental Data Quality Workgroup, Final Version 4.1. Final..
- USACE (U.S. Army Corps of Engineers) 2000. *Environmental Data Quality Assurance Guideline, Louisville District.* May. (Draft).
- USACE 2001. *Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio,* DACA62-00-D-0001, Delivery Order CY02. Final. March.
- USACE 2002. *Louisville Chemistry Guideline*, Samir A. Mansy, Environmental Chemistry Branch, Rev. 5, June
- USACE 2007. *Louisville DoD Quality Systems Manual Supplement (LS)* Version 1. March.
- USEPA (U.S. Environmental Protection Agency) 1999. *Contract Laboratory Program National Functional Guidelines for Organic Data Review*, EPA-540/R-99/008. Final. October.
- USEPA 2004. *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, EPA-540/R-04/004. Final. October.
- Test America Laboratories, Inc. *Quality Assurance Management Pla*n (QAMP), and Test America Laboratories Laboratory Standard Operating Procedures/QAMP.

APPENDIX G

CUMULATIVE SIGNED DOCUMENTATION/CORRESPONDENCE

You forwarded this message on 5/18/2010 7:48 AM.

Brian Stockwell

From: Eileen Mohr [eileen.mohr@epa.state.oh.us] **Sent:** Thu 4/15/2010 3:40 PM
To: Brian Stockwell
Cc: Eileen Mohr; Todd Fisher; mark.c.patterson@us.army.mil; Derek.S.Kinder@usace.army.mil; Glen.Beckham@usace.army.mil; Nathaniel.Peters.II@usace.army.mil
Subject: DB-802/Load Line 2
Attachments:

Brian

I have reviewed the data obtained from the URS sampling at the above area and the write-up prepared by USACE/URS. I also compared the sediment data that was obtained with the clean-up numbers presented in the approved Load Lines 1-4 ROD. In addition, I looked at the chromium data with respect to the 1:6 ratio that we have been using. With respect to arsenic in the surface water I looked at it from the perspective of the arsenic levels that at times are observed in the installation wells and local residential wells; coupled with the fact that the surface water samples were probably not filtered in the field. THe addition of acid as a presevative to a turbid sample could have increased metals concentrations.

All of that being said, approval is granted to discharge the surface water to the ground surface in the vicinity of DB-802 subject to the discharge conditions that have been established for RVAAP. As we discussed in the field today, I do not have an obection to a "sock fiilter" device over the end of the hose to ensure that solid particulates are not discharged. This device was used by another contractor on a different project at RVAAP.

Previously approvals have been granted with respect to the areas at Load Lines 2 and 3 that can be re-graded and the materials that can be used. All that is left is for the final selection of the water discharge location. As we discussed in the field, the area to the west of DB-802 may work out fine. Let me know when you want me to have a look at the area that is ultimately selected by PIKA.

That's it. Looks like you are good to go.

Thanks and have a good weekend.

Eileen

Eileen T. Mohr
Project Manager
Division of Emergency and Remedial Response
2110 East Aurora Road
Twinsburg, OH 44087
330-963-1221
330-487-0769 (FAX)
email: Eileen.Mohr@epa.state.oh.us

PIKA INTERNATIONAL, INC.

Sue Boles <sboles@pikainc.com>

Fwd: MI Sampling Guidance (UNCLASSIFIED)

1 message

Shahram Taherinia <staherinia@pikainc.com> **Mon, Feb 7, 2011 at 7:54 AM**
To: Sue Boles <sboles@pikainc.com>

---------- Forwarded message ----------
From: **Shahram Taherinia** <staherinia@pikainc.com>
Date: Fri, Feb 4, 2011 at 10:49 PM
Subject: Fwd: MI Sampling Guidance (UNCLASSIFIED)
To: brian <bstockwell@pikainc.com>

---------- Forwarded message ----------
From: **Kinder, Derek S LRL** <Derek.S.Kinder@usace.army.mil>
Date: Fri, Feb 4, 2011 at 2:47 PM
Subject: RE: MI Sampling Guidance (UNCLASSIFIED)
To: Shahram Taherinia <staherinia@pikainc.com>

Classification: UNCLASSIFIED
Caveats: NONE

Please refer to the Draft Facility-Wide Sampling and Analysis Plan for Environmental Investigations, Nov. 11, 2010, it is currently available on REIMS.

Thanks,

Derek Kinder, PE
Civil/Environmental Engineer
Environmental Branch
Louisville District
US Army Corps of Engineers
502-315-6393
Comments on our Environmental Services are invited:
http://ice.disa.mil/index.cfm?fa=card&site_id=915&service_provider_id=115446

-----Original Message-----
From: Shahram Taherinia [mailto:staherinia@pikainc.com]
Sent: Thursday, February 03, 2011 12:12 PM
To: Kinder, Derek S LRL
Subject: MI Sampling Guidance

Derek,
Would you please send me a copy of MI sampling guidance (text). Thanks.

--

Shahram Taherinia
PIKA International, Inc.
12723 Capricorn Dr., Suite 500
Stafford, TX 77477
(281) 340-5525 Office
(281) 226-3179 Cell
(281) 340-5533 Fax

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PIKA INTERNATIONAL, INC.

Sue Boles <sboles@pikainc.com>

Re: Draft Work Plan for CC-RVAAP-80 Group 2 Propellant Can Top Site (UNCLASSIFIED)

2 messages

Brian Stockwell <bstockwell@pikainc.com> **Mon, Feb 7, 2011 at 10:00 AM**
To: "Tait, Kathryn S Ms CIV NG OHARNG" <kathryn.s.tait@us.army.mil>
Cc: Sue Boles <sboles@pikainc.com>

Hi Katie - we had been waiting to get all the comments from the rest of the Stakeholders before sending along our response to your comments below - pls have a look and let me know - thanks

Brian

On Fri, Dec 17, 2010 at 1:00 PM, Tait, Kathryn S Ms CIV NG OHARNG <kathryn.s.tait@us.army.mil> wrote:

> Classification: UNCLASSIFIED
> Caveats: FOUO
>
> Brian:
> After being out of pocket for a couple weeks due to computer issues, I am not
> quite sure where the review is on this document. Finally got a chance to
> review it. Just a couple minor comments:
> 1) Pg 6, Line 15: "The reported northern area (see Figure 3)..." This
> northern area was removed from the scope and was taken off the Figure so I
> think this is a carry over. Please delete the statement. Correct, the northern area will be removed from Figure 3.
> 2) Pg 25, Section 2.13, Vegetation Removal: Please make sure you coordinate
> all vegetation removal in Group 2 with the OHARNG and state so in the text in
> this section. For clarification, the following information will be incorporated into Section 2.13 "All brush clearing and vegetation removal operations will be coordinated with the OHARNG."
>
> Thanks and please contact me with any questions.
>
> Katie Tait
> Environmental Specialist 2
> Ohio Army National Guard
> (614)336-6136
> kathryn.s.tait@us.army.mil
>
> Classification: UNCLASSIFIED
> Caveats: FOUO

--
Regards,

Brian Stockwell
Project Manager
PIKA International, Inc.
330-358-7135

Tait, Kathryn S Ms CIV NG OHARNG <kathryn.s.tait@us.army.mil> **Mon, Feb 7, 2011 at 12:12 PM**
To: Brian Stockwell <bstockwell@pikainc.com>
Cc: Sue Boles <sboles@pikainc.com>

Classification: UNCLASSIFIED
Caveats: FOUO

Brian:
Responses to comments are acceptable. Thanks.

Katie
[Quoted text hidden]
Classification: UNCLASSIFIED
Caveats: FOUO

PIKA INTERNATIONAL, INC.

Sue Boles <sboles@pikainc.com>

Fwd: Group 2 Followup

1 message

Brian Stockwell <bstockwell@pikainc.com> **Tue, Feb 8, 2011 at 11:26 AM**
To: Sue Boles <sboles@pikainc.com>

fyi -

---------- Forwarded message ----------
From: **Eileen Mohr** <eileen.mohr@epa.state.oh.us>
Date: Tue, Feb 8, 2011 at 11:21 AM
Subject: Re: Group 2 Followup
To: staherinia@pikainc.com
Cc: Eileen Mohr <eileen.mohr@epa.state.oh.us>, bstockwell@pikainc.com

Thanks Shahram. If you could add to the revised document, that would be great.

Eileen T. Mohr
Project Manager
Division of Emergency and Remedial Response
2110 East Aurora Road
Twinsburg, OH 44087
330-963-1221
330-487-0769 (FAX)
email: Eileen.Mohr@epa.state.oh.us

>>> Shahram Taherinia 02/07/11 12:33 PM >>>
Eileen,
based on our follow up with Geosearch, please see the following clarifications.

1- The EM61 and Ground Penetrating Radar can reach depths of up to 15-20 feet depending on the subsurface consistency on the day of the survey.
2- "Section 6.6" (page # 39)- Under the “Data Processing” paragraph the first word should read “GeoSearches” not Shaw’s.
3- "Section 6.5.2" (last bullet, page #39) The collected Data will be subjected to Quality Control procedures on daily basis to make sure all planned data lines for the day are covered.

--
Shahram Taherinia
PIKA International, Inc.
12723 Capricorn Dr., Suite 500
Stafford, TX 77477
(281) 340-5525 Office
(281) 226-3179 Cell
(281) 340-5533 Fax

--
Regards,

Brian Stockwell
Project Manager
PIKA International, Inc.
330-358-7135

Ohio | Environmental Protection Agency
John R. Kasich, Governor
Mary Taylor, Lt. Governor
Scott J. Nally, Director

March 3, 2011

RE: RAVENNA ARMY AMMUNITION PLANT
FINAL GROUP 2 PROP CAN WORK PLAN
PORTAGE/TRUMBULL COUNTIES
OHIO EPA ID # 267000859059

Mr. Mark Patterson, Facility Manager
Ravenna Army Ammunition Plant
8451 State Route 5
Ravenna, OH 44266

CERTIFIED MAIL

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR) has received and reviewed the document entitled: "Final Project Work Plan for the Compliance Restoration Site CC-RVAAP-80 Group 2 Propellant Can Tops and Other Environmental Services." This document, dated February 25, 2011 and received at Ohio EPA NEDO on February 24, 2011 was prepared for the US Army Corps of Engineers (USAC E) – Louisville District by PIKA International, Inc. under contract number W912QR-10-P-0058.

This document was compared to the draft document dated October 29, 2010. PIKA will provide a replacement for page 5 and a revised CD to all stakeholders. Subsequent to receipt of the replacement page and CD, the work plan is approved.

If you have any questions concerning this correspondence, please do not hesitate to contact me at 330-963-1221.

Sincerely,

for

Eileen T. Mohr, Project Manager
Division of Emergency and Remedial Response

ETM/ams

ec: Justin Burke, Ohio EPA, Central Office, DERR
Mike Eberle, Ohio EPA, NEDO, DERR
Todd Fisher, Ohio EPA, NEDO, DERR
Mark Eldridge, AEC
Glen Beckham, USACE Louisville
Greg Moore, USACE Louisville
Jay Trumble, USACE Louisville
LTC Ed Meade, OHARNG
Katie Tait, OHARNG
Christy Esler, Army/VISTA
Brian Stockwell, PIKA
Sue Boles, PIKA

APPENDIX H

OHIO EPA MEC NOTIFICATION PROCEDURE

Munitions and Explosives of Concern (MEC) at the Ravenna Army Ammunition Plant (RVAAP) - Notification Procedures

Paragraph 9(a) of the Director's Final Findings and Orders (journalized June 10, 2004) allows for the following exemption: "The requirement to obtain a hazardous waste facility installation and operation permit, as required by ORC 3734.02 (E), for the storage and treatment (destruction) of MEC (excluding bulk storage of munitions and chemical and biological warfare materiel) at OD#2, and for the in-place treatment (destruction) of MEC (excluding bulk storage of munitions and chemical and biological warfare materiel) discovered at the RVAAP that can not be safely transported to OD#2, provided, however, that Respondent shall comply with all applicable requirements of ORC chapter 3734 and OAC chapters 3745-50 through 3745-68, including but not limited to the hazardous waste requirements set forth at Appendix E."

In the absence of obtaining emergency permits, the following is the type of information that should be provided to Ohio EPA Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR) [attn: Eileen Mohr] and Division of Hazardous Waste Management (DHWM)[attn: Greg Orr]. The information is divided into categories: prior to destruction of the MEC and subsequent to the destruction of the MEC. Prior to the MEC destruction, notification can be made via either letter or email. Subsequent to detonation, the information can be transmitted in a written summary report after each detonation event or at the conclusion of clearance activities at a particular Area of Concern (AOC).]

Information to be provided prior to Blow in Place (BIP) or Detonation at OD#2:

1. Point of Contact (POC)
2. POC's phone number(s) and fax number
3. Location/date/time/person discovering the MEC
4. Description of MEC to be blown: including type and quantity
5. Proposed destruction location: either at OD#2 or BIP
6. Proposed method of destruction
7. Proposed methods to mitigate/abate potential contamination
8. Preparedness and prevention
9. Notifications to be made

Information to be provided subsequent to BIP or Detonation at OD#2:

1. POC
2. POC's phone number(s) and fax number
3. Description of MEC blown: including type and quantity
4. Location/date/time/person responsible for the MEC destruction
5. Location of destruction activities - description and map with GPS locations listed and (if applicable) the depth and number of shot holes utilized at OD#2
6. Method of destruction utilized
7. List of donor charges and amounts
8. Any problems encountered
9. Inspection/disposal of residues
10. Confirmation of adherence to minimum isolation distances specified in OAC 3745-68-82
11. Whether or not any subsequent soil samples were collected and location of available analytical results

APPENDIX I

GEOSEARCHES INFORMATIONAL LETTER MEMO

GEOSEARCHES

December 6, 2010

Pika International
8451 State Route 5
Ravenna, OH 44266-9244

SUBJECT: Questions Answered (in order)

1. The two Geophysical methods EM and GPR have been chosen to compliment each other's ability to discern buried metallic objects to compile the complete subsurface picture.

2. The equipment was chosen as result of many years experience at utilizing these methods on similar projects.

3. Like all Geophysical instruments there will be a limitation in some areas due to lithology of the subsurface. However for the task at hand both are the most competent instrumentation to achieve the project goals.

4. Magnetics was also considered but will not define such small targets as we are looking for.

5. The depth of penetration can be up to 50 feet in the correct conditions.

6. If there are a lot buried together in a pile then discrimination will be difficult.

7. An instrument calibration test will be carried out involving within an ISV.

8. Blind seeding will not be undertaken.

9. The grid size and spacing was determined to extract as much data as possible without losing 100% data coverage.

Best regard's,

Terence M. Hamill
President / Principal Geophysicist
GeoSearches, Inc.

APPENDIX J

COMMENT RESPONSE TABLE

NO COMMENT RESPONSE TABLE HAS BEEN SUBMITTED WITH THIS FINAL DOCUMENT AS COMMENT RESPONSES WERE RECORDED IN THE OHIO EPA COPY OF THE DRAFT ITERATION.

END OF REPORT