FINAL SITE-SPECIFIC HEALTH AND SAFETY PLAN

PIKA INTERNATIONAL, INC.

FINAL SITE-SPECIFIC HEALTH AND SAFETY PLAN TIME CRITICAL RESPONSE ACTION (TCRA) OF THE SAND CREEK BARRIER SYSTEM

Ravenna Army Ammunition Plant (RVAAP)
Ravenna, Ohio

Contract No. DACA-63-03-D0009

Submitted to:

U.S. Army Corps Of Engineers
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FINAL SITE SAFETY AND HEALTH PLAN APPROVAL

Project: Operations and Maintenance of Sand Creek Barrier System,

Site: Sand Creek, 2,700 feet downstream of Rocket Ridge Area of Open Demolition Area #2

Site Location: Ravenna, Ohio

The Site-Specific Health and Safety Plan (SSHASP) presented in this document has been developed for the U.S. Army Corps of Engineers (USACE) Omaha District and engineering-environmental Management, Inc. (e²M) in support of the Scope of Work (SOW) for the above referenced project. The PIKA personnel referenced below have reviewed and approved this SSHASP for implementation at the above referenced site once approval has been received from e²M. Procedures for the submission, approval, integration and implementation of changes to this SSHASP are discussed within the body of this SSHASP and will be followed whenever a change would significantly impact the safety of site personnel, the environment or off-site personnel.

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LIST OF ACRONYMS

ºF	Degrees Fahrenheit
ACGIH	American Conference of Governmental Industrial Hygienist
ALS	Advanced Life Support
BBP	Bloodborne Pathogen
BEIs	Biological Exposure Incidence
BZ	Breathing Zone
CAHA	Certificate of Activity Hazard Analysis
CESHP	PIKA Corporate Environmental Safety and Health Program
CESHM	PIKA Corporate Environmental Safety and Health Manager
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CPR	Cardiopulmonary Resuscitation
CWM	Chemical Warfare Materiel
DOD	Department of Defense
DOT	Department of Transportation
e²M	engineering - environmental Management, Inc.
EM	Engineering Manual
EOD	Explosive Ordnance Disposal
EP	Engineering Pamphlet
ER	Engineering Regulation
ES&H	Environmental Safety and Health
EZ	Exclusion Zone
FM	Factory Manual Engineering Corporation
GFCI	Ground Fault Circuit Interrupter
HAZCOM	Hazard Communication Standard
HAZWOPER	Hazardous Waste Operations and Emergency Response
HTRW	Hazardous Toxic and Radioactive Waste
IAW	In Accordance With
LO/TO	Lockout/Tagout
ma	Milliampere
MEC	Munitions and Explosives of Concern
MSDS	Material Safety Data Sheet
MSP	Medical Surveillance Program
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PDS	Personnel Decontamination Station

PIKA	PIKA International, Inc.
PM	Project Manager
PPE	Personal Protective Equipment
SHSM	Site Health and Safety Manager
SM	Site Manager
SOP	Standard Operating Procedure
SOW	Scope of Work
SSHASP	Site Specific Health and Safety Plan
SUXOS	Senior UXO Supervisor
SWPs	Safe Work Practices
SZ	Support Zone
TLVs	Threshold Limit Values
UL	Underwriters Laboratories
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
UXOSO	UXO Site Safety and Health Officer/Team Leader
WP	Work Plan
WZ	Work Zone

1.0 INTRODUCTION

This Site Specific Health and Safety Plan (SSHASP) has been prepared by PIKA International, Inc. (PIKA) to outline the procedures and work practices that PIKA personnel will use to safeguard site personnel during the performance of work at Ravenna Army Ammunition Plant, Ravenna (RVAAP), Ohio. This SSHASP has been designed to meet or exceed the minimum requirements as outlined in the Final Health and Safety Plan (HASP) developed by engineering-environmental Management, Inc. (e²M), dated September 2007. While this SSHASP will be used in conjunction with the e²M HASP, it has been designed to present the hazard information and control procedures for those site-specific tasks to be performed by PIKA personnel.

This SSHASP will act as PIKA's environmental, safety and health (ES&H) document for this project and as such it contains the site-specific information related to site hazards and the safe work practices that will be used to control or mitigate the hazards. Other ES&H documents referenced in this SSHASP, such as Certificates of Activity Hazard Assessment (CAHA) forms, Environmental Safety and Health Procedures (ESHPs), and ES&H forms, are included as attachments to this SSHASP. This SSHASP will be implemented under the e²M *Revised Operation and Maintenance (O&M) Plan* (Revised May 2008) which will hereafter be referred to in this document as the e²M WP.

1.1 GENERAL

PIKA corporate policy requires the use of all feasible hazard controls when there is a potential for personnel exposure to chemical, physical, or biological hazards. To implement this policy, PIKA implements a comprehensive Corporate Environmental Safety and Health Program (CESHP). This program has been developed by PIKA's Corporate Environmental Safety and Health Manager (CESHM) with the support and consultation of PIKA's Munitions and Explosives of Concern (MEC) and environmental management personnel. The PIKA CESHP was developed to comply with the Occupational Safety and Health Administration (OSHA) requirements found in 29 Code of Federal Regulations (CFR) 1910.120 and 29 CFR 1926.65, as well as 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

PIKA has developed this SSHASP for the O&M of the Sand Creek Barrier System installed 2,700 feet downstream at the Rocket Ridge Area of Open Demolition Area #2, RVAAP, Ohio. The SSHASP addresses the requirements of 29 CFR 1910.120(b)(4)(ii), 29 CFR 1926.65(b)(4)(ii), Section 28, paragraph A.02.b of the U.S. Army Corps of Engineers (USACE) Engineering Manual (EM) 385-1-1, Safety and Health Requirements manual, and other applicable Federal, state, and local safety and health requirements. The level of detail required in this SSHASP has been tailored to the type of work,

complexity of operations to be accomplished, and the hazards anticipated. The SSHASP addresses those elements, which are specific to the site and PIKA's SOW, and have the potential for negative effects on the safety and health of workers, the environment and the public.

1.2.2 Objective

The primary objective of this SSHASP is to provide PIKA with an effective tool for the anticipation, identification, evaluation, control, and/or elimination of recognized safety and health hazards anticipated for the operations conducted at RVAAP. The secondary objective of this SSHASP 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. For those emergencies that may reasonably occur, contingency plans and emergency response procedures have been developed and are presented in this SSHASP.

1.3 SSHASP APPROVAL AND COMPLIANCE BY SITE PERSONNEL

All PIKA, subcontractor, and visitor personnel involved in this project shall carefully read this document and the e²M HASP prior to participation in any on-site tasks that involve potential exposure to on-site safety or health hazards. Questions related to the information in this SSHASP will be addressed to, and resolved by, the PIKA UXO Safety Officer (UXOSO), with consultation from the CESHM if needed.

After reading this SSHASP, site personnel will complete the PIKA SSHASP Review and Approval Form located in Attachment 3 of this SSHASP, indicating their understanding of, and willingness to comply with, the requirements in this SSHASP. All site personnel will exercise reasonable caution at all times and shall immediately report to the UXOSO any site conditions which may pose a safety or health hazard to site personnel.

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 SSHASP

The levels of personal protective equipment (PPE) and the safe work practices (SWPs) specified in this plan are based on the best available information, archival data, anticipated site conditions, and professional experience gained from operations PIKA has performed previously at similar sites. It is understood that this SSHASP is a living

document, and the actual on-site implementation of site tasks may facilitate changes in PPE, monitoring, SWPs, or other elements of this SSHASP.

If a previously un-assessed task is identified, or a proposed SOW change requires a written revision of this SSHASP, the PIKA Project Manager (PM) will submit a written request for change to the PIKA CESHM, along with attached documentation. Approved changes to this SSHASP and the modified pages of this SSHASP will be forwarded to the PM upon approval by the CESHM. Notification and update pages will also be sent to e²M by the PIKA PM for review and approval. If a proposed change involves 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. Changes of this nature will not be allowed until written approval from e²M has been received and any necessary changes have been made to this SSHASP.

1.5 REGULATIONS AND REFERENCES

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

- Current versions of the OSHA General Industry (29 CFR 1910) and Construction Standards (29 CFR 1926).
- USACE EM 385-1-1 Safety and Health Requirements Manual (03 November 2003).
- USACE Engineering Regulation (ER) 385-1-95, Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations, 1 April 2006.
- USACE ER 385-1-92, Safety and Occupational Health Requirements for Hazardous, Toxic and Radioactive Waste (HTRW) Activities, 01 May 2007.
- 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.
- DDESB TP 18, Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel, 20 December 2004.
- Department of Defense (DoD) 6055.9-STD, DoD Ammunition and Explosives Safety Standards. 5 October 2004, with approved 14 December 2004 changes.
- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs®) and Biological Exposure Indices (BEIs®), 2007.
- The PIKA CESHP (this document will be on site and available to site personnel during the project).

2.0 SITE DESCRIPTION & CONTAMINATION CHARACTERIZATION

2.1 LOCATION

RVAAP (Federal Facility Identification number: OH213820736) is located 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.

2.2 SITE HISTORY

The Installation is approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide. It is 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. Several communities surround the Installation, including: Windham on the north; Garrettsville 9.6 kilometers (6 miles) to the northwest; Newton Falls 1.6 kilometers (1 mile) to the southeast; Charlestown to the southwest; and Wayland 4.8 kilometers (3 miles) to the south.

The Installation is currently known as the Ravenna Training and Logistics Site (RTLS). During operational years the entire 21,683-acre parcel was a government-owned, contractor-operated industrial facility. As of February 2006, a total of 20,403 acres of the former 21,683 acre RVAAP were transferred to the National Guard Bureau and have been subsequently licensed to the Ohio Army National Guard (OHARNG) for use as a military training site. The current RVAAP consists of 1,280 acres scattered throughout the OHARNG RTLS. These 1,280 acres consist of former industrial facilities that are being remediated and managed by the Base Realignment and Closure (BRAC) Office.

Rocket Ridge is located at Demolition Area #2 MRS. The following is a description of Rocket Ridge:

Rocket Ridge is a steep embankment approximately 500 feet long and 25 feet high located adjacent to Sand Creek within ODA2, approximately 2,700 feet upstream of the George Road Bridge. ODA2 was used for munitions demilitarization, including detonation of large caliber munitions and off-specification bulk explosives that could not be deactivated or demilitarized by any other means. The Rocket Ridge slope was used for the disposal of demilitarized munitions, although not all munitions appear to have been completely demilitarized. Munitions-related items that could be identified include 75-millimeter (mm) and 105-mm rounds, booster cups, three 500-pound bombs, white phosphorus rifle grenades, fuzes, and burster tubes. It appears that the munitions were transported from the demolition site to Rocket Ridge and dumped at the top of

the slope. Sand Creek flows in an eastward direction along the northern boundary of the Rocket Ridge Area of ODA2, at the toe of the slope. Due to the steep slope of the disposal area and the stream bank erosion resulting from high water events, some of the munitions materials have reached Sand Creek.

2.3 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 2-1: 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)

2.4 DESCRIPTION OF WORK TO BE PERFORMED

PIKA's SOW involves the tasks described below which are required to meet the requirements of the SOW. Descriptions of each major task within the SOW and the hazards associated with those tasks are presented in this section. The hazards listed for each task are discussed in greater detail in Section 3.0 of this SSHASP. For each hazard listed site personnel will utilize the procedures, SWPs, and PPE described in this

SSHASP to control or eliminate the hazards. Additionally, a task-by-task breakdown of the task hazards and their control techniques is presented in the CAHA forms presented in Attachment 1 of this SSHASP.

2.4.1 Mobilization

2.4.1.1 Task Description

This task will involve the mobilization and set-up of work force and equipment resources to the project site to establish PIKA's operational readiness. Upon notice to proceed, equipment and materials will be taken to the site as needed by the project teams. PIKA will mobilize one 2-man team to perform the operations of the SOW.

2.4.1.2 Task Hazards

The hazards associated with this task will include the items listed below. For the listed hazards, site personnel involved in the task will use the information in this SSHASP, to include the CAHA forms, the SWPs in Section 10.0, and the attached PIKA SOPs, along with daily safety briefings, PPE, and good personal safety practices to safeguard themselves and their co-workers from the hazards.

- Slip, trip and fall hazards for the entire work area, both inside and outside of structure
- Physical exertion and muscle strain
- Use of hand and power tools
- Heat stress and inclement weather
- Hand lacerations/punctures and abrasions hazards from sharp object and tool use
- Biological hazards associated with working in wooded areas in warm weather conditions

2.4.2 Operation and Maintenance (O&M) Field Activities

2.4.2.1 Task Description

The scope of work for the O&M field activities at the Sand Creek Barrier System requires PIKA to inspect and remove the debris accumulated on the screens and assessing the integrity of the construction. The O&M activities will begin after the completion of the barrier construction. The O&M field team will include at least one UXO Technician III and one UXO Technician II. This will occur on a monthly basis during the calendar year.

2.4.2.2 Task Hazards

It is anticipated that the hazards associated with this task will include those hazards listed below. Site personnel performing activities for this task will use the information in this SSHASP and information provided in the daily safety briefings to safeguard themselves from these hazards.

- MEC items trapped in debris in the screens;
- Physical strain, exertion, and lifting hazards;
- Slip, trip and fall hazards from uneven surfaces and vegetation;
- Thermal stresses and other inclement weather depending upon the time of year;
- Biological hazards such as ticks, chiggers, snakes and poisonous plants during warm weather months;
- Ice and snow hazards during winter months;
- High water and water current (depending upon rain or snow melt events);
- Cut, puncture and laceration hazards;
- Hazards from use of hand or power tools.

2.4.3 Management Alternatives for Munitions-Related Material

2.4.3.1 Task Description

The SOW requires PIKA to inspect, and certify that all MD and non-MD scrap be free of energetic hazards prior to transporting the scrap to the Earth Covered Magazine number 1501 located at OD-2. Additionally the SOW requires PIKA to mitigate MEC hazards identified in the screens. This will involve PIKA personnel inspecting MEC items located in the screen and determining if the item is safe to transport or must be blown in place. The decision process and MEC options to be used are outlined in Table 1 of the e²M WP. MEC and MD management are contract option items to be exercised if MEC or MD are found at the barrier System.

2.4.3.2 Task Hazards

It is anticipated that the hazards associated with this task will include those hazards listed below. Site personnel performing activities for this task will use the information in this SSHASP and information provided in the daily safety briefings to safeguard themselves from these hazards.

- MEC;
- Use of High Explosives for demolition operations;
- Hand cut, puncture or laceration in handling MEC, MD, and non-MD scap;
- Physical strain, exertion, and lifting hazards;
- Slip, trip and fall hazards from uneven surfaces and vegetation;
- Use of fork lifts and heavy equipment;
- Ice and snow hazards during winter months;
- Thermal stresses and other inclement weather dependant upon the time of year;
- Biological hazards such as ticks, chiggers, snakes and poisonous plants during warm weather months.

2.5 CONTAMINATION CHARACTERIZATION

The e²M has provided PIKA with information regarding hazardous substances and other contaminants that could be encountered during site operations. This information has

been augmented by PIKA's professional knowledge of MEC operations conducted at similar sites under similar conditions. Based upon this information PIKA has assessed the potential for site personnel to be exposed to chemical contaminants during site operations. The results of this assessment are presented below.

2.5.1 Chemical Warfare Materiel Contamination

No chemical warfare materiel or agent breakdown byproducts currently exist at RVAAP. However, in the highly unlikely event that any potential source of CWM is encountered, PIKA personnel will evacuate the area in an upwind direction to a safe location. The Project Manager (PM) will notify the RVAAP Facility Manager who will request military Explosive Ordnance Disposal (EOD) support. From an upwind position, PIKA personnel will assist the RVAAP Facility Manager in securing the area until relieved by military EOD support. Confirmation of CWM will require a halt in site operations until the potential for future exposure can be assessed and this SSHASP is modified.

2.5.2 Hazardous Substance Contamination

A hazardous substance is defined as "any substance, as defined as a hazardous substance under 29 CFR 1910.120, 1926.65, or 40 CFR Part 302, or any chemical determined to be a hazard as specified in 29 CFR 1910.1200 or 1926.59 to include a chemical (as a gas, liquid, vapor, mist, dust, or fume) which has been identified as causing adverse health effects in exposed humans."

Review of the available information relevant to the site and the tasks to be conducted has indicated that very little to no potential exists for personnel to be exposed to on-site hazardous substances during the performance of the SOW. This includes the potential for exposure to chemicals associated with the performance of site tasks since PIKA does not anticipate the need to bring hazardous substances to the site for the O&M Field Activities.

2.5.3 MEC Contamination

MEC items are known to exist within the Rocket Ridge Area of ODA#2, which is located 2,700 feet upstream of the Sand Creek Barrier System. The MEC items pose a risk of personnel exposure to physical hazards and as such only UXO personnel as defined in DDESB TP-18 will be involved with the location, investigation and assessment of anomalies during the O&M Field Activities associated with the SOW. Additional discussion related to MEC hazards and their assessment is presented in Section 3.2.

3.0 HAZARD/RISK ANALYSIS

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 a CAHA form for each site task with a potential for exposure to site hazards that will require the use of engineering controls, administrative controls, or PPE to minimize or reduce worker exposure. The CAHA forms for this project are presented in Attachment 1 of this SSHASP. These CAHA forms will be used by the UXOSO to brief site personnel on the type and degree of hazard to be expected during site operations and the means site personnel will use to safeguard themselves from the hazards.

While the hazard analyses and risk assessments presented in this SSHASP have been made using 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 and in which site personnel play a major role. All site personnel shall be vigilant in recognizing workplace hazards and bringing them to the attention of the UXOSO or the PM. If changes occur in the level or types of hazards present for a currently evaluated task, or if a new task is added to the Work Plan, the UXOSO will inform the PIKA CESHM of the change. If needed, a new CAHA form will be completed to outline the hazards, control methods and PPE for the task. Any additions to the approved SSHASP will be reviewed and approved by the responsible PIKA personnel and submitted to e²M for final approval. Once approved, the changes will be added to the appropriate site plans.

3.1 CHEMICAL HAZARDS

3.1.1 On-site Chemical Contaminants

As discussed in Section 2.5, PIKA anticipates that there should not be a potential for site personnel to be exposed to on-site chemical contaminants with a potential for causing an occupational exposure situation.

3.1.2 Risk of Exposures Task Related Chemicals

With the exception of insect repellant, wasp spray, and de-icer, PIKA does not anticipate bringing any other products to the site that contains hazardous substances. During the use of these products personnel exposures will be controlled and minimized based on the limited quantities that will be used at any one time and because the products will be used in well-ventilated conditions. Additionally, PIKA personnel will follow the manufacturer's instructions regarding application and use. PIKA will further implement the Hazards Communication (HAZCOM) requirements outlined in paragraph 10.15 of this SSHASP to inform and instruct personnel as to the safe use of the products. If site activities are modified, or evidence of environmental contamination is found, the potential for chemical exposure will be re-evaluated and this SSHASP will be modified as needed to ensure personnel protection.

3.2 MEC

As noted in Section 2.5.3, MEC hazards could be associated with the activities to be performed under the SOW. The potential for significant risk is minimized by the extreme diligence practiced by PIKA's UXO personnel to ensure that MEC is properly located, identified, and reported. While there is no "safe" procedure for dealing with explosives, merely procedures which are considered least dangerous, maximum safety during MEC operations will be achieved through adherence to applicable safety precautions, use of a systematically planned and executed work approach, and intensive supervision. The safety and health procedures that will be used for reducing the hazards associated with MEC during activities under the SOW are discussed in Section 10.16 of this SSHASP.

3.3 PHYSICAL HAZARDS

Based on the nature of the planned site operations, the potential and risk for exposure to physical hazards is high for this project. Physical hazards that may be encountered during site operations include:

- Flammable/explosive materials to include gasoline and diesel fuel;
- Material lifting hazards such as back strain, pulled muscles and tendons, pinched/crushed fingers and toes;
- Hazards associated with the operation of hand and power tools, including cuts/lacerations, and flying objects and debris;
- Slip, trip and fall hazards associated with exposed tree/brush stumps, uneven terrain, rocks, vegetation growth;
- Inclement weather such as snow, hail, heavy rain, thunder/lightning storms, and tornados;
- Deep holes in the forest floor which can cause tripping and leg/knee injury;
- Exposure to temperature extremes;
- Possible high water, and heavy current hazards;
- immersion hazards during cold weather months; and
- Sharp objects that may cause cut, scrape, puncture, splinter or laceration injuries.

PIKA field personnel will be instructed to remain alert to the presence of potential physical hazards and to immediately report the observance of any previously unidentified physical hazards to their UXOSO. The UXOSO will shall be responsible for thoroughly 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, shall be reviewed during the daily safety briefing. General procedures for reducing or eliminating the physical hazards are discussed in Section 10.0 of this SSHASP.

3.4 INCLEMENT WEATHER

Inclement weather such as severe thunder/lightning storms and high winds can have a significant impact on personnel safety and the safe performance of site operations. Site personnel will be briefed each morning to inform them of any potential weather hazards that may be present during the day and will remain alert to the onset of inclement weather. The hazards associated with inclement weather include:

Heavy Rain: Heavy rain can create working and driving hazards of which site personnel should be aware. This includes the increase in slip and fall hazards due to slick walking surfaces, and reduction in visibility. Additionally, heavy rains can cause flash flooding in low-lying areas and creek and river areas. In the event that heavy rains occur while personnel are outside, the UXOSO will advise the team to halt operations and instruct personnel to seek shelter. The determination to re-start operations will be the responsibility of the PM, 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 indicates that severe thunderstorms are possible in and close to the watch area. A severe thunderstorm warning indicates that a severe thunderstorm has been spotted and is going to move through the area soon. Work may continue at the work site during severe thunderstorm watches; however, site work shall cease and the work zone (WZ) will be evacuated during a thunderstorm or severe thunderstorm warning. Additionally, work will be halted by the UXOSO if lightning is detected within ten miles of the team location.

High Winds: High winds can create conditions that threaten the safety and health of site personnel, and if coupled with low humidity, can create a static electricity hazard. High winds can cut visibility by creating dust clouds and can cause trees and tree limbs to fall. The UXOSO will determine when wind levels present a hazard to site personnel and will call for the evacuation of the work areas if deemed necessary. The determination to restart operations will be the responsibility of the PM in consultation with the UXOSO to ensure site conditions are safe for re-entry and continuation of operations.

Tornados: Tornados with their associated high winds, rain, and potentially damaging hail can create serious threats to personnel on site. If a tornado watch is reported, conditions are favorable over a large area for severe thunderstorms and tornadoes to develop, and the UXOSO will notify all personnel of the danger. In the event that a tornado watch is upgraded to a tornado warning, a tornado has been detected or seen, is on the ground, moving, and is expected to move through the effected area soon. If

a tornado warning is sounded, the UXOSO will instruct personnel to evacuate the site immediately and take cover. Environmental clues to look for include: dark, often greenish sky; large hail; a wall of clouds; and a loud roar, similar to a freight train.

3.5 TEMPERATURE EXTREMES

During the conduct of site operations the potential will exist for personnel to be exposed to temperature extremes. PIKA's hazard information, procedures and controls regarding heat and cold stress are presented in Section 9.0 of this SSHASP.

3.6 IONIZING RADIATION

No ionizing radiation exposure above background will be encountered during this project.

3.7 BIOLOGICAL

During portions of the year when the weather is warm, there is a significant probability that site personnel will encounter biological hazards in vegetated areas. The biological hazards anticipated for this project include: stinging insects like bees, wasps and hornets; poisonous plants, such as poison ivy, oak and sumac; biting arthropods like ticks; mosquitoes; spiders; and poisonous snakes. PIKA personnel will be briefed by the UXOSO as to the potential biological hazards that may be encountered. Employee awareness and the SWPs outlined in Section 10.0 of this SSHASP and the PIKA Biological Hazards SOP in Attachment 2 of this SSHASP will be used to reduce, or eliminate, the risks associated with these hazards.

3.8 ACTION LEVELS AND METHODS TO MITIGATE HAZARDS

3.8.1 Upgrades/Downgrades of PPE

The provisions for the upgrading and downgrading of PPE levels are based upon the potential for personnel exposure to chemical or physical hazards. Provisions for upgrading or downgrading PPE due to physical or chemical hazards are contained in Table 8-1 and Section 6.0 of this SSHASP, as well as the CAHA forms in Attachment 1 of this SSHASP.

3.8.2 Work Stoppage and/or Emergency Evacuation

All PIKA personnel are empowered with the ability to immediately halt site operations for a known or perceived ES&H threat or hazard. In the event that this occurs, the emergency evacuation procedures outlined in Section 15.0 of this SSHASP will be utilized. These evacuation procedures will be also be used if site personnel must be evacuated due to an emergency conditions such as winds exceeding 40 miles per hour, rain which obscures visibility (as decided upon by the UXOSO), the threat of a tornado, or unsafe winter weather conditions as determined by the UXOSO.

4.0 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

4.1 GENERAL STAFF INFORMATION

All personnel who may be exposed to on-site safety or health hazards are subject to and will comply with this SSHASP. 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 SSHASP. PIKA staffs all projects with highly skilled and trained personnel who are intimately familiar with the anticipated hazards and the measures needed to protect resources from those hazards. Ensuring site safety is a joint effort promoted by all site personnel. However, the personnel listed in this section have been given key safety-related responsibilities and are involved with PIKA's safety and health chain of command. Since this project involves the use of a two person UXO team the PIKA Team Leader will be acting as the UXOSO during this project.

4.2 PIKA PRESIDENT

The PIKA president is Mr. Terry Kasnavia, who is ultimately responsible for the safety and health of all PIKA personnel and ensuring the integration of safety and health practices into 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 President and flows through PIKA PMs 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

The PM for this project will be Mr. 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, and as such, the PM will:

- Manage and provide the funding, man power, and equipment resources needed to safely conduct site operations.
- Review this SSHASP and have a thorough understanding of its requirements.
- Furnish copies of this SSHASP 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 SSHASP.
- Coordinate the assignment of subcontractors and ensure that subcontractor personnel and equipment meet the requirements of this SSHASP.
- Provide consultation and support to the PIKA PM regarding safety and health issues.
- Coordinate with the CESHM to ensure site compliance with SSHASP and the PIKA CESHP.

4.4 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The PIKA CESHM is Mr. Drew Bryson who is a board Certified Industrial Hygienist with over 18-years of industrial hygiene, safety, and hazardous waste experience, including over 15 years of experience with MEC-related projects. Mr. Bryson has completed the OSHA HAZWOPER site worker and supervisor training requirements in accordance with (IAW) 29 CFR 1910.120, and 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 SSHASP.
- Coordinate with the PIKA UXOSO for field implementation of this SSHASP.
- Communicate and consult with the PM, and UXOSO.
- Evaluate and authorize any changes to this SSHASP.
- Conduct, or assist in the presentation of, site, task and hazard-specific training.
- Conduct periodic site safety and health audits.
- Ensure site and personnel compliance with the PIKA CESHP.
- Provide signature approval for this SSHASP.

4.5 SITE SAFETY AND HEALTH OFFICER/TEAM LEADER

The UXOSO will be responsible for the on-site implementation of the safety and health requirements presented in this SSHP. The UXOSO 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. 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 CSHP.

4.6 GENERAL SITE PERSONNEL

Even though specific PIKA personnel have been given distinct responsibilities for site safety, ensuring the safe and healthful conduct of site operations is the responsibility of all personnel assigned to the site. Therefore, all project personnel involved in site activities will:

- Comply with the safety and health provisions of this SSHASP 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.
- Immediately report all injuries, no matter how minor, to the UXOSO.
- Maintain equipment in working order and report defects to the UXOSO.
- Properly inspect and use the PPE required by this SSHASP or the UXOSO.
- Report to the UXOSO any injuries requiring first aid procedures or higher for treatment, and any exposures to chemical, physical or biological hazards.

5.0 TRAINING

5.1 GENERAL INFORMATION

All personnel assigned to, or regularly entering the project site, shall receive the training required in this section prior to participation in assigned site activities that pose a potential for exposure to safety or health hazards. Site personnel shall also receive the training outlined in this section as applicable to their assigned duties. Documentation of relevant training will be maintained at the PIKA corporate office and the PIKA RVAAP field office.

5.2 MEC TRAINING REQUIREMENTS

PIKA personnel involved in the O&M Field Activities shall meet one of the prerequisites outlined in DDESB TP-18 as specified below:

Position Description	Training Required (1, 2, & 3)	Minimum Years of EOD/UXO Experience (4)	Special Requirements (5)
Senior UXO Supervisor	1, 2, or 3	10 years	Significant experience in all aspects of munitions response actions or range clearance activities, as appropriate for the contracted operation. Five years experience in supervisory positions.
UXO Safety Officer	1, 2, or 3	8 years	Experience in all phases of munitions response actions or range clearance activities, as appropriate for the contracted operation, and applicable safety standards.
UXO Quality Control Specialist	1, 2,3	8 years	Experience in all phases of munitions response actions or range clearance activities, as appropriate for the contracted operation, and the transportation, handling and storage of munitions and commercial explosives.
UXO Technician III	1, 2 or 3	8 years	Prior military EOD and/or commercial UXO experience in munitions response actions or range clearance activities, as appropriate for the contracted operation.
UXO Technician II	1 or 2 ------or------ 3	N/A -------or------ 3 years	Prior military EOD experience ----------or---------- Experience in munitions response actions or range clearance activities, as appropriate for the contracted operation, plus specific project/explosives safety training.
UXO Technician I	3	0	Successfully completed formal course of instruction appropriate to this skill level

Notes: 1. Graduate of a military EOD School of the United States.
2. Graduate of a military EOD school of Canada, Great Britain, Germany, or Australia.
3. Graduate of a formal training course of instruction (as specified in Chapter 3 of DDESB TP 18) or EOD assistant courses.
4. Personnel working in the commercial industry may have significant breaks between jobs. Only actual time performing UXO-related tasks should be counted. (2080 hours = 1 man-year)

All UXO-qualified site personnel shall also receive site-specific training that covers the descriptions of the MEC items anticipated for the site, to include the hazards associated with their handling. The topics to be covered in the refresher training shall include: type of ordnance in which this items were used, fillers, hazards, and handling and disposal procedures.

5.3 CFR 1910.120 HAZWOPER TRAINING REQUIREMENT

5.3.1 40-Hour General Site Worker Training

All PIKA and subcontractor personnel with the potential for exposure to hazardous substances or other safety and health hazards during the course of this project must obtain 40-hours of off-site HAZWOPER training. This training must be completed, and documentation presented, before personnel are to participate in site activities involving exposure to site hazards.

5.3.2 24-Hour Occasional Site Worker Training

This type of training will not be applicable to personnel participating in field activities associated with the SOW for this project.

5.3.3 Three-Day On-Site Training

All PIKA on-site and subcontractor personnel shall be given a minimum of three days of actual on-site field experience/training under the direct supervision of a trained, experienced supervisor. This training will be used to familiarize site personnel with the site-specific organization, PPE, and emergency response procedures. The three-day on-site training is site-specific and shall be documented using the Three-day On-site Training Form (located in Attachment 3 of this SSHASP). The UXOSO will generate and maintain this form and will ensure that all personnel receive this training and sign the form.

5.3.4 8-Hour Annual Refresher Training

All PIKA and subcontractor personnel, to include management/supervisory personnel shall 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 any other related topics.

5.3.5 Supervisor and Management Training

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

5.4 SITE-SPECIFIC AND HAZARD INFORMATION TRAINING

5.4.1 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 5.3.3, and cover site-specific training topics listed below.

- 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.

Additionally, all site related personnel will sign a Safety Indoctrination Form acknowledging that they have received safety indoctrination training and a SSHASP Review Form acknowledging that they have read and understood this SSHASP.

5.4.2 Hazard-Specific Information Training

Hazard-specific 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.

- A complete description of physical and toxicological properties of any hazardous materials expected to be found on-site.
- A complete description of the physical hazards associated with site operations, including those hazards listed for the site tasks as associated with this SSHASP.
- 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.
- The SWPs or other hazard control techniques that will be used to minimize exposure.

5.5 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, whenever possible, a watch for visitors approaching the site and to immediately notify the PM and UXOSO of the presence of the visitor. Visitors shall be

required to comply with the general requirements listed in Section 5.4.1 and shall meet the appropriate requirements as specified below depending upon the part of the site they will be visiting.

5.5.1 General Requirements for All Site Visitors

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

- The PIKA PM and UXOSO shall be notified of the nature/duration of the visit.
- Visitors shall sign the Visitor Log and shall record their names, date of visit, and the name of the company or agency represented.
- Site visitors shall be escorted by a PIKA representative while in the area.
- Visitors shall comply with the safety/health requirements described below.

5.5.2 Visitors Remaining Outside the EZ

Visitors wishing to observe site activities from outside the Exclusion Zone (EZ) shall receive general hazard information training, which incorporates the following topics.

- 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.

5.5.3 Visitors Entering the EZ

Any visitors requesting entry into the EZ shall be subject to the same site-specific and hazard information training as specified in Section 5.4.2 of this SSHASP. This training shall be conducted prior to the visitor entering the EZ. Visitors requesting entry to an EZ shall 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 PIKA personnel while in the EZ, and no more than two visitors will be permitted in the EZ at any given time. All MEC-related operations shall cease whenever visitors enter the EZ.

5.6 FIRST AID AND CARDIOPULMONARY RESUSCITATION TRAINING

At least two full-time PIKA site employees shall be trained and certified in first aid and cardiopulmonary resuscitation (CPR). Whenever possible, the PM or UXOSO will be one of the two site personnel so trained. 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.

5.7 BLOODBORNE PATHOGEN TRAINING

The PIKA first aid-trained personnel will primarily be 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 shall receive training as outlined in the 29 CFR 1910.1030(g)(2) and the PIKA Bloodborne Pathogens (BBP) Exposure Control Plan. Whenever feasible, all on-site PIKA personnel will receive the same level of BBP training as specified above.

5.8 PPE TRAINING

A detailed discussion related to the training required prior to personnel using PPE is presented in Section 6.0 of this SSHASP. 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.

5.9 HAZARD COMMUNICATION TRAINING

In order to comply with the requirements of the OSHA Hazard Communication (HAZCOM) Standard, 29 CFR 1910.1200, HAZCOM training shall be provided for all site personnel who will use products containing hazardous substances. This training shall be provided upon initial assignment to the site and prior to use of the product. Supplemental HAZCOM training shall be scheduled and presented whenever a new hazardous substance is introduced into the work area or employee changes job locations where new products are encountered.

5.10 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.

5.11 CONTROL OF HAZARDOUS ENERGY TRAINING (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 SOP. All training shall comply with 29 CFR 1910.147. LO/TO training requirements are presented in the PIKA LO/TO SOP presented in Attachment 2 of this SSHASP.

5.12 DAILY SAFETY MEETINGS

5.12.1 Daily Task and Safety Briefing

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

5.12.2 Daily Safety Observer Report

On a daily basis, 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 potential issues of particular concern and prior to the Daily Safety Briefing, and will use the PIKA Daily Safety Observer Report to document and present the issues relevant to the day's activities.

5.12.3 Weekly Safety Briefing

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 UXOSO. All site personnel will attend the training, and the UXOSO shall document this training on the PIKA Documentation of Training Form.

5.13 ADDITIONALLY REQUIRED OSHA TRAINING

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

5.14 DOCUMENTATION OF OSHA TRAINING

All on-site and management/supervisory personnel shall present documentation or certification of training completion prior to participating in site activities. Without appropriate documentation, personnel shall be prohibited from entering hazardous areas or engaging in hazardous site activities.

6.0 PERSONAL PROTECTIVE EQUIPMENT

6.1 USE OF ENGINEERING CONTROLS

According to OSHA 1910.120(g), 1910.132, and 1910.134, 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. However, when feasible engineering controls are not available, a reasonable combination of administrative controls (i.e., written safe work practices) and PPE will be used.

6.2 GENERAL REQUIREMENTS

All personnel performing operations on site shall be required to use the appropriate level of PPE, as specified below and in the CAHA forms in Attachment 1 of this SSHASP. This SSHASP makes provisions for use of Level D PPE, according to the hazards associated with the SOW tasks. The PPE levels presented in this Section will be reassessed and the PIKA CESHM contacted if any of the following events occur.

- Appearance of previously unidentified chemicals or, conditions including CWM.
- Changes in ambient weather conditions which impact the use of assigned PPE.
- Introduction of new task or expansion of a previously assigned/evaluated task.

6.3 SPECIAL CONSIDERATIONS

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

- Hard hats will not be required for personnel involved with the location and inspection of anomalies.

6.4 HAZARD-SPECIFIC AND TASK-SPECIFIC PPE SELECTION

Table 6-1 presents a listing of the primary tasks that are anticipated for this project. Next to each planned task is the initial level of PPE that will be worn during task performance. Revisions to the PPE level will only be made upon approval of the PIKA CESHM.

Table 6-1: Task-Specific PPE Assignments

Task To Be Performed	Level Of PPE
Mobilization of site-specific equipment and site preparation;	D
O&M Field Activities	D
Demolition Operations	D
Handling of MD and non-MD scrap	D

6.5 PPE ASSOCIATED WITH VARIOUS PPE LEVELS

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

- Work clothes or coveralls (cotton);
- Work gloves (to be used whenever hands require protection from cuts and abrasions or when working with explosives);

- Steel or safety-toed leather work boots (steel-toed boots will be used if working around heavy objects or heavy equipment);
- Waders for walking/working in water depths over boot height;
- Life preserver is working in water in excess of three feet;
- Safety glasses (to be used whenever an eye impact hazard exists);
- Leg chaps (for chain saw use);
- Hard hat (required when an overhead hazard exits); and
- Ear plugs or muffs (as required when working in areas of high noise).

6.6 PPE TRAINING

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

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

6.7 RESPIRATORY PROTECTION PLAN

Due to the nature of the work being performed by PIKA at RVAAP, the mandatory use of respirators to safeguard personnel from exposures to airborne contaminants in excess of the OSHA Permissible Exposure Limit or the ACGIH Threshold Limit Values is not expected during any phase of operations. In the event that site operations change and the need for respiratory protection become necessary, PIKA will update this Section to comply with OSHA 29 CFR 1910.134 requirements and will submit the changes it to e²M for approval.

6.8 PPE INSPECTION, MAINTENANCE AND STORAGE

Site personnel using PPE will keep their PPE in clean, good working condition. PIKA shall provide cleansing wipes, wash sprays and clothes, towelettes, or equivalent cleaning supplies to allow personnel to surface clean PPE. Additionally, PIKA will establish and maintain a PPE storage area where field personnel may store their PPE during non-use. 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 made effective through replacement of specific 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.

6.9 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 and emergency response supplies will be available on-site. Each field team will have and maintain first aid supplies consisting of:

- A 16-Unit (or 25-person) first aid kit with at least two BBP protection kits;
- Portable eye wash bottles for use during transportation to the 15-minute eye wash station;
- Burn kit with bandages;
- Trauma bandages;
- A fire blanket; and
- Fire extinguisher

Additional first aid and emergency response supplies will be maintained on site as required by Section 14.0 of this SSHASP. 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. Any operational team that functions in remote areas away from other team personnel or the trailer 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 14.0 of this SSHASP. 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

PIKA has established a comprehensive Medical Surveillance Program (MSP) designed 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 are based upon PIKA's MSP and shall 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 shall be conducted by, or under the supervision of, a licensed physician, who is board-certified in occupational medicine or has had extensive experience in the recognition, evaluation, and treatment of occupational diseases.

7.3 PHYSICIANS STATEMENT

Upon completion of a health assessment, the physician shall provide the results of the examination to the employee, and a written physician's statement shall be provided to PIKA. The physician's statement shall, as a minimum, include the following: 1) the employee's name and social security number; 2) a statement that the employee is qualified to participate 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

7.4 MEDICAL SURVEILLANCE EXAMINATIONS

7.4.1 Pre-Assignment Health Assessment

The pre-assignment health assessment shall be conducted prior to personnel participation in site activities involving potential exposure to chemical or physical hazards. The pre-assignment health assessment shall have been conducted within the past 12 months and will meet the requirements of the PIKA Medical Surveillance Program presented in the PIKA CESHP.

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 without the use of respiratory protection, shall undergo a supplemental examination. The physician will determine the contents of this examination and shall certify the employee’s fitness to return to work prior to reassignment. The physician shall specify in writing any work restrictions required.

7.4.3 Follow-up Health Assessments

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

7.4.4 Task-specific Medical Examinations

No site or task-specific medical examinations or tests are anticipated for the sites tasks associated with this contract. In the event that the CESHM identifies any specific contaminants that require biological assessment and monitoring, this section will be modified and the modified section submitted to e²M for approval.

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 which would result if treatment were delayed. Route maps and instructions to the medical facilities identified in this section are included in Section 15.15 of this SSHASP.

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 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. Primary treatment for minor illnesses or injuries that could occur on site will be provided at the PIKA designated occupational health clinic for work at the RVAAP: MEDGroup – 3913 Darrow Road, Suite 100, Stow Ohio 44224. If additional treatment is needed, it 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 additional care as required by the nature of the injury and commensurate with the EMT's level of training.

7.5.2 Treatment of Serious Injuries

In the event that advanced life support or ambulance transportation will be needed the SSHO will contact Post 1 to request ambulance support and PIKA first aid personnel will provide initial support in an effort to stabilize the injured person until the ambulance service arrives. If the SSHO believes ALS is required, the SSHO will convey such information to the personnel at Post 1 when placing the call. The personnel at Post 1 will convey this information to the 911 Operator when requesting ambulance support. Once on site, the EMT personnel will determine 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, Robinsons Memorial Hospital in Ravenna, Ohio will be the first choice for serious injuries, unless otherwise determined by the medical response personnel.

8.0 EXPOSURE MONITORING/AIR SAMPLING PROGRAM

8.1 GENERAL

On-site monitoring will be conducted during specified 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 upgrading or downgrading PPE requirements, and the effectiveness of SWPs. Direct-reading, real-time instruments will be used whenever possible, or required, to detect and qualify site hazards. If a reading is achieved which exceeds the action levels specified in **Table 8-1** the UXOSO shall take the steps outlined in this section, or other referenced sections, to correct the situation or minimize the exposure.

8.2 PERIMETER MONITORING REQUIREMENTS

No perimeter monitoring will be required for this project since PIKA does not anticipate locating any contaminant sources that would create an airborne exposure hazard.

8.3 PERSONAL MONITORING REQUIREMENTS

8.3.1 Real-Time Direct-Reading Monitoring

The guidelines presented in Table 8-1 represent the initial real-time, direct-reading monitoring requirements to be employed during project tasks. Monitoring frequency may be escalated or reduced 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 during this project will include:

- Digital ambient air thermometer - Used to assess heat and cold stress affects IAW Section 9.0 of this SSHASP.

Table 8-1: 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 un-acclimatized 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 SOP-17	Institute physiological monitoring and appropriate controls as outlined in SOP-17
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 Table 18-2 of SOP-18	See Section 5.2 of SOP-18 in to determine appropriate controls.

8.4 INTEGRATED BREATHING ZONE SAMPLING

Integrated breathing zone (BZ) sampling will not be required during the performance of the O&M of the Sand Creek Barrier System being performed by PIKA personnel.

8.5 MONITORING SCHEDULE AND FREQUENCY

Exposure monitoring will focus on the potential for exposure to physical and chemical hazards during site operations. Table 8-1 identifies the type of monitoring equipment to be used, the frequency at which the monitoring will be conducted, monitoring method to be employed, action level, and the action to be taken if the action level is exceeded.

8.6 TEMPERATURE EXTREME MONITORING

Heat and cold stress monitoring will be conducted IAW the guidelines presented in the respective SOPs in Attachment 2 of this SSHASP. 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.

8.7 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, it will be removed from service until it can be 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 heat and cold stress prevention SOPs (SOP-17 and SOP-18, respectively) in Attachment 2 of this SSHASP. If weather conditions exceed the temperatures outlined in Table 8-1 of this SSHASP, the UXOSO will implement the monitoring and personnel controls outlined in the specified SOPs.

9.1 HEAT STRESS

9.1.1 Introduction to Heat Stress and Strain

During activities conducted at RVAAP, hot environmental conditions can create serious safety and health threats to site workers. Heat stress is one of the most common (and potentially serious) illnesses that can affect site personnel during spring, summer and fall weather conditions. Factors that may predispose a worker or increase susceptibility to heat stress include:

- Environmental factors such as air temperature,
- Humidity, and radiant heat;
- Use of PPE that interferes with the evaporation of perspiration;
- Lack of physical fitness and lack of acclimatization to hot environments;
- Degree of hydration before and during work in hot environments;
- 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.

9.1.2 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.

9.1.3 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.

9.1.4 Heat Stress Ailments

The greatest cause of heat related ailments is inadequate employee acclimatization and lack of adequate hydration, both of which can easily occur during project tasks. This

section presents information related to the most common heat stress ailments that could adversely affect site personnel. Additional information related to prevention and treatment of heat stress is contained in the PIKA Heat Stress Prevention SOP presented in Attachment 2 of this SSHASP.

9.1.5 Heat Stress and Strain Evaluation and Control

Control of heat stress is generally maintained through proper acclimatization, adequate hydration and by conducting personnel monitoring when conditions are such that monitoring is required. Detailed information related to acclimatization, hydration, and other forms of heat stress prevention is presented in PIKA SOP-17 presented in Attachment 2 of this SSHASP. Site personnel will read and consult this SOP for the steps needed to minimize heat stress. Additionally, the requirements for heat stress monitoring are discussed in Section 8.6 of this SSHASP.

9.2 COLD STRESS

9.2.1 Introduction

Because personnel will be working during winter months, there will be a potential for site personnel to be exposed to cold temperatures, wind, snow, ice and cold water immersion. The cold stress effects experienced by site personnel when working in cold environments depend upon environmental and personal factors, such as air temperature, wind speed, time of exposure, 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.

9.2.2 Cold Stress Treatment and Prevention

The requirements for cold stress treatment and prevention, to include monitoring, work-rest cycles and additional controls are discussed in the PIKA Cold Stress SOP provided in Attachment 2 of this SSHASP. PIKA personnel will read this SOP and will be given periodic briefs related to cold stress prevention as a part of the project training plan as discussed in Section 5.0 of this SSHASP.

10.0 STANDARD OPERATING SAFETY PROCEDURES, ENGINEERING CONTROLS, AND WORK PRACTICES

10.1 GENERAL

This section outlines the engineering controls, SWPs, and Standing Site Orders which 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. For reference, a copy of the PIKA CESHP will be available on-site, as will the PIKA task-specific SOPs. Since the SOPs are generic in nature and are intended to compliment this SSHASP, many of the SOPs may contain information that may be superfluous to this project. Prior to, and during site operations, the UXOSO and PM will carefully read the SOPs and determine which SOP provisions apply to this project. As a rule, all site personnel will comply with the following guidelines:

- The applicable regulatory requirements of 29 CFR 1910 and 29 CFR 1926 shall be followed during all site activities.
- All site personnel shall immediately report to the UXOSO any conditions that do not comply with, or are not addressed by this SSHASP.
- Site personnel shall immediately report to the UXOSO any deviations from the plans or equipment that has been approved to ensure an evaluation of the hazards is conducted.
- Site personnel will wear the PPE as specified in Section 6.0 and the CAHA forms presented in Attachment 1 of this SSHASP.
- 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.
- 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.
- Site personnel shall 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 shall carry appropriate emergency medical antidotes on their person at all times when on site.
- Site personnel shall 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 to be used whenever feasible to remove the potential for personnel exposure. Because of the dynamic nature of MEC site operations, the effective design and implementation of engineering controls is typically not feasible. However, during project activities PIKA personnel and he CESHM will work closely to identify any engineering controls that may be applicable to safeguarding site personnel.

10.3 SITE RULES / PROHIBITIONS

10.3.1 Buddy System Procedures

All work conducted within a work zone shall 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 conducted only in designated areas, at designated break times, and only after personnel have washed their face and hands using available towelettes or other sanitary means. At no time will personnel smoke while conducting any operations within the EZ.

10.3.3 Standing Site Rules

To maintain safety and health awareness, a list of standing site rules has been developed which outlines the practices that must be followed at all times. These standing orders will be enforced by the UXOSO, and personnel violating these orders may be subject to disciplinary action. The general standing orders for the site and the EZ are listed in **Tables 10-1** and **10-2.**

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 unless positive precautions have been made to protect the personnel from falling objects. 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 shall be followed in selecting a means for material handling:

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

The lifting fundamentals and requirements are presented in PIKA SOP-43 (Material Handling) in Attachment 2 of this SSHASP. The lifting procedures in this SOP will be

followed whenever personnel are required to lift objects. The personal lifting limitation of 50 pounds will be followed at all times.

TABLE 10-1: 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 by the PM or UXOSO.
3. Buddy system procedures will be enforced during all site operations.
4. The number of personnel in any work area will be the minimum number necessary to perform work tasks in a safe and efficient manner.
5. Site personnel will check in with the PM or UXOSO prior to leaving the site and again upon returning to the site.
6. Site visitors are to be escorted by 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 PM or 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. All personnel will immediately report to the UXOSO and PM any injury, illness or exposure associated with the performance of work.
11. Remember, **"When in doubt, don't." Ask questions first.**

TABLE 10-2: WORK ZONE RULES AND PROHIBITIONS

1. No matches, lighters, or spark sources are allowed in any designated WZ.
2. No personnel will enter a WZ without authorization from the Site Supervisor 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. Drinking 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 this SSHASP.
7. Remain alert to site conditions and report any changes or unusual occurrences to the PM or UXOSO.
8. Verbal communication shall be immediately available at all times between the WZ and off-site emergency resources.
9. Remember: **Safety First, At Work, Home, and Play!!**

10.5 DRUM/CONTAINER HANDLING PROCEDURES AND PRECAUTIONS

No drum or container handling is anticipated for this project.

10.6 HOT WORK AND FIRE PROTECTION/PREVENTION

10.6.1 Hot Work Practices

No hot work activities are anticipated under the SOW. However, if hot work is required, PIKA personnel will follow the S&H precautions and SWPs outlined in SOP-39, PIKA's Welding, Cutting and Hot Work SOP, in Attachment 2 of this SSHASP.

10.6.2 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:

- Ignition of explosive/flammable gases or vapors by external ignition 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.
- Brush and/or wildfires caused by lightening and/or off-site unknown sources.

10.6.3 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 shall follow the guidelines listed in PIKA SOP-23 in Attachment 2 of this SSHASP to prevent fires and explosions:

10.6.4 Fire Protection

To ensure adequate fire protection, the UXOSO will inspect the site to ensure that all flammable and combustible materials are being 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 shall be located on site IAW the requirements in Section 14.0 of this SSHASP. Additional information on fire protection can be found in Section 15.9 of this SSHASP.

10.7 ELECTRICAL SAFETY PROCEDURES

For this project, no electrical wiring installation is anticipated. However, the use of electrical tools and apparatus will be conducted IAW OSHA Standard 29 CFR 1910.137(2) and SOP-45 (Electrical Safety) in Attachment 2 of this SSHASP. These requirements include, but are not limited to:

- All electrical equipment will be of a type listed by Underwriters Laboratories (UL) or Factory Mutual Engineering Corp. (FM) for the specific application.
- 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.
- Portable and semi-portable 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 an approved 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 milliamperes (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).

10.8 MACHINERY GUARDING

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

- All reciprocating, rotating or moving parts of machinery or equipment shall be guarded IAW manufacturer's specifications if they create a hazard through contact with personnel.
- All hot surfaces of equipment shall be guarded or insulated to prevent injury and fire.
- No guard, safety appliance, or device shall be removed from machinery or equipment or made ineffective except when making immediate 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 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

While LO/TO procedures are not typically needed for the proposed site operations, 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 those personnel conducting the maintenance or servicing. These activities may include the lubrication, cleaning or un-jamming 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. This also includes working under raised dump beds and the bucket arms of front-end loaders, skid steers or any other piece of equipment where an arm, bucket or other assembly is hydraulically raised. Equipment of this nature on which maintenance must be performed in this configuration will have the raised or suspended item blocked and braced with appropriate timber members or other means to ensure the system does not de-energize and endanger the maintenance personnel. 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 SOP-36 presented in Attachment 2 of this SSHASP.

10.10 FALL PROTECTION

PIKA does not anticipate any fall hazards associated with the performance of the tasks under the project SOW. However, in the event a fall hazard is recognized, personal fall protection devices will be required as per PIKA SOP-42 presented in Attachment 2 of this SSHASP.

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 personnel receive HAZCOM training at 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 Sheets (MSDSs) for any materials brought on-site by the subcontractor 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 during the time period from 30 minutes after sunrise to 30 minutes before sunset. All office and storage facilities will be supplied with adequate artificial or ambient light so as to ensure the safe performance of operations within the facility.

10.13 POWER AND HAND-TOOL OPERATION

To control the hazards associated with power tool operation, personnel will follow the requirements outlined in 29 CFR 1910, Subpart P, 29 CFR 1926, Subpart I, and the SWPs listed in the PIKA Hand and Power Tools SOP-37 presented in Attachment 2 of this SSHASP.

10.14 BIOLOGICAL HAZARDS

This project is scheduled to start in the early spring. Therefore, site personnel will experience exposure to biological hazards such as: stinging insects like bees, wasps and hornets; biting arthropods such as spiders, ticks and chiggers; and snakes. Site personnel will read the PIKA Biological Hazards SOP-14 in Attachment 2 of this SSHASP to determine the hazards associated with biological hazards and the controls to be used. The UXOSO will be responsible for providing briefings and selecting from the Biological Hazards SOP-14 and identifying the requisite controls for any biological hazards identified. Employee awareness and the SWPs outlined in the Biological Hazards SOP-14 should reduce the risk associated with these hazards.

10.15 USE OF PRODUCTS CONTAINING HAZARDOUS MATERIALS

Because of the nature of products used on site and the manner in which they will be used, it is not anticipated that there will 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:

- To determine the chemical properties of the hazardous materials and the protective measures to be used, all site personnel who use shall personally 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, and personnel will stand upwind of the dispensing point when dispensing the product.
- When using or dispensing a product with a skin contact hazard, personnel will utilize protective gloves, as identified in Section 6.0 of this SSHASP
- Only those personnel, who have received appropriate HAZCOM training, as outlined in Section 5.9 of this SSHASP, shall use a product containing hazardous materials.
- Personnel shall immediately wash any affected skin that accidentally comes in contact with a hazardous material identified as being a skin contact hazard.

10.16 MEC HAZARDS

For the O&M Field Activities, the MEC procedures and practices listed below shall be strictly enforced.

- Only the minimum number of personnel, required to perform a given MEC-related activity, will be involved in the operation.

- Movement and handling of MEC will be kept to a minimum at all times.
- Only PIKA UXO-qualified personnel will be involved in the investigation, identification, movement, and handling of known or potential MEC items and explosive materials.
- No smoking, or possession or use of open flame or spark sources will be allowed in the EZ, unless approved by the UXOSO, and then only in designated areas.

11.0 SITE CONTROL MEASURES

11.1 CENTER OF OPERATIONS

PIKA has an established office at RVAAP. Additionally, if feasible PIKA will establish a support zone (SZ) near the MRS work locations. In the event of a site accident involving the total evacuation of site personnel, the SZ will serve as the primary assembly point for the site personnel for initial accountability, with the PIKA office being the location for a final head count in the event of a full site evacuation.

11.2 SECURITY PROCEDURES

11.2.1 Project Site Access and Security

Project site access and security will be via existing access roads and fences, and augmented as needed with the use of signs and barricades. For site operations PIKA will establish work zones as described below. These work zones will endure that personnel are properly attired in PPE to mitigate the hazards associated with the site and that only those personnel with the experience and training are permitted in the areas where exposures to site hazards could exist.

11.2.2 Work Zones

To reduce the potential for non-essential personnel being exposed to MEC hazards, PIKA will establish an exclusion zone (EZ) based upon the MSD associated with the particular task being conducted. The MSD for unintentional and intentional detonations are outlined in the e²M WP.

11.3 EQUIPMENT STORAGE AND SECURITY

During non-working periods, all project equipment used on-site, to include hand tools, will be stored, in designated storage facilities located at the site.

11.4 SITE MAPS

Prior to initiation of site activities, a site map will be available which will detail the following information: site size and shape; restricted areas; designated assembly points; the site access routes; staging areas; and any other information deemed necessary by the PM or UXOSO. The site map will be used by the UXOSO during site safety training and the daily safety briefings.

11.5 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, etc.; and alert site personnel to emergency situations. Means of communicating with 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:

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

11.6 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:

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

12.0 PERSONAL HYGIENE AND DECONTAMINATION

To control and minimize contamination, personnel shall refer to SOP 46, Contamination Control, in Attachment 2 of this SSHASP. In addition, personal hygiene and sanitation facilities will be established on site IAW 29 CFR 1910.120(n) and USACE EM 385-1-1,

12.1 WATER SUPPLY

An adequate supply of potable (drinkable) water shall be provided on site at all times and will be supplied as per 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 the unused cups and for the disposal of the used cups where single service cups are provided.
- Water or other supplied beverages shall not be dipped from the container by any means, and use of a common cup shall 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.”

12.2 TOILET FACILITIES

During the O&M activities, personnel will utilize the toilet facilities provided in the PIKA field office at Building 1038. Antibacterial hand cleaning solution will be available within the restroom.

12.3 WASHING FACILITIES

Hand and face washing facilities will be utilized by all personnel exiting the WZ and prior to any 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 SZ.

12.4 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 shall 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.

13.0 EQUIPMENT DECONTAMINATION

Equipment used in the field, to include PPE, shall be cleaned and inspected at the end of each workday to ensure that the equipment is maintained in safe operating condition. Any equipment found to be defective would be brought to the attention of the PM or Team Leader. Tools and equipment used in the EZ will be kept free of accumulations of soil and other debris and will be cleaned prior to their removal from the EZ. Hand equipment will be cleaned as needed to prevent the spread of dirt and poison oak/ivy toxins. Prior to the start of operations where equipment could become contaminated, the UXOSO will ensure that equipment decontamination supplies are available and ready to use.

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 field office and lay down area 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;
- Portable eye wash bottles;
- Burn kit with bandages;
- Trauma bandages;
- A fire blanket; and
- 5 lb – 10 lb Fire extinguisher

First aid and emergency response supplies will be maintained on site as required in Table 14-1 of this SSHASP. 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. 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 since there is no potential for personnel being drenched with hazardous substances that can pose a threat to the skin.

Table 14-1: 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.	PIKA field office	All operations
Biohazard Kit	2 ea.	Each team within the WZ and in the PM/UXOSO vehicle	All operations
Large Medical Kit with Trauma Supplies	1 ea.	1 in PM/UXOSO vehicle	All operations
Portable Stretcher	1 ea.	1 in PM/UXOSO vehicle	All operations
Air Horn	1 ea.	Each team within the WZ	All operations
Spill Containment/ Cleanup Supplies	Varies	PIKA field office	Operations involving hazardous materials
Fire Extinguisher	1 ea. (5-10 lb)	Each team, vehicle, and flammable storage area	All operations

15.0 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

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 shall 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 conduct of site operations, PIKA site personnel will have contacted and met with appropriate local authorities to inform them of the site activities to be performed under this SSHASP and the potential hazards that these activities pose to site personnel, the environment, and the public. The 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 as requirement in this Section.

15.3 IDENTIFICATION OF POTENTIAL EMERGENCIES

During the development of this SSHASP, great attention was given to identifying potential safety and health hazards associated with the planned site activities. These hazards were then 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 as follows:

- Personal injury associated with the operation of hand and power tools, including cuts/lacerations, and flying objects and debris;
- Personal injury associated with sharp objects that may cause cut, scrape, puncture, splinter or laceration injuries;
- Injury or illness associated with site activities and on-site chemical, physical or biological hazards;
- Fire; and/or
- Inclement weather.

15.4 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 the services. It will be the responsibility of the UXOSO to ensure that off-site communications are available at all times. Site operations shall 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 shall be aware of the procedures for notifying emergency services.

15.5 INITIAL INCIDENT REPORTING PROCEDURES

Once an emergency has occurred, team members will sound the air horn alarm and the respective UXOSO will establish radio contact with the PM. This will initiate site evacuation and mobilization of PIKA first aid/CPR response personnel. Once informed of the emergency, the PM will ensure notification to RVAAP and will summon emergency responders as necessary. The PM/UXOSO will ensure that all teams are cognizant of the situation and are involved in the proper response procedures.

15.6 PERSONNEL ROLES, AUTHORITY AND COMMUNICATIONS

15.6.1 PM

Upon notification of an emergency situation, the PM will assume the role of the On-Site Incident Commander until relieved by the RVAAP Facility Manager, or a representative of the local emergency response team. As the On-Site Incident Commander, the PM will have overall responsibility for coordinating the efforts of the PIKA on-site response actions, and if directed by the RVAAP personnel will contact and coordinate with off-site emergency response resources. The On-Site Incident Commander will be assisted by the PIKA UXOSOs if needed.

15.6.2 UXOSO

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

15.6.3 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 PM 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.

15.6.4 Off-site Emergency Response Services

The off-site emergency resources presented in **Table 15-1** will be contacted by the EC in the event of an emergency.

Table 15-1: 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	MEDGroup 3913 Darrow Road, Suite 100 Stow, OH 44224	330-688-7900 / 800-455-6155
Emergency Hospital Care	Robinson Memorial Hospital 6847 N Chestnut Street Ravenna, OH 44266	330-297-0811
Police	Portage County Sheriff Office	330-296-5100 / 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
William O'Donell	BRAC	703-601-1570 (w)
Mark Patterson	RVAAP Facility Manager	330-358-7311 (w)
Major Ed Meade	OHARNG Base Operations Supervisor	614-336-6560 (w)
Katie Elgin	Environmental Specialist 2, OHARNG –RTLS	614-336-6136 (w)
Jerome Stolinski	USACE Project Manager	402-221-7674 (w)
Mary Ellen Maly	USAEC MMRP Project Manager	410-436-7083 (w)
Eileen T. Mohr	Ohio EPA Project Manager	330-963-1221 (w)
Daniel Zugris	e²M Technical Program Manager	703-752-7755 (w) 703-505-7023 (c)
Rob Klawitter	e²M Health & Safety Director	303-721-9219 (w) 303-748-6615 (c)
Phil Werner	e ²M Technical Project Manager/SSC	703-752-7755 (w) 571-215-0677 (c)
Brian Stockwell	PIKA Project Manager	Office 330-385-2920 Cellular 330-352-6955
Terry Kasnavia	PIKA President	Cellular 281-382-6732
Drew Bryson, CIH	PIKA Safety and Health Mgr.	Office 281-546-4862 Cellular 865-482-1292

15.7 COMMUNICATIONS

Emergency communications will be available and maintained during all on-site operations. As previously discussed, radio and cellular phone communications will be used between the field teams and the field office. The field office will have hard line and cellular phone communication to off-site emergency services.

15.8 POSTED INSTRUCTIONS AND EMERGENCY CONTACTS

Evacuation routes, assembly points, emergency and site control procedures, 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 hospital route map and the list of emergency contacts presented in Table 15-1 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.

15.9 EMERGENCY RECOGNITION AND PREVENTION

15.9.1 Small Fires

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

- The PIKA UXOSO will immediately notify the PM.
- All unnecessary personnel shall be evacuated to an upwind location.
- Under the initial direction of the PIKA UXOSO, as directed by the PM, PIKA personnel will extinguish the fire from an upwind location.
- Post 1 will be contacted to summon off-site emergency services as needed for the treatment of injuries or exposures.
- 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.

15.9.2 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 shall be taken:

- The PIKA UXOSO will immediately notify the PM.
- All unnecessary personnel shall be evacuated to an upwind assembly point.
- Post 1 will be contacted to summon off-site emergency services as needed for the treatment of injuries or exposures.
- To the extent that it can be safely accomplished, the PM 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 shall 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.

15.9.3 Explosion

In the event of an unintentional explosion, all personnel shall evacuate and help secure the site. The PM and UXOSO will immediately be notified of the situation, and the PM shall request the required support equipment and personnel. If personnel injuries have occurred, the PM shall direct and coordinate the treatment of the affected personnel. After an explosion, it is essential that the site be evacuated and that no one is allowed to re-enter the area, except to possibly save a life, for at least 30 minutes after the explosion. The PM/ in conjunction with the UXOSO will determine what actions will be taken to resolve the situation, and once resolved, the PM and UXOSO will initiate an investigation to determine the cause of the explosion. Any changes to the PIKA SSHASP will be made and approved prior to the resumption of site activities.

15.9.4 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 shall be responsible for obtaining the local weather on a daily basis and advising the team personnel 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 heavy precipitation will, in the opinion of the UXOSO, 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 PM and 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 on the radio or television 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 shall cease and the EZ will be evacuated during a thunderstorm or severe thunderstorm warning that is reported in the site area.

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 PM and UXOSO to ensure site conditions are safe for re-entry and continuation of operations.

15.10 CRITERIA AND PROCEDURES FOR SITE EVACUATION

15.10.1 Emergency Alerting Procedures

It is the responsibility of the PM to ensure that off-site communications are available at all times for respective operations. Site operations shall not be conducted unless means of off-site communications are established. The telephone numbers for all emergency services and contacts are listed in Table 15-1. These phone numbers shall be posted in the office/break area, and all site personnel shall be aware of the procedures for obtaining off-site emergency services.

15.10.2 Employee Alarm System

To alert on-site team members, each PIKA UXOSO will have an air horn (or as an alternative an automobile horn) that will be sounded to inform personnel in the immediate area of the occurrence of an emergency. The effectiveness of the air horn and automobile horn will be tested during initial site activities to ensure that all site personnel can clearly perceive the alarm above operational noise levels. If operational noise levels prevent site personnel from detecting the air horn alarm, other means of notification will be implemented.

To alert WZ 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 for each WZ will be located in a safe area as identified during the daily safety briefing each morning. Once WZ personnel are assembled, the UXOSO will conduct a head count of all team personnel. Once accounted for, WZ personnel await instructions from the UXOSO, which may include: further evacuation from the site, emergency response instructions; or any other instructions deemed necessary.

15.10.3 Evacuation Routes and Assembly Points

Prior to the initiation of site operations, the PM in conjunction with the UXOSO will identify the evacuation routes and assembly points for the various areas on 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.

15.11 SITE SECURITY AND CONTROL DURING EMERGENCIES

During an emergency, site security and control will be paramount to controlling the possible negative effects of the emergency. Upon notification of an emergency, the UXOSO will initially be responsible for locating, assembling, counting and controlling

their team personnel. If the UXOSO is unable to perform this role, the duty will be passed to another team member. Once the team has evacuated the site to the given assembly point, the UXOSO will maintain control over the personnel until the PM takes control of the personnel and verbally informs the UXOSO 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 PM.

PIKA personnel as directed to do so by the On-Site Incident Commander will initially conduct site access control and security. If PIKA personnel are needed for other response actions, the On-Site Incident Commander will request assistance from the local Police Department.

15.12 DECONTAMINATION AND TREATMENT OF INJURED PERSONNEL

15.12.1 General

Since PIKA personnel will not be engaged in operations involving chemical contamination, no decontamination will be required prior to the treatment and transportation of injured personnel. Should this change, this SSHASP will be amended to include decontamination procedures which will then be approved by e²M prior to implementation of the changes.

15.12.2 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 On-Site Incident Commander shall 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.

15.12.3 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 PM 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 PM 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 as determined by the scope of the incident. In the event that the care required is beyond the scope of the professional rescuer training given to the on-site first aid response personnel, medical attention and transportation will be summoned. In the event of an emergency, Post 1 will be contacted to summon off-site emergency services as needed for treatment of injuries or exposure. The first aid personnel will provide those services for which they have been trained.

- 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 to the greatest extent possible, and determine as best as possible 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.
- 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 if it is safe to do so and if no further injury to the victim will be sustained by the action.
- 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 to the greatest extent possible and administer any first aid procedures that may be required before the victims can be moved.
- Transport the affected personnel via the predetermined mode as determined by their injury.
- Record as 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.

15.12.4 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 PM and the UXOSO will respond to the location where the injury/illness has occurred.
- The severity of the injury/illness will be accessed, the required first aid support will be provided, and the PM 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, Post 1 will be contacted to summon off-site emergency services. If deemed necessary by the emergency service operator, an air ambulance may be summoned to transport the affected party.
- If additional medical attention is required, but Advanced Life Support (ALS) is not required, the UXOSO, or a designated person, may transport the affected person to the designated medical facility. However, in this situation, ambulance service with basic life support may be requested and used if the injuries are such that additional medical attention would be needed during the transportation phase.

15.13 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 U.S. and local regulatory agencies be notified of the emergency. 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 utilized or damaged in the emergency. Items to be cleaned will be only those durable items that can be safely cleaned and reused. Any durable items that have come in contact with blood or body fluids will be cleaned and disinfected IAW the PIKA Bloodborne Pathogen (BBP) Control SOP-20 found in Attachment 2 of this SSHASP. Non-durable items will be discarded accordingly with any items that have contacted blood or body fluids being discarded in appropriate bio-hazard waste containers as outlined in the BBP Control SOP.

- The PIKA CESHM in conjunction with the PM and UXOSO shall conduct an accident investigation to determine the cause of the emergency and what preventative measures shall be taken to ensure the emergency does not occur again.
- The PIKA CESHM, in conjunction with the PM and UXOSO shall 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 U.S. Army required accident forms.
- Review and revise, as needed, the site operational and emergency response procedures, and, if necessary, update this SSHASP to reflect the new procedures.

15.14 DOCUMENTATION

Documentation related to the emergency shall be recorded in an accurate, authentic and complete fashion. Documentation shall be recorded as soon as possible 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

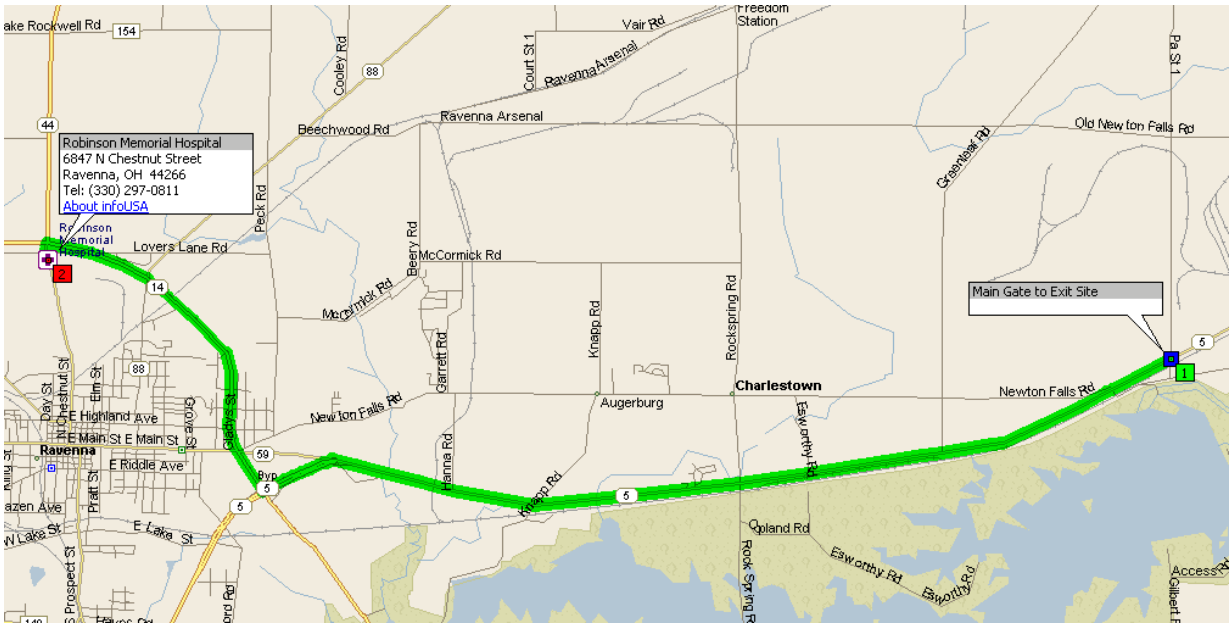
15.15 ROUTE MAPS TO MEDICAL TREATMENT FACILITY

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 along with the OSHA clinic and the hospital route map. Not all on-site injuries will require ALS service and ambulance transportation to the hospital. If the UXOSO determines that an injured party can be transported to medical attention using a site vehicle, the directions presented in Table 15-2 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.

TABLE 15-2: DIRECTIONS TO THE REGIONAL MEDICAL CENTER

Instruction	For
Depart Main Gate to Exit Site on SR-5 [Ravenna Warren Rd] (West)	7.0 mi
Turn RIGHT (North) onto SR-14	2.7 mi
Turn LEFT (South) onto (N) Chestnut St	0.1 mi
Arrive Robinson Memorial Hospital [6847 N Chestnut Street, Ravenna, OH 44266, Tel: (330) 297-0811]	

FIGURE 15-1: HOSPITAL ROUTE MAP



15.16 COMMUNITY ALERT PROGRAM

It is not anticipated that any on-site operations will result in a potential emergency that would require PIKA to implement a community alert program. However, in the event that an on-site event affects the local community, the PM will notify the local emergency operator who will notify local emergency response services.

15.17 SPILL RESPONSE AND CONTAINMENT

A portable spill response kit containing oil/solvent absorbent pillows/pads, non-sparking shovel, PPE and disposal supplies shall be maintained in a readily accessible location where 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. In the event of a spill, the PIKA SUXOS will notify the OHARNG of the nature and extent of the spill. Both notification and spill clean-up will be conducted in accordance with the RTLS Integrated Contingency Plan using the OHARNG First Responder Notification Form.

15.17.1 Small Spills

During site operations that involve O&M of the Sand Creek Barrier, subsurface investigation of anomalies, PIKA may use mechanical equipment that requires the use and storage of fuels and oils during site operations. It is anticipated that only small containers (five gallons or less) will be used. If materials from these containers are spilled, the steps outlined below will be followed to mitigate the spill hazard:

- The immediate area will be evacuated, ignition sources will be extinguished, and the PM will be notified of the spill.
- The PM 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 PM will notify the RVAAP Facility Manager that the spill occurred and will brief them as to the cleanup actions that were taken by PIKA personnel.
- The PIKA PM will contact the RVAAP Facility Manager who will provide guidance on disposal of the contaminants and other actions that must be taken.

15.17.2 Large Spills

No large scale use or storage of hazardous substances is intended for operations conducted under this SSHASP.

16.0 LOGS, REPORTS, AND RECORDKEEPING

All Safety Logs, Accident Reports, Training Logs, Visitor Logs, Inspection Reports, and EH&S Forms can be found in Attachment 3 of this SSHASP.

16.1 SAFETY LOG

The UXOSO shall maintain a Safety Log and shall 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 shall be completed and forwarded the same day the accident/incident occurs to the CESHM, the PM and PIKA President. In addition, if USACE Form 3394 must be completed, the PM/UXOSO will complete the form and forward it to the CESHM and the PIKA PM for review prior to dissemination to e²M. If a near miss occurs, the UXOSO shall 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 PM.

16.3 TRAINING LOG

The UXOSO is responsible for ensuring that all safety- and health-related training conducted 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 shall maintain this log and any associated training forms on site.

16.4 VISITOR LOG

The UXOSO shall be responsible for maintaining the visitor 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. This log shall utilize the PIKA Site Visitors Log. 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 1

Certificate of Activity Hazard Analysis

PIKA INTERNATIONAL, INC.

ACTIVITY HAZARD ANALYSIS

Job: Mobilization and site set-up

Date Prepared: 17 May 2008

Project: O&M of Sand Creek Barrier System Rocket Range Area of Open Demolition Area #2 MRS, Ravenna, Ohio

Risk Assessment Code (RAC): L

Prepared By: Drew Bryson, CIH

Reviewed By: Phil Curry

Recommended Protective Clothing and Equipment

Level D
Leather outer gloves as needed for hand protection; Leather boots; Safety Glasses.

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. Mobilize equipment and tools. 2. Develop PIKA's operational capability at the site 3. Install rope and barricade tape to define exclusion zones and work zones as needed.	General	Site personnel will be given task-specific briefings daily regarding the hazards associated with their tasks and the procedures used to control/mitigate the hazards. All personnel inside exclusion zone will wear the Level D PPE listed above.	01.B.05
	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 ensure that unauthorized access during tasks that could cause exposure to MEC or other ES&H hazards.	28.A.02 (10)
	Cold Stress	Personnel will be monitored for cold stress and PIKA will implement the PIKA SOP-18, Cold Stress Prevention.	06.J.05 – 06.J.10b
	Heat Stress	Personnel will be monitored for heat stress as directed by the UXOSO and PIKA will implement the PIKA SOP-17, Heat Stress Prevention when temperatures exceed 78 °F. Personnel will maintain adequate hydration and personal monitoring will be conducted as required by SOP-17.	06.J.02 – 06.J.04
	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.	06.J.01

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM-385-1-1 (PARA REF)
	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. In and around the creek areas, algae, moss, rocks, and rushing water can cause slippery, uneven and unstable walking surfaces. Personnel will remain alert to the potential for slip, trips and falls when working around the water.	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.	01.C.01
	Use of Hand Tools	Hand 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 tools will be inspected daily prior to use and any defective tools will be tagged and removed from service immediately. Personnel will follow the other requirements of PIKA SOP-37, Hand and Power Tool Safety to ensure proper use of the hand tools used on this project.	11.C.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, puncture and laceration hazards.	05.A.01
	Eye hazards	When working in the woods or any location with eye hazards, personnel will use safety glasses to protect their eyes from hazards.	05.B
	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 SOP-43.	14.A.04
	Biological	PIKA will implement SOP-14 and the guidelines in the SSHP to reduce or minimize biological hazards that may be encountered. Insect repellant will be used by site personnel as needed to repel insects. Site personnel will report to the SSHO and their team leader the presence of any hazardous animals, insects or plants.	06.D.01 – 06.D.03

PIKA INTERNATIONAL, INC.

ACTIVITY HAZARD ANALYSIS

Job: Mobilization and site set-up

Date Prepared: 17 May 2008

Project: O&M of Sand Creek Barrier System Rocket Range Area of Open Demolition Area #2 MRS, Ravenna, Ohio

Equipment To Be Used	Inspections Required	Training Required
Hand Tools and Equipments	Daily inspections of hand tools/equipments	40-Hour HAZWOPER
		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.

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: 05/21/08	Signature of Reviewer:	Date: 05/21/08

ACTIVITY HAZARD ANALYSIS

Job: Anomaly Avoidance of the Construction Area

Date Prepared: 17 May 2008

Project: O&M of Sand Creek Barrier System Rocket Range Area of Open Demolition Area #2 MRS, Ravenna, Ohio

Risk Assessment Code (RAC): L

Prepared By: Drew Bryson, CIH **Reviewed By:** Phil Curry

Recommended Protective Clothing and Equipment

Level D – Leather outer gloves as needed for hand protection; Hard hat if overhead hazards exist; Safety glasses

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. An UXO technician will use a Schonstedt to survey the construction area of the Sand Creek Barrier System and work zones for potential Munitions and Explosives of Concern (MEC) anomalies prior to entry by construction team members.	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 SOP's that affect their operations.	01.B.05
	Site access control	Site personnel will maintain a constant watch for intrusion of unauthorized personnel.	28.A.02 (10)
	Heat Stress	Personnel will be monitored for heat stress and PIKA will implement the PIKA SOP-17, Heat Stress Prevention. Personnel will maintain adequate hydration and personal monitoring will be conducted as required by SOP-17.	06.J.02 – 06.J.04
	Cold Stress	Personnel will be monitored for cold stress and PIKA will implement the PIKA SOP-18, Cold Stress Prevention.	06.J.05 – 06.J.10b
	Adverse Weather	When there are warnings or indications of impending severe weather, conditions will be monitored and appropriate precaution	06.J.01

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM-385-1-1 (PARA REF)
		taken to protect personnel and property as specified in the SSHP.	
	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. In and around the creek areas, algae, moss, rocks, and rushing water can cause slippery, uneven and unstable walking surfaces. Personnel will remain alert to the potential for slip, trips and falls when working around the water.:	14.C14.C
	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 SOP-43.	14.A.04
	Use of Schonstedt	Schonstedt operators will be trained on the use, inspection and maintenance of the Schonstedt.	25.A.01b
	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 to over exert themselves and not overstrain muscles and joints.	01.C.01
	Cuts and Lacerations	Level D PPE with leather gloves will be used per 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 complete their tasks and the hazards of exposed metal and other cut hazards.	05.A.01
	MEC	Safety during MEC operations will be achieved through adherence to applicable safety precautions, use of a systematically planned and executed approach, and intensive supervision. For all site operations with the potential for exposure to MEC, only those personnel essential to the operation shall be allowed inside the MSD of 1,250 feet.	25.A.01b
	Biological	PIKA will implement SOP-14 Identification and Control of Biological Hazards. Biological hazards that may be encountered include stinging and biting insects, hazardous plants, and snakes. Insect	06.D.01 – 06.D.03

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM-385-1-1 (PARA REF)
		repellant will be used by site personnel as needed to repel hazardous insects. Site personnel will report to the SSHO and their team leader the presence of any hazardous animals, insects or plants.	
	UV Radiation	Site personnel will be cautioned about the possibility of sunburns and will be use sunscreen with a minimum SPF 30 on exposed skin.	06.J.13 & 05.B.07
	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.	13.A.03

ACTIVITY HAZARD ANALYSIS

Job: Anomaly Avoidance of the Construction Area

Date Prepared: 11 February 2008

Project: O&M of Sand Creek Barrier System Rocket Range Area of Open Demolition Area #2 MRS, Ravenna, Ohio

EQUIPMENT TO BE USED	INSPECTIONS REQUIRED	TRAINING REQUIRED
1. Schonstedt	Daily inspection of equipment	40-Hour HAZWOPER
		8-Hour Refresher
		Initial Site / Task Hazard Training
		PPE Training
		Schonstedt operators are required to be trained in the operation, inspection and maintenance of the equipment they are using.

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: 05/17/08	Signature of Reviewer:	Date: 05/17/08

PIKA INTERNATIONAL, INC.

ACTIVITY HAZARD ANALYSIS

Job: O&M Field Activities

Date Prepared: 17 May 2008

Project: O&M of Sand Creek Barrier System Rocket Range Area of Open Demolition Area #2 MRS, Ravenna, Ohio

Risk Assessment Code (RAC): **L**

Prepared By: Drew Bryson, CIH

Reviewed By: Phil Curry

Recommended Protective Clothing and Equipment

Level D
Leather outer gloves as needed for hand protection; Leather work boots; Safety Glasses.

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. Inspect the Sand Creek Barrier System Screens for the presence of MEC/MPPEH.	General	Site personnel will be given task-specific briefings daily regarding the hazards associated with their tasks and the procedures used to control/mitigate the hazards. All personnel inside exclusion zone will wear the Level D PPE listed above.	01.B.05
	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 ensure that unauthorized access during tasks that could cause exposure to MEC or other ES&H hazards.	28.A.02 (10)
	Cold Stress	Personnel will be monitored for cold stress and PIKA will implement the PIKA SOP-18, Cold Stress Prevention.	06.J.05 – 06.J.10b
	Heat Stress	Personnel will be monitored for heat stress as directed by the UXOSO and PIKA will implement the PIKA SOP-17, Heat Stress Prevention when temperatures exceed 78 °F. Personnel will maintain adequate hydration and personal monitoring will be conducted as required by SOP-17.	06.J.02 – 06.J.04
	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.	06.J.01

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM-385-1-1 (PARA REF)
	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. In and around the creek areas, algae, moss, rocks, and rushing water can cause slippery, uneven and unstable walking surfaces. Personnel will remain alert to the potential for slip, trips and falls when working around the water.	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.	01.C.01
	Pinch points, impact and other hazards associated with heavy equipment use.	All equipment will receive daily inspections to verify the working condition of equipped safety features. If equipment features are not operating correctly, equipment will not be used. All ground personnel will wear safety vests while heavy equipment is being operated at the site. Operators will turn off equipment prior to exiting. Spotters will be used to control personnel/vehicle traffic at the site. Barricades will be utilized as necessary to delineate traffic. All equipment operators will be qualified to operate equipment.	16.A.02 – 16.A.04
	High Noise levels (>85dBA)	PIKA personnel exposed to greater than 82 dBA 8-hour TWA will use hearing protection devices and the SSHO will implement ESHP-505. SSHO will monitor noise levels and establish hearing protection requirements for high noise hazards.	05.C.01 – 05.C.07
	Use of Hand Tools	Hand 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 tools will be inspected daily prior to use and any defective tools will be tagged and removed from service immediately. Personnel will follow the other requirements of PIKA SOP-37, Hand and Power Tool Safety to ensure proper use of the hand tools used on this project.	11.C.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, puncture and laceration hazards.	05.A.01

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM-385-1-1 (PARA REF)
	Eye hazards	When working in the woods or any location with eye hazards, personnel will use safety glasses to protect their eyes from hazards.	05.B
	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 SOP-43.	14.A.04
	Biological	PIKA will implement SOP-14 and the guidelines in the SSHP to reduce or minimize biological hazards that may be encountered. Insect repellant will be used by site personnel as needed to repel insects. Site personnel will report to the SSHO and their team leader the presence of any hazardous animals, insects or plants.	06.D.01 – 06.D.03

PIKA INTERNATIONAL, INC.

ACTIVITY HAZARD ANALYSIS

Job: O&M Field Activities

Date Prepared: 17 May 2008

Project: O&M of Sand Creek Barrier System Rocket Range Area of Open Demolition Area #2 MRS, Ravenna, Ohio

Equipment To Be Used	Inspections Required	Training Required
Hand tools	Daily inspections of hand tools	40-Hour HAZWOPER
Magnetometers	Daily inspection and response check of the magnetometers	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.

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: 02/13/2008	Signature of Reviewer:	Date: 02/13/2008

ACTIVITY HAZARD ANALYSIS

Job: Demolition of MEC items

Date Prepared: 17 May 2008

Project: O&M of Sand Creek Barrier System Rocket Range Area of Open Demolition Area #2 MRS, Ravenna, Ohio

Risk Assessment Code (RAC): M

Prepared By: Drew Bryson, CIH **Reviewed By:** Phil Curry

Recommended Protective Clothing and Equipment

Level D
Leather outer gloves as needed for hand protection; Leather work boots; Safety Glasses.

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. Using demolition explosives to blow MEC items in place or to conduct consolidated demolition shots	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 the EZ will wear a minimum of Level D PPE. All PIKA subcontractors will be required to read and sign-off on the PIKA SOP's that affect their operations.	01.B.05
	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 ensure that unauthorized access during tasks that could cause exposure to MEC or other ES&H hazards. The MSD/EZ of 1,702 feet will be established prior to the initiation of surface clearance operations.	28.A.02 (10)
	Heat Stress	If ambient temperatures exceed 75°F, PIKA will implement the PIKA SOP-17, Heat Stress Prevention Personnel will be monitored for heat stress and will maintain adequate hydration.	06.J.02 – 06.J.04
	Cold Stress	If ambient temperatures drop below 61°F, PIKA will implement the PIKA SOP-18, Cold Stress Prevention, and personnel will be monitored for cold stress.	06.J.05 – 06.J.10b

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM-385-1-1 (PARA REF)
	Adverse Weather	When there are warnings or indications of impending severe weather, conditions will be monitored and appropriate precautions taken to protect personnel and property as specified in the SSHP.	06.J.01
	Slips, trips and falls	All personnel will utilize good house keeping procedures and maintain clean work areas to remove trip hazards. Personnel will also be aware of uneven walking and working surfaces and the potential for rocks and brush stumps protruding from the soil. In and around the creek areas, algae, moss, rocks, and rushing water can cause slippery, uneven and unstable walking surfaces. Personnel will remain alert to the potential for slip, trips and falls when working around the water.	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 or overstrain muscles and joints.	01.C.01
	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 Personnel will follow the other requirements of PIKA SOP-37, Hand and Power Tool Safety to ensure proper use of the hand and power tools anticipated for this project.	11.C.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
	Biological	PIKA will implement SOP-14 Identification and Control of 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 SSHO and their team leader the presence of any hazardous animals, insects or plants.	06.D.01 – 06.D.03

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM-385-1-1 (PARA REF)
	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 SOP-43.	14.A.04
	Overhead Hazards	Hard hats will be required in those areas with potential hazard of head injury. All protective head gear shall meet the current requirements of the current ANSI Z89.1.	05.D.01 & 05.D.02
	Explosion, fire and over pressure	Only unexploded ordnance (UXO) personnel who meet the requirements as outlined in Section 5.0 of the SSHP will be permitted to conduct demolition operations. surface clearance activities. PIKA UXO personnel will utilize the requirements of EP 385-1-95a and the PIKA MEC Demolition SOPs Attachment 3 to the APP to ensure safe performance of MEC demolition.	NA
	Fragmentation	To ensure the protection of all non-essential personnel, only those personnel essential to the performance of the demolition operations will be permitted inside the EZ while MEC items are being primed for demolition. Additionally, all PIKA UXO personnel will evacuate outside the EZ prior to initiation of the demolition donor charges. To minimize the potential for re-contamination of adjacent grids with fragments, the SUXOS may choose to utilize sandbag mitigation techniques to reduce the spread of fragments. For sandbag use, PIKA personnel will use the requirements of “Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions,” (HNC-ED-CS-S-98-7, dated August 1998).	

ACTIVITY HAZARD ANALYSIS

Job: Demolition of MEC items

Date Prepared: 17 May 2008

Project: O&M of Sand Creek Barrier System Rocket Range Area of Open Demolition Area #2 MRS, Ravenna, Ohio

Equipment To Be Used	Inspections Required	Training Required
Hand Tools and Equipments	Daily inspections of hand tools/equipment	40-Hour HAZWOPER
		8-Hour Refresher
		Initial Site / Task Hazard Training
		PPE Training
		All personnel operating hand tools and equipments will be trained in proper inspection, maintenance and use of the hand tools.

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: 05/21/08	Signature of Reviewer:	Date: 05/21/08

ACTIVITY HAZARD ANALYSIS

Job: Inspection/handling of MD and non-MD scrap **Date Prepared:** 17 May 2008

Project: O&M of Sand Creek Barrier System Rocket Range Area of Open Demolition Area #2 MRS, Ravenna, Ohio

Risk Assessment Code (RAC): **M**

Prepared By: Drew Bryson, CIH **Reviewed By:** Phil Curry

Recommended Protective Clothing and Equipment

Level D
Leather outer gloves as needed for hand protection; Leather work boots; Safety Glasses.

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. PIKA UXO personnel will inspect MD and non-MD scrap to ensure no explosive hazards exist.	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 the EZ will wear a minimum of Level D PPE. All PIKA subcontractors will be required to read and sign-off on the PIKA SOP's that affect their operations.	01.B.05
	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 ensure that unauthorized access during tasks that could cause exposure to MEC or other ES&H hazards.	28.A.02 (10)
	Heat Stress	If ambient temperatures exceed 75°F, PIKA will implement the PIKA SOP-17; Heat Stress Prevention Personnel will be monitored for heat stress and will maintain adequate hydration.	06.J.02 – 06.J.04
	Cold Stress	If ambient temperatures drop below 61°F, PIKA will implement the PIKA SOP-18, Cold Stress Prevention, and personnel will be monitored for cold stress.	06.J.05 – 06.J.10b
	Adverse Weather	When there are warnings or indications of impending severe weather,	06.J.01

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM-385-1-1 (PARA REF)
		conditions will be monitored and appropriate precautions taken to protect personnel and property as specified in the SSHP.	
	Slips, trips and falls	All personnel will utilize good house keeping procedures and maintain clean work areas to remove trip hazards. Personnel will also be aware of uneven walking and working surfaces and the potential for rocks and brush stumps protruding from the soil. In and around the creek areas, algae, moss, rocks, and rushing water can cause slippery, uneven and unstable walking surfaces. Personnel will remain alert to the potential for slip, trips and falls when working around the water.	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.	01.C.01
	Use of Hand Tools	Hand 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 tools will be inspected daily prior to use and any defective tools will be tagged and removed from service immediately Personnel will follow the other requirements of PIKA SOP-37, Hand and Power Tool Safety to ensure proper use of the hand and power tools anticipated for this project.	11.C.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
	Biological	PIKA will implement SOP-14 Identification and Control of 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 SSHO and their team leader the presence of any hazardous animals, insects or plants.	06.D.01 – 06.D.03

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM-385-1-1 (PARA REF)
	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 SOP-43.	14.A.04
	Explosion, fire and over pressure	Only unexploded ordnance (UXO) personnel who meet the requirements as outlined in Section 5.0 of the SSHP will be permitted to conduct MD inspections. To ensure that the MD and non-MD sent to the smelter is free of explosive hazards, PIKA personnel will utilize a four-step inspection process. Until such time as MD and scrap has been inspected according to the procedures in the WP, the MD and scrap will be considered to be hazardous and all site controls relevant to MEC operations will be utilized to reduce exposure risks.	NA
	Explosion, fire and over pressure	Only unexploded ordnance (UXO) personnel who meet the requirements as outlined in Section 5.0 of the SSHP will be permitted to conduct demolition operations. surface clearance activities. PIKA UXO personnel will utilize the requirements of EP 385-1-95a and the PIKA MEC Demolition SOPs Attachment 3 to the APP to ensure safe performance of MEC demolition.	NA
	Fragmentation	To ensure the protection of all non-essential personnel, only those personnel essential to the performance of the demolition operations will be permitted inside the EZ while MEC items are being primed for demolition. Additionally, all PIKA UXO personnel will evacuate outside the EZ prior to initiation of the demolition donor charges. To minimize the potential for re-contamination of adjacent grids with fragments, the SUXOS may choose to utilize sandbag mitigation techniques to reduce the spread of fragments. For sandbag use, PIKA personnel will use the requirements of “Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions,” (HNC-ED-CS-S-98-7, dated August 1998).	

PIKA INTERNATIONAL, INC.

ACTIVITY HAZARD ANALYSIS

Job: Inspection/handling of MD and non-MD scrap **Date Prepared:** 17 May 2008

Project: O&M of Sand Creek Barrier System Rocket Range Area of Open Demolition Area #2 MRS, Ravenna, Ohio

Equipment To Be Used	Inspections Required	Training Required
Hand Tools and Equipments	Daily inspections of hand tools/equipment	40-Hour HAZWOPER
		8-Hour Refresher
		Initial Site / Task Hazard Training
		PPE Training
		All personnel operating hand tools and equipments will be trained in proper inspection, maintenance and use of the hand tools.

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: 05/21/08	Signature of Reviewer:	Date: 05/21/08

ACTIVITY HAZARD ANALYSIS

Job: Site restoration and demobilization

Date Prepared: 17 May 2008

Project: O&M of Sand Creek Barrier System Rocket Range Area of Open Demolition Area #2 MRS, Ravenna, Ohio

Risk Assessment Code (RAC): L

Prepared By: Drew Bryson, CIH **Reviewed By:** Phil Curry

Recommended Protective Clothing and Equipment

Level D
Leather outer gloves as needed for hand protection; Leather work boots; Safety Glasses.

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. Demobilize equipment and tools.	General	Site personnel will be given task-specific briefings daily regarding the hazards associated with their tasks and the procedures used to control/mitigate the hazards. All personnel inside exclusion zone will wear the Level D PPE listed above.	01.B.05
	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 ensure that unauthorized access.	28.A.02 (10)
	Cold Stress	Personnel will be monitored for cold stress and PIKA will implement the PIKA SOP-18, Cold Stress Prevention.	06.J.05 – 06.J.10b
	Heat Stress	Personnel will be monitored for heat stress as directed by the UXOSO and PIKA will implement the PIKA SOP-17, Heat Stress Prevention when temperatures exceed 78 °F. Personnel will maintain adequate hydration and personal monitoring will be conducted as required by SOP-17.	06.J.02 – 06.J.04
	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.	06.J.01

ACTIVITY HAZARD ANALYSIS

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM-385-1-1 (PARA REF)
	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. In and around the creek areas, algae, moss, rocks, and rushing water can cause slippery, uneven and unstable walking surfaces. Personnel will remain alert to the potential for slip, trips and falls when working around the water.	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.	01.C.01
	Use of Hand Tools	Hand 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 tools will be inspected daily prior to use and any defective tools will be tagged and removed from service immediately. Personnel will follow the other requirements of PIKA SOP-37, Hand and Power Tool Safety to ensure proper use of the hand tools used on this project.	11.C.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, puncture and laceration hazards.	05.A.01
	Eye hazards	When working in the woods or any location with eye hazards, personnel will use safety glasses to protect their eyes from hazards.	05.B
	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 SOP-43.	14.A.04
	Biological	MKM will implement SOP-14 and the guidelines in the SSHP to reduce or minimize biological hazards that may be encountered. Insect repellant will be used by site personnel as needed to repel insects. Site personnel will report to the SSHO and their team leader the presence of any hazardous animals, insects or plants.	06.D.01 – 06.D.03

ACTIVITY HAZARD ANALYSIS

Job: Site restoration and demobilization

Date Prepared: 17 May 2008

Project: O&M of Sand Creek Barrier System Rocket Range Area of Open Demolition Area #2 MRS, Ravenna, Ohio

Equipment To Be Used	Inspections Required	Training Required
Hand Tools and Equipments	Daily inspections of hand tools/equipment	40-Hour HAZWOPER
		8-Hour Refresher
		Initial Site / Task Hazard Training
		PPE Training
		All personnel operating hand tools and equipments will be trained in proper inspection, maintenance and use of the hand tools.

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: 05/21/08	Signature of Reviewer:	Date: 05/21/08

ATTACHMENT 2

PIKA SOPS

SOP 01: Inspection by Others
SOP 02: Drug and Alcohol Abuse
SOP 03: Incident Reporting
SOP 04: 300 Log Reporting
SOP 05: Visitor
SOP 06: OE Operations: General UXO Procedures
SOP 07: OE Operations: Excavation of Anomalies
SOP 08: OE Operations: Mechanical Screening for OE
SOP 09: OE Operations: Ordnance and Explosives Transportation
SOP 10: OE Operations: Quality Control
SOP 11: OE Operations: Inspection and Disposal of OE Scrap
SOP 12: OE Operations: Explosive Acquisition, Storage, and Accountability
SOP 13: OE Operations: Explosive Demolition Operations
SOP 14: Biological Hazards
SOP 15: Confined Space
SOP 16: Hearing Conservation
SOP 17: Heat Stress and Heat Strain Prevention
SOP 18: Cold Stress Prevention
SOP 19: Weather
SOP 20: Bloodborne Pathogen
SOP 21: Hazard Communication
SOP 22: Signs and Labeling
SOP 23: Fire Protection and Prevention
SOP 24: Sanitation, Housekeeping and Illumination
SOP 25: Respiratory Protection
SOP 26: Personal Protective Equipment
SOP 27: Safe Vehicle Operations
SOP 28: Crane Safety
SOP 29: Drill Rig Operations
SOP 30: Rigging
SOP 31: Chain Saw and Wood Chipper Operations
SOP 32: Forklift Safety
SOP 33: Heavy Equipment Operation
SOP 34: Excavation and Trenching Safety
SOP 35: Building Demolition Safety
SOP 36: Lockout/Tagout
SOP 37: Hand and Power Tool Safety
SOP 38: Pneumatic Tool Safety
SOP 39: Welding, Cutting and Hot Work Safety
SOP 40: Ladder and Stairway Safety
SOP 41: Scaffolding Safety
SOP 42: Fall Protection
SOP 43: Manual Lifting and Material Handling Safety
SOP 44: Hazardous Materials Transportation
SOP 45: Electrical Safety
SOP 46: Contamination Control
SOP 47: Site Monitoring and Sampling
SOP 48: Drum Handling and Removal
SOP 49: SSHO Procedures

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) 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 SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations controlled by PIKA. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP.

- 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 shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented 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, and within the bounds of this SOP 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.

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 all persons present.
4. Notify PIKA Corporate Safety and Health Manager (CSHM) and the Project Manager (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 Officer 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 all comments and items looked at and take pictures from the same position as the inspector. The SS shall also observe all 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 CSHM 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 all affected workers of the danger and 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 CSHM 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 CSHM and provided to the PIKA President and PM. Coordination of subsequent hearings, legal representation, and settlements will be prepared and delivered by the CSHM.

6.0 AUDIT CRITERIA

No audit criteria are associates with this SOP.

7.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to outline PIKA's drug and alcohol abuse policy. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations at any site where PIKA personnel work. As such, this procedure addresses prohibited activities, drug testing scenarios, and employment eligibility in regards to alcohol/drug abuse.

3.0 REFERENCES

The following reference document was used in the development of this SOP.

- Controlled Substances Act, U.S.C 811, 812.

4.0 DEFINITIONS

As used in this SOP, the following terms apply:

Illegal Drug – An illegal drug is any controlled substance, as specified in Schedules I through V of the Controlled Substances Act, U.S.C 811, 812. The term “illegal drugs” does not apply to a controlled substance that is used in accordance with (IAW) the terms of a valid prescription, or other uses authorized by law.

Installation Property - Means project site owned equipment or vehicles used for government business.

Medical Review Officer (MRO) - A licensed physician who is responsible for receiving laboratory results generated as a result of testing conducted under the requirements of either this SOP or any site-specific substance abuse procedure. The MRO shall be knowledgeable of information related to illegal drug use and other substance abuse disorders and shall be trained to evaluate an individual’s positive test result.

Misuse or Abuse of Alcohol - Means performing a work related function while (1) having an blood alcohol concentration at or above 0.04, (2) consuming alcohol within two hours of a scheduled work period or during any work period, or (3) being otherwise impaired by alcohol.

Occurrence - Means any occurrence or incident that is a deviation from the planned or expected behavior or course of events in connection with any operation if the deviation has environmental, public safety and health, or national security significance. Incidents having such significance include the following or incidents of similar nature:

- A work place accident that results in property damage, an injury to any person that requires medical treatment, or a fatality.
- Involvement of nuclear, flammable or explosive materials that results in an explosion, fire, the spread of radioactive material, personal injury or death, or significant damage to property.
- Accidental release of pollutants that results or could result in a significant effect on the public or environment.
- Accidental release of radioactive material above regulatory limits.

Substance Abuse - Means the misuse of alcohol, prescription medication, or the use of illegal drugs.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training.

5.2 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for the following:

1. Conducting an annual review of this SOP and making modifications as necessary.
2. Conducting periodic audits of PIKA projects to ensure compliance with this SOP.
3. Scheduling random drug testing and assisting the SS and SSHO in the scheduling of testing conducted as a result of this SOP.
4. Providing the Site Safety and Health Officer (SSHO) with consultation related to visitor entry and protective measures.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for all PIKA operations. The SS will also ensure that relevant sections of this SOP are discussed in

the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation. The SS will also be responsible for notifying the PM and CSHM if there is suspicion that an employee is using illegal drugs or is appearing a work under the influence of alcohol.

5.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring this SOP is enforced on a daily basis by conducting inspections of site operations to observe site personnel.

6.0 PROCEDURES AND PROHIBITED ACTIVITIES

The procedures and prohibited activities discussed in this paragraph are the minimum procedures and prohibited activities that shall be implemented during all PIKA projects. These procedures and prohibited activities may be augmented by project-specific requirements if so mandated by the client and required by the project contract.

6.1 GENERAL REQUIREMENTS

Any employee harboring, possessing, using, or selling alcoholic beverages or illegal drugs while on company property shall be required to leave such property and the SS will immediately notify the PIKA Project Manager and CSHM. Alcoholic beverages shall not be consumed during working hours or two (2) hours prior to a scheduled work shift. Additionally, misuse of prescription medications shall also be prohibited.

6.2 DRUG TESTING

An independent laboratory will perform substance abuse testing. Testing may be done using urine, hair or blood samples or a breath test. Testing is performed to ensure safe Company operations. PIKA shall conduct drug testing as noted under the following circumstances:

- **Pre-Employment Testing -** All persons who are offered employment to work at project site facility shall pass a pre-employment drug-screening test prior to beginning actual work.
- **Random testing** - All project personnel will be subject to random testing. Upon notification by the CSHM, employees shall report to a designated clinic to participate in random drug testing.
- **Testing as a Result of Occurrence** - In the event of a job related occurrence, PIKA shall arrange for a post incident drug test and possible alcohol test as soon as possible, but not more than 24 hours from the time of the occurrence. Employees directly involved with the incident will be tested to determine if such individuals could have caused or contributed to the conditions which caused the occurrence.

- **Testing on the Basis of Suspicion** - In the event that two or more supervisory or management officials, at least one of whom is in the direct chain of supervision of the employee, agree that such testing is appropriate the contractor's safety representative shall be contacted to coordinate arrangements for drug and/or alcohol testing.
- **Observation of Drugs or Alcohol on the Premises** – Drug testing shall be required in the event that alcohol or illegal drugs are discovered either on the project site or in an employee's possession.

6.3 POSITIVE TEST RESULTS

In the event that a drug/alcohol screen or test results in a positive result, a confirmation test will be performed by the gas chromatography/mass spectrometry method. All test results and medical history shall be reviewed by the MRO who will make a final determination of a positive drug test. If initial test results for alcohol show an alcohol concentration of 0.04 or above, a confirmatory test will be performed following an interval of 15 minutes. The confirmatory test shall be considered the final result for purposes of any subsequent action, including discipline. All confirmed positive tests for drugs or alcohol shall be reported by the MRO. Any disciplinary action taken as a result of a positive drug/alcohol test, up to and including termination, will be determined by the President of PIKA.

6.4 PRESCRIPTION/OVER-THE-COUNTER DRUGS

The use of medically prescribed or over-the-counter medications, pursuant to the direction of a licensed physician for current use (within the past 12 months), is permissible as long as the medication or drug does not adversely affect work ability, job performance, or employee/client safety. Employees taking a drug with a potentially significant impact on their job performance must inform their Immediate Supervisor before starting or resuming work. The Company reserves the right to limit or suspend an employee's work activity during the period in which job performance may be affected.

6.5 SEARCHES

During the scope and course of the employee's employment, the Company reserves the right to conduct searches or inspections to monitor compliance with rules concerning PIKA drug, alcohol and/or inhalant use. This policy extends to work areas, desks, cabinets, lockers, storage areas, Company vehicles, vehicles on property and other personal items (i.e., purses, briefcases, backpacks, etc.). Searches of the person shall include the emptying of pockets and the production of other items concealed in clothing. A member of site or project management will conduct all searches. The Company has the right to search regardless of whether the employee places a private lock on the property.

These searches may be conducted randomly or if there is reasonable cause to suspect a violation of PIKA rules with regard to security, drug, alcohol and/or inhalant use and the possession of weapons. Any item found during a search believed to be an illegal drug or drug paraphernalia, alcohol or weapon will be confiscated, and the individual will be given a written receipt listing the items or substances seized. The employee will be given the opportunity to explain anything found during the search as established by execution of this form.

All searches will be conducted with the authorization of the employee. Personal privacy will be considered to the maximum extent practicable in the administration of these search provisions. A search of a person or personal area should not be construed as an accusation of wrongdoing, but only as compliance with PIKA policy. Any action deemed necessary as a result of a search will be decided upon by the President of PIKA or his designated representative.

6.5.1 Drug Convictions

Any employee convicted of violating a criminal drug or alcohol statute will report in writing the facts surrounding the conviction and sentence to the President or his designated representative within five calendar days of the conviction. The President of PIKA, or his designated representative, will determine the type and extent of any necessary actions.

7.0 AUDIT CRITERIA

The following items related to site compliance with this SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;
3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist.

8.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

This procedure is designed to allow for the identification of accident causes, assist in preventing similar occurrences, and to comply with PIKA accident reporting and record keeping requirements. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA project sites where PIKA personnel or subcontractors are involved in project tasks. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA Standard 29 CFR 1904.
- US Army Regulation 385-40 with USACE Supplement.

4.0 RESPONSIBILITIES

4.1 CORPORATE SAFETY AND HEALTH MANAGER

The Corporate Safety and Health Manager (CSHM) shall be responsible for the overall management of this SOP and its annual review. The CSHM will also be responsible for the review of all forms completed in conjunction with this procedure and ensuring the complete and thorough investigation of all reported accidents and illnesses. The CSHM will also be responsible for initiating an accident investigation and for reporting fatalities or incidents with more than three hospitalizations to the Area OSHA Director.

4.2 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that all accidents involving site personnel or equipment are reported to the PM and the CSHM within 24-hours, and for the appropriate investigation of the incident. The SS will coordinate with the Site Safety and Health Officer (SSHO) to ensure the PIKA Accident/Injury/Illness/Near Miss form (see Attachment 1) is properly completed and will sign the form prior to its submission.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO will be responsible for the on-site implementation of this SOP. As such the SSHO will be responsible for the effective reporting and investigation of accidents involving PIKA personnel, contractors, equipment or property.

5.0 PROCEDURE

5.1 IMMEDIATE RESPONSE

Upon notification of a work-related incident, the SS and SSHO must ensure that injured employees are properly cared for and that professional medical services are made available. Response should include the following:

1. Secure area to ensure that the area is free of any additional hazards that may endanger personnel.
2. Provide or summon medical attention as quickly as possible after determining the extent of injury.
3. Perform CPR/First Aid as appropriate and secure injured employee until professional medical personnel arrive.
4. Dispose of biological waste (body fluids) and related waste accordingly. After injured personnel have been removed from the incident scene, all surfaces contaminated by body fluids must be cleaned and disinfected in accordance with SOP-20 Bloodborne Pathogens.

5.2 INCIDENT REPORTING

Prompt notification is critical in order that necessary actions can be implemented within prescribed time frames.

1. Contact the CSHM (Cellular: 713-412-9948) as soon as possible (not to exceed 2-hours). The CSHM will be responsible for notifying government authorities and agencies if needed.
2. Complete the PIKA Accident/Injury/Near Miss Report form (Attachment 1) and forward it to the CSHM and PM within 24 HOURS of the incident.
3. The CSHM shall report all 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.
4. The CSHM, in conjunction with the SS and SSHO, shall arrange for all 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.

5. 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 SOP-20, Bloodborne Pathogen Control.
6. Inquiries from media (newspaper, TV, etc.) concerning work related incidents shall be referred to the PM or CSHM.

5.3 INVESTIGATE THE INCIDENT

Investigation of a work-related incident must be made immediately and should involve participation of immediate supervision, all injured persons, and any witnesses to the incident. The SS or SSHO, in conjunction with the CSHM will perform the following:

1. Question all 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 all involved equipment or property.
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.

5.4 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 US 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 all equipment and supplies utilized or damaged in the emergency.
2. Determine the cause of the emergency and what preventative measures shall be taken to ensure the emergency does not occur again.
3. The PIKA PM and CSHM, in conjunction with the SUXOS 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.

6.0 ATTACHMENTS

- Accident/Injury/Illness/Near Miss Report form - Attachment 1

7.0 DOCUMENTATION

- Accident/Injury/Illness/Near Miss Report form - Attachment 1

PIKA ACCIDENT/INJURY/NEAR-MISS REPORTING FORM

SECTION 1 - GENERAL INFORMATION

Name:	SSN:		
Job Title:	D.O.B.:	Sex:	Age:
Site Name:	Safety Officer:		
Date of Report:	Date of Incident:	Time of Incident:	
Task/Operation Being Conducted:			
PPE Worn:			

INCIDENT DETAILS AND CONDITIONS AT TIME OF INCIDENT

Temperature: _____ Humidity: _____ Cloud Cover: _____
Wind Speed: _____ Direction: _____ Precipitation: _____Other: _____

Type of Incident: ☐ Personal Injury ☐ Personal Illness ☐ Chemical Exposure
☐ Motor Vehicle ☐ 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: _____
_____

Have arrangements been made for a drug/alcohol screen?: ☐ Yes ☐ No If Yes, where: _____

Have photos been taken? ☐ Yes ☐ No If Yes, who has photos: _____

SECTION 2 - 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 ☐ 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): _____
_____
_____
_____

PIKA ACCIDENT/INJURY/NEAR-MISS REPORTING FORM

SECTION 3 - MOTOR VEHICLE ACCIDENT

Type of Vehicle/Equipment	Type of Collision	Seat Belt Use
☐ Automobile ☐ Van/Truck ☐ Bush Hog ☐ 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 SOP or a SSHP?

☐ Yes Reference: _____

☐ No Explain: _____

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: _____

SSO Signature: _____ Date: _____

Corrective Actions Completed By: _____ Date: _____

PIKA Corp. Review By: _____ Date: _____

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide site management personnel with the Occupational Safety and Health Administration (OSHA) requirements for reporting and documenting work-related accidents and illnesses. This SOP also outlines the requirements for the posting of the OSHA 300 Log.

2.0 SCOPE

This SOP applies to all PIKA project sites where PIKA personnel are employed. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP for additional for compliance issues.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply accident reporting and to the conduct of operations associated with the SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA regulation regarding the recording and reporting occupational injuries and illnesses 29 CFR Part 1904.

4.0 DEFINITIONS

As used in this procedure, the following terms shall apply:

1. **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.
2. **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.
3. **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 (see Attachment 04-1 of this SOP).
4. **Recordable Incident** - An injury or illness meets the general recording criteria and is therefore to be recordable 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. **First Aid** - For the purposes of Part 1904, "first aid" means one of the following listed below. For an injury to classify 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.

6. **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 SOP, 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 5.

5.0 RESPONSIBILITIES

5.1 CORPORATE SAFETY AND HEALTH MANAGER

The Corporate Safety and Health Manager (CSHM) shall be responsible for the overall management of this SOP and its annual review. The CSHM will also be responsible for the review of all forms completed in conjunction with this procedure and ensuring the complete and thorough investigation of all recordable accidents and illnesses. Additionally, the CSHM will ensure the proper entry of all OSHA recordable accidents, injuries and illnesses on the OSHA 300 Log, and will complete and ensure the proper posting of the 300-A Form annually.

5.2 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the project resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site-specific plans, procedures and training as needed.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented and that any required forms associated with this SOP are properly completed and submitted in accordance with (IAW) the guidelines in this SOP. The SS will also ensure that the Form 300-A is posted at the project site during the annual posting period. Additionally, the SS will coordinate and ensure the completion of the Form 301 The

5.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for assisting in the accident or illness investigation and for ensuring the proper completion of the Form 301.

6.0 PROCEDURES

The basic requirements of the OSHA regulation 29 CFR 1904, Recording and Reporting Occupational Injuries and Illnesses, is to ensure that employers record, certify and post data related to occupational injuries and illness experiences by the company's employees. To meet these requirements, PIKA shall implement the reporting and record keeping requirements listed in the paragraphs below.

1. In the event of an accident which results in a recordable injury or illness, the PM and CSHM will be notified within 24-hours of the occurrence. However, in the event of an accident that involves a fatality or the hospitalization of three or more workers, the SS or SSHO will immediately (within 8-hours) inform the CSHM and PM of the occurrence.
2. In the event of a recordable accident, the SS or SSHO will initiate an accident investigation (see PIKA SOP-03) and complete Form 301 as well as any other forms required by PIKA SOP-03 or the client. The Form 301 and any other required accident investigation forms will be submitted to the CSHM and PM within six days after the incident occurs.
3. The details within the Form 301 will be transferred to the 300 Log within seven days of the incident notification.
4. 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.
5. At the end of the calendar year, the CSHM will transfer data from the 300 Log to the Form 300-A to summarize the occupational injuries and illnesses for each establishment.
6. 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.

7.0 AUDIT CRITERIA

The following items related to site compliance with this SOP will be maintained in site records and subject to audit:

1. The PIKA Accident/Injury/Illness/Near Miss Report Form (see PIKA SOP-03);
2. The Form 301s; and
3. The 300 Logs for each establishment.

8.0 ATTACHMENTS

Attachment 04-1, The OSHA Form 301

OSHA's Form 301
Injuries and Illnesses Incident Report

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

U.S. Department of Labor
Occupational Safety and Health Administration

This *Injury and Illness Incident Report* is one of the first forms you must fill out when a recordable work- related injury or illness has occurred. Together with the *Log of Work-Related injuries and Illnesses* and the accompanying *Summary*, these forms help the employer and OSHA develop a picture of the extent and severity of work-related incidents.

Within 7 calendar days after you receive information that a recordable work-related injury or illness has occurred, you must fill out this form or an equivalent. Some state workers' compensation, insurance, or other reports may be acceptable substitutes. To be considered an equivalent form, any substitute must contain all the information asked for on this form.

According to Public Law 91-596 and 29 CFR 1904, OSHA's recordkeeping rule, you must keep this form on file for 5 years following the year to which it pertains.

If you need additional copies of this form, you may photocopy and use as many as you need.

Completed by _____

Title _____

Phone (_____)_____-_____ Date ____ /____ /____

Information about the employee

1) Full Name _____

2) Street _____

City _____ State _____ Zip _____

3) Date of Birth _____ / _____ / _____

4) Date hired _____ / _____ / _____

5) ☐ Male
☐ Female

Information about the physician or other health care professional

6) Name of physician or other health care professional _____

_____

7) If treatment was given away from the work site, where was it given?

Facility _____

Street _____

City _____ State _____ Zip _____

8) Was employee treated in an emergency room?
☐ Yes
☐ No

9) Was employee hospitalized overnight as an in-patient?
☐ Yes
☐ No

Information about the case

10) Case number from the Log _____ (Transfer the case number from the Log after you record the case.)

11) Date of injury or illness _____ / _____ / _____

12) Time employee began work _____ AM / PM

13) Time of event _____ AM / PM ☐ Check if time cannot be determined

14) ***What was the employee doing just before the incident occurred?*** Describe the activity, as well as the tools, equipment or material the employee was using. Be specific. Examples: "climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry."

15) ***What was the injury or illness?*** Tell us the part of the body that was affected and how it was affected; be more specific than "hurt", "pain", or "sore." Examples: "strained back"; "chemical burn, hand"; "carpal tunnel syndrome."

16) ***What was the injury or illness?*** Tell us the part of the body that was affected and how it was affected; be more specific than "hurt", "pain", or "sore." Examples: "strained back"; "chemical burn, hand"; "carpal tunnel syndrome."

17) ***What object or substance directly harmed the employee?*** Examples: "concrete floor"; "chlorine"; "radial arm saw." If this question does not apply to the incident, leave it blank.

18) ***If the employee died, when did death occur?*** Date of death _____ / _____ / _____

Public reporting burden for this collection of information is estimated to average 22 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collections of information. Persons are not required to respond to the collection of information unless it displays a current valid OMB contr9ol number. If you have any comments about this estimate or any other aspects of this data collection, including suggestions for reducing this burden, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

1.0 PURPOSE

This procedure is designed to ensure that all persons visiting a project site are escorted and receive a site clearance when performing activities within a work area. All persons performing work at a project site who are not full-time employees of PIKA International, Inc. (PIKA) or an employee of a PIKA subcontractor will be considered "visitors" and shall be accounted for, at all times, while visiting the job site.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving where PIKA is charged with site control. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the implementation of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA General Industry Standard 29 CFR 1910.120.
- USACE EM 385-1-1, Section 06.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The PIKA Project Manager (PM) is responsible for the overall implementation of the PIKA Corporate Safety and Health Program (CSHP) on those project sites the PM manages. As such, the PM is responsible for ensuring the availability of the PIKA resources needed to implement this PIKA Visitor SOP.

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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP and making modifications as necessary;
2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that will apply to visitors.

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 ensure compliance with this SOP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for ensuring the effective implementation of this SOP, and for the allocation of project resources needed to implement this SOP.

4.4 SITE SAFETY AND HEATLH OFFICER

The SSHO will be responsible for implementing this SOP and any site-specific visitor control procedures outlined in the SSHP. It will be the SSHO's responsibility to ensure that the procedures for personnel and equipment decontamination are executed correctly.

5.0 SITE WORK ZONE PROCEDURES

5.1.1 GENERAL

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, whenever possible, maintain a watch for visitors approaching the site and to immediately notify the SS or SSHO of the presence of the visitor. Visitors shall be required to comply with the general and site-specific requirements specified below depending upon the part of the site they will be visiting.

5.1.2 Visitor Badge and Sign-in

Visitor(s) entering the project site will register with the project office and receive a "Visitors Badge" (Figure 1). The SS shall instruct expected employees and subcontractors to register upon arrival to the project site. Upon registering at the site office, visitors will sign the Visitor Sign-in Log (see Attachment 1). Depending on the location of their work, they may require an escort. Upon completion of the visit, the visitor will return their badge to the project office and sign out on the Visitor Sign-in Log.

5.2 VISITOR TRAINING AND CONTROL

5.2.1 General Requirements for All Site Visitors

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

1. The PIKA SS and SSHO shall be notified of the nature/duration of the visit

2. After receiving a visitor badge and signing the Visitor Sign-in Log, visitors shall be escorted by an PIKA representative while in the area
3. Visitors shall comply with the safety/health requirements described below

5.2.2 Visitors Remaining Outside the EZ

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

1. Location and description of potential hazards and risks
2. A short briefing about the chemical hazards found on site
3. Areas of the site that are closed to visitors
4. The site evacuation plan and emergency procedures
5. Other topics as deemed appropriate

5.2.3 Visitors Entering the EZ

Any visitors requesting entry into the EZ shall be subject to the same site-specific and hazard information training as specified in paragraph 6.3.2 of this SSHP. This training shall be conducted prior to the visitor entering the EZ. Visitors requesting entry to an EZ shall also be required to present documentation of OSHA hazardous waste training and medical surveillance, consistent with the requirements for the general site employees. All OE-related operations shall cease whenever non-essential personnel enter the EZ.

5.3 SUBCONTRACTOR SITE CLEARANCE

Subcontractors performing field or maintenance activities shall register in advance of their scheduled visit with the site office and obtain a “Visitor Pass”. The visitor pass must be displayed by the visitor at all times while on-site and returned to the sit e office daily upon exiting the facility.

5.3.1 Equipment Inspection

The SS or SSHO shall inspect tools and/or equipment to ensure they satisfy OSHA Safety Standards (29 CFR 1926).

5.3.1.1 Work Observation

Visitor field activities will be observed during their execution to guard against unsafe work practices or conditions. Work will be stopped in the event unsafe conditions or practices are determined and will not resume until such conditions are corrected.

6.0 AUDIT CRITERIA

The following items related to site compliance with this SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;

3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

Attachment 1 ..... Site Visitor Log

Visitor Pass (Figure 1)

VISITOR's PASS

Name:_____Issued:_____

Company:_____Expires:_____

Authorized Work:_____

Approved Equipment ? Yes_____ No_____

Escort Required? Yes_____ No_____

_____
SM/SSHO Signature

Attachment 1: Visitors Sign-In Log

PROJECT LOCATION: _____

PROJECT SITE: _____ PROJECT NO:_____

DATE	NAME	REPRESENTING	EQUIPMENT AND PPE LEVEL	TIME IN	TIME OUT

COMMENTS: _____

_____

_____

_____

_____

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations on sites with Munitions of Explosive Concern (MEC) or unexploded ordnance (UXO) contamination. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) Manual, and will be implemented on a project site as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). Specifications and guidance relevant to the development of either a SSHP or an APP are outlined in the PIKA CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations involving conducting operations on a project site with known or suspected MEC hazards. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 Ordnance and Explosives Operations* (latest edition) is presented as Attachment 1 of this SOP. This EP contains general guidelines for MEC/UXO 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/UXO.

4.0 DEFINITIONS

As related to this SOP and MEC/UXO operations, the definitions presented below shall apply:

1. **MEC Procedures**: Procedures which include, but are not limited to, the following actions performed by a UXO-qualified individual:
   a. Gaining access to (manual excavation) 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 all MEC.

2. **MEC-Related Procedures**: Procedures which include, but are not limited to, the following actions which may be performed by a non-UXO-qualified individual:
   a. Locating and marking subsurface anomalies.
   b. Locating and marking suspected surface MEC.
   c. Transporting and storing recovered MEC.

d. Utilizing EMM to excavate overburden from suspected MEC.

3. **Ordnance and Explosives**: Consists of (1) military munitions that have been abandoned, expelled from demolition pits or burning pads, lost, discarded, or buried, (2) UXO, (3) soil presenting explosion hazards, and (4) buildings with explosives residues that present explosion hazards.

4. **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.

5. **UXO-Qualified Personnel**: Personnel meeting the requirements for the positions of UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, and Senior UXO Supervisor. For qualification requirements, refer to EP 1110-1-18.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of PIKA personnel and equipment resources needed to effectively implement this SOP. The PM will also ensure that this SOP is incorporated into site specific plans, procedures and training for sites MEC/UXO contamination may be encountered.

5.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to hazards associated with MEC/UXO. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

5.3 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will ensure that the safety and health hazards and control techniques associated with MEC/UXO 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 ensure their initial and continued compliance with this SOP and other regulatory guidelines.

6.0 PROCEDURES

6.1 SAFETY HAZARDS AND OPERATIONAL CONTROL TECHNIQUES

6.1.1 MEC/UXO Hazards

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

6.1.2 General Precautions for MEC/UXO

If MEC/UXO is present and may be located during site activities, only UXO-qualified personnel shall be allowed to perform UXO operations. UXO-qualified personnel will follow the procedures and requirements of the EP 385-1-95a and other UXO safety procedures found in the Work Plan when investigating, inspecting, handling or demilitarizing MEC/UXO. UXO-qualified personnel shall also follow all other site-specific UXO and occupational safety and health SOPs presented in the site-specific WP/SSHP.

6.1.3 Requirements for Non-UXO Qualified Personnel

Due to the lack of required training and to ensure the safety and health of site personnel, non-UXO qualified personnel will be prohibited from conducting UXO operations as defined above. 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 Team Leader or a UXO-qualified individual of higher rank than UXO Team Leader. Whenever a non-UXO qualified individual who is not essential to the operation enters the site exclusion zone as defined in the project WP, all UXO operations will be halted. Further, the safe work practices listed below shall be applicable to and followed by all non-UXO qualified personnel on site:

1. Non-UXO qualified personnel shall receive site-specific UXO recognition training prior to participation in site activities.
2. Non-UXO qualified personnel shall be escorted in areas with known or potential UXO contamination at all times by an UXO-qualified person, until such time as the area is cleared of all UXO hazards.
3. Once an area has been cleared, the boundaries of the cleared area will be identified through the use of flagging, and only then may non-UXO qualified personnel perform duties in the area unescorted.
4. At no time shall non-UXO qualified personnel leave the cleared area unescorted.
5. Non-UXO qualified personnel shall not touch or disturb any object that could potentially be MEC/UXO related, and shall immediately notify the nearest UXO qualified person of the presence of the object.

6.2 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

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

1. Hard hats are required only when working around heavy equipment or when an overhead or head impact hazard exists. If a hard hat is required and personnel are involved with the hand excavation, investigation, handling or demolition of explosives, the hard hat shall be secured to prevent it from falling and striking potential MEC.
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). Safety glasses shall be secured to prevent falling if UXO personnel are involved with hand excavation, inspection, handling or demolition operations.

7.0 AUDIT CRITERIA

The following items related to operations on an MEC/UXO contaminated site will be audited to ensure compliance with this SOP:

1. The Site Daily Operational and Safety Logs
2. The Documentation of Training form for the initial site hazard training
3. The Documentation of Training forms for the Daily Safety Briefings
4. The Daily Safety Inspection Checklist

8.0 ATTACHMENTS

The following attachment to this SOP will be reviewed by all site personnel prior to initiation of site activities involving potential exposure to MEC/UXO hazards.

Attachment 06-1.....EP 385-1-95a

ATTACHMENT 06-1
TO
PIKA SOP-06

ER 385-1-95a
BASIC SAFETY CONCEPTS AND CONSIDERATIONS FOR ORDNANCE AND EXPLOSIVES OPERATIONS

U.S. ARMY CORPS OF ENGINEERS SAFETY OFFICE

Revised 29 June 2001

DEPARTMENT OF THE ARMY
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Safety
BASIC SAFETY CONCEPTS AND
CONSIDERATIONS FOR ORDNANCE
AND EXPLOSIVES OPERATIONS

1. Purpose. This pamphlet establishes U.S. Army Corps of Engineers (USACE) operating procedures for dealing with ordnance and explosives (MEC) items at Formerly Used Defense Sites (FUDS), Base Realignment and Closure, and Installation Restoration projects. There are no absolutely safe procedures for dealing with MEC items, merely procedures considered to be least dangerous; therefore, it is essential that a planned and systematic approach to dealing with such items be established.

2. Applicability. This pamphlet applies to all Headquarters, U.S. Army Corps of Engineers elements and all USACE Commands having responsibility for performing MEC response activities.

3. Distribution Statement. Approved for public release; distribution is unlimited.

4. References.
   a. 27 CFR 55, Commerce in Explosives.
   b. 29 CFR 1926, Subpart P, Excavations.
   c. DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards.
   d. AR 385-64, U.S. Army Explosives Safety Program.
   e. DA Pam 385-64, Ammunition and Explosives Safety Standards.
   f. TM 60A-1-1-31, Explosive Ordnance Disposal Procedures: General Information on EOD Disposal Procedures.
   g. TB 700-2, Department of Defense Ammunition and Explosives Hazard Classification Procedures.
   h. ER 5-1-11, Program and Project Management. EP 385-1-95a 29 June 01
   i. ER 1110-1-12, Quality Management.
   j. EP 1110-1-17, Establishing a Temporary Open Burn and Open Detonation Site for Conventional Ordnance and Explosives Projects.
   k. EP 1110-1-18, Ordnance and Explosives Response.
   l. EM 385-1-1, Safety and Health Requirements Manual.

m. HNC-ED-CS-S-98-1, Methods for Predicting Primary Fragmentation Characteristics of Cased Explosives, January 1998. This document is available on the Internet at http://www.hnd.usace.army.mil/.
n. HNC-ED-CS-S-98-2, Method for Calculating Ranges to No More Than One Hazardous Fragment per 600 Square Feet, January 1998. This document is available on the Internet at http://www.hnd.usace.army.mil/.
o. Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (MEC) Sites, U.S. Army Engineering and Support Center, Huntsville, August 1998. This document is available on the Internet at http://www.hnd.usace.army.mil/.
p. AFM 91-201, Explosives Safety Standards.
q. NAVSEA OP5, Ammunition and Explosives Ashore Safety Regulations for Handling, Storing, Production, Renovation, and Shipping.
r. NFPA 780, Standard for the Installation of Lightning Protection Systems.

5. Explanation of Abbreviations and Terms.

Abbreviations/acronyms and special terms used in this document are explained in the glossary.

6. Policy.

The policy of USACE is to produce products and services that fully meet customers' expectations of quality, timeliness, and cost effectiveness, within the bounds of legal responsibility. An acceptable level of quality does not imply perfection; however, there should be no compromise of functional, health, or safety requirements. Adherence to the principles outlined in ER 5-1-11 and ER 1110-1-12 will contribute to achieving this goal. MEC response procedures must be formulated to ensure harmony with the USACE Strategic Vision and should be executed in concert with activities presented in other USACE guidance.

7. Responsibilities.

USACE and contractor personnel involved with MEC response projects are responsible for safely executing response actions in accordance with (IAW) the approved Site Safety and Health Plan, approved Work Plan, and all applicable laws, regulations, and policies.

8. General Safety Concerns and Procedures.

a. As a general rule, all fuzed unexploded ordnance (UXO) will be detonated in the original position found. This is the safest method to effect final disposition of munitions.

b. MEC operations will not be conducted until all applicable plans for the site in question are prepared and approved. These plans will be based upon the concept of

limiting exposure to the minimum number of personnel, for the minimum amount of time, to the minimum amount of MEC consistent with safe and efficient operations.

c. Only UXO-qualified personnel will perform MEC procedures. As an exception, a UXO Technician I may assist in the performance of MEC procedures when under the supervision of a UXO Technician III or a UXO-qualified individual of higher rank than UXO Technician III. 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 UXO Technician III. All personnel engaged in field operations will be thoroughly trained and capable of recognizing the specific hazards of the procedures being performed. To ensure that these procedures are performed to standards, all field personnel will be under the direct supervision of a UXO Technician III or a UXO-qualified individual of higher rank than UXO Technician III.

d. Personnel who will be handling MEC items will not wear outer or inner garments having static-electricity-generating characteristics. Materials made of 100-percent polyester, nylon, silk, and wool are highly static producing. Refer to DA Pam 385-64 for more information regarding nonstatic-producing clothing.

e. Prior to any action being performed on an ordnance item, all fuzing will be definitively identified. This identification will consist of fuze type by function and condition (armed or unarmed) and the physical state/condition of the fuze, i.e., burned, broken, parts exposed/ sheared, etc.

f. MEC operations will be conducted only during daylight hours.

9. MEC Safety Precautions.

a. Every effort will be made to identify a suspect MEC item. Under no circumstances will any fuzed UXO be moved in an attempt to make a definitive identification. The MEC item will be visually examined for markings and other external features such as shape, size, and external fittings. If an unknown MEC item is encountered, the onsite USACE representative will be notified immediately. If there is no onsite USACE representative, the USACE district or the U.S. Army Engineering and Support Center, Huntsville (USAESCH) MEC Safety Group will be notified as soon as possible. If research of documentation is required, it will be initiated by USAESCH. Following is additional guidance for the safe handling of MEC items:

(1) Projectiles containing base-detonating fuzes are to be considered armed if the round is fired.

(2) Arming wires and popout pins on unarmed fuzes should be secured prior to moving MEC items.

(3) Do not depress plungers, turn vanes, or rotate spindles, levers, setting rings, or other external fittings on MEC items. Such actions may arm or activate the items.

(4) Do not attempt to remove any fuze(s) from MEC items. Do not dismantle or strip components from any MEC items.
(5) UXO personnel are not authorized to render inert any MEC items found onsite.
(6) MEC items will not be taken from the site as souvenirs/training aids.
(7) Civil War ordnance will be treated in the same manner as any other MEC items.

b. Prior to entering areas/ranges contaminated with Improved Conventional Munitions (ICMs) or submunitions, a Department of the Army (DA) waiver must be obtained by the affected installation or for FUDS properties, the executing Corps district. If an ICM or submunitions is found at a site not previously known to contain ICMs or submunitions, work will cease. The discovered item will be identified, then properly disposed of (including guarding the item if disposition is to be delayed). Work will resume only when an ICM waiver has been obtained. For guidance on the preparation of waiver requests, contact the MEC Mandatory Center of Expertise.

c. Any time suspect chemical warfare materiel is encountered during conventional MEC site activities, all work will immediately cease. Project personnel will withdraw along cleared paths upwind from the discovery. A team consisting of a minimum of two personnel will secure the area to prevent unauthorized access. Personnel should position themselves as far upwind as possible while still maintaining security of the area.

(1) On FUDS properties, the UXO team will notify the local point of contact (POC) designated in the Work Plan. The local POC will facilitate explosive ordnance disposal (EOD) response, and two personnel will secure the site until the EOD unit's arrival. If the local POC designated in the Work Plan is not the local law enforcement agency, the local POC will inform the local law enforcement agency of the discovery if necessary. The EOD unit will notify the Technical Escort Unit (TEU) and secure the area until TEU's arrival. After notifying the local law enforcement agency (when necessary), the local POC will notify the USAESCH MEC Safety Group of the actions taken.
(2) On active installations, the UXO team will normally notify the Range Control Officer, the Facility Engineer, post headquarters, or the POC designated in the Work Plan.

d. Avoid inhalation of and skin contact with smoke, fumes, and vapors of explosives and related hazardous materials.

e. Consider MEC items that may have been exposed to fire and detonation as extremely hazardous. Chemical and physical changes may have occurred to an item's contents, which may have rendered the item more sensitive than in its original state.

f. Do not rely on the color coding of MEC items for definitive identification. Munitions having incomplete or improper color codes have been encountered.

g. Avoid approaching the forward area of an MEC item until it can be determined whether or not the item contains a shaped charge. The explosive jet, which is formed during detonation, can be lethal at great distances. Assume that all shaped-charge munitions contain a piezoelectric (PZ) fuzing system until investigation proves otherwise. PZ fuzing is extremely sensitive. It can function at the slightest physical change and can remain hazardous for an indefinite period of time.

h. Approach an unfired rocket motor from the rear at a 45-degree angle. Accidental ignition can cause a missile hazard and hot exhaust.

i. Do not expose unfired rocket motors to any electromagnetic radiation (EMR) sources. See DA Pam 385-64 for safe separation distances from various sources of EMR.

j. Consider an emplaced landmine to be armed until proven otherwise. It may be intentionally booby-trapped to deceive.

(1) Many training mines contain spotting charges capable of inflicting serious injury.

(2) Exercise extreme care with wooden mines that have been buried for long periods of time. Certain soil conditions can cause the wood to deteriorate, and any inadvertent movement or pressure can initiate the fuze.

k. Assume that a practice MEC item contains a live charge until investigation proves otherwise. Expended pyrotechnic and practice devices can contain red or white phosphorus (WP) residue. Due to incomplete combustion, this residue may re-ignite spontaneously if the crust is broken and exposed to air.

l. Do not approach a smoking WP munition. Burning WP may detonate the explosive burster charge at any time.

m. Foreign ordnance was shipped to the United States for exploitation and subsequent disposal. Every effort will be made to research all applicable documentation prior to commencement of a project involving foreign ordnance.

10. MEC Storage. During MEC projects, explosive storage falls into two categories, on Department of Defense (DOD) installations and off DOD installations.

a. On DOD installations, DOD 6055.9-STD and Service requirements (Army – AR 385- 64; Navy – NAVSEA OP5; Air Force – AFM 91-201) will be met. For the remainder of this pamphlet, reference to DOD standards (i.e., DOD 6055.9-STD) also implies that Service explosives safety publications will be adhered to. Generally, the installation will have an existing explosives storage facility that meets DOD standards. If not, the contractor will establish a temporary storage facility. The compatibility of explosives defined in chapter 3, DOD 6055.9-STD, will be followed. Recovered MEC items awaiting final disposition will not be stored with serviceable explosives. Commercial explosives will be assigned a DOD hazard classification (i.e., 1.1, 1.2, etc.) and storage compatibility grouping by the U.S. Army Technical Center for Explosives Safety prior to being stored on a military installation.

b. Off DOD installations, the contractor will be responsible for establishing a temporary explosives storage facility. This temporary storage facility will meet local, state, 27 CFR 55, AR 385-64, and DOD 6055.9-STD requirements to the greatest extent practicable.

(1) In cases where the facility cannot meet the intermagazine, inhabited building, and public traffic route quantity-distance requirements specified in DA Pam 385-64 and DOD 6055.9-STD, a barricading plan or other engineering controls to protect the public from accidental detonation must be submitted to and approved by the USAESCH Directorate of Engineering.

(2) Magazines must meet the requirements of 27 CFR 55, and each magazine must have a Net Explosive Weight and hazard classification established for the explosives to be stored.

(3) Each magazine must be provided lightning protection IAW DA Pam 385-64. The provisions of NFPA 780, which are consistent with Army guidance, may be used to supplement Army guidance where necessary.

(4) A physical security survey will be conducted to determine if fencing or guards are required. This survey will be coordinated through local law enforcement agencies. Generally, a fence around the magazine is not needed, IAW 27 CFR 55. However, the contractor is responsible for providing the degree of protection needed to prevent the theft of MEC items.

c. A fire plan for either an on- or off-installation explosives storage facility will be prepared and coordinated with the local fire department. Placarding of magazines will be IAW local rules and regulations.

11. MEC Transportation, Offsite.

In the event that MEC items must be transported offsite, the provisions of chapter 15, EP 1110-1-18, will be followed. In addition, USACE contractors are prohibited from transporting UXO offsite for destruction until the provisions of paragraph 1-9, TB 700-2, have been met.

12. MEC Transportation, Onsite.

The following safety procedures will be followed for the transportation of MEC items onsite:

a. Do not transport WP munitions unless they are immersed in water, mud, or wet sand.

b. If loose pyrotechnic, tracer, flare, or similar mixtures are to be transported, they will be placed in No. 10 mineral oil or equivalent to minimize the fire and explosion hazards.

c. Incendiary-loaded munitions should be placed on a bed of sand and covered with sand to help control the burn if a fire should start.

d. If an unfired rocket motor must be transported, it will be positioned in the vehicle parallel to the rear axle. This will afford maximum protection for the personnel operating the vehicle.

e. If a base-ejection projectile must be transported to a disposal facility, the base will be oriented in the vehicle such that it is parallel to the rear axle. This will afford maximum protection for the personnel operating the vehicle.

f. MEC items with exposed hazardous fillers, such as High Explosive, will be placed in appropriate containers with packing material to prevent migration of the hazardous fillers. Padding should be added to protect the exposed filler from heat, shock, and friction.

13. Exclusion Zone Operations. On MEC project sites, it is the responsibility of the contractor's Unexploded Ordnance Safety Officer (UXOSO) to establish the exclusion zone for each UXO work area.

a. The purpose of the exclusion zone is to protect nonessential personnel from blast overpressure and fragmentation hazards. Calculating exclusion zones with respect to intentional and unintentional detonations is discussed below.

(1) Intentional Detonations. The minimum separation distances specified in DOD 6055.9- STD, chapter 5, paragraph C5.5.4, will be used unless lesser distances have been calculated using HNC-ED-CS-S-98-1.

(2) Unintentional Detonations. If the identity of MEC items on a site is unknown, the minimum separation distance specified in DOD 6055.9-STD, chapter 5, paragraph C5.5.4, will be used to establish the exclusion zones. When the identity of MEC items is known, the USAESCH Directorate of Engineering will use HNC-ED-CS-S-98-1 and HNC-ED-CS-S-98-2 to determine the criteria for establishing the exclusion zones.

b. When multiple teams are working onsite, a team separation distance (TSD) will be established. The minimum TSD will be the greater of 200 feet or the K50 (0.9 pounds per square inch) overpressure distance.

c. While MEC procedures are being conducted, only personnel essential for the operation will be allowed in the exclusion zone. When nonessential personnel enter the exclusion zone, all MEC operations will cease. In addition to this work stoppage, the following actions will be taken:

(1) The individual(s) must receive a safety briefing and sign the visitors log prior to entering the zone.

(2) The individual(s) will be escorted by a UXO-qualified individual.

d. All personnel working within the exclusion zone will comply with the following:

(1) There will be no smoking within the exclusion zone, except in areas designated by the UXOSO.

(2) There will be no open fires for heating or cooking (gas stoves, grills, etc.) within the exclusion zone, except where authorized by the UXOSO.

(3) During geophysical detection operations, personnel will not wear any metal that would interfere with instrument operations.

14. MEC Excavation Operations.

a. Hand excavation is the most reliable method for uncovering an MEC item. However, hand excavation exposes personnel to the hazard of detonation . Therefore, only UXO-qualified personnel will be used to perform this task.

b. Earth-moving machinery (EMM) may be used to excavate overburden from suspected MEC items. EMM will not be used to excavate within 12 inches of a suspected MEC item. Once the EMM is within 12 inches of the suspected MEC item, the excavation will be completed by hand excavation methods. Personnel who are not UXO qualified may operate EMM only when supervised by a UXO Technician III or a UXO-qualified individual of higher rank than UXO Technician III.

(1) If more than one earth-moving machine is to be used onsite, the same minimum separation distances required for multiple work teams apply.

(2) EMM operations will be conducted within the guidelines of EM 385-1-1 and 29 CFR 1926, subpart P.

c. Excavation operations, whether by hand or EMM, will employ a stepdown or offset access method. Under no circumstances will any excavation be made directly over suspected MEC items.

15. MEC Disposal Operations.

All disposal operations will be conducted IAW TM 60A-1-1-31, EP 1110-1-17, and the unnumbered USAESCH publication entitled Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (MEC) Sites. a. As a general rule, all disposal operations will be accomplished by electrical means to ensure maximum safety. There are exceptions to this requirement in situations where static electricity or EMR hazards are present. Unintentional detonations can occur because of these induced currents (or lightning). The following precautions from DA Pam 385-64 are to be followed:

(1) Premature detonation of electric blasting caps by induced current from radio frequency signals is possible. Refer to DA Pam 385-64 for minimum safe distance with respect to transmitter power and indication of distance beyond which it is safe to conduct electric blasting even under the most adverse conditions.

(2) Lightning is a hazard with respect to both electric and non-electric blasting caps. A direct hit or a nearby miss is almost certain to initiate either type of cap or other sensitive explosive elements such as caps in delay detonators. Lightning strikes, even at distant locations, may cause extremely high local earth currents that may initiate electrical firing circuits. Effects of remote lightning strikes are multiplied by their proximity to conducting elements such as those found in buildings, fences, railroads, bridges, streams, and underground cables or conduits. The only safe procedure is to suspend all blasting activities when an electrical storm approaches to within 10 miles of the site.

(3) Electric power lines also pose a hazard with respect to electric initiating systems. It is recommended that any disposal operation closer than 155 meters to electric power lines be done with a nonelectric system.

1. The only acceptable disposal method is the one stated in the appropriate TM 60 Series manual for specific ordnance types. Any commercial explosives being used will be equivalent to the military explosive required for the disposal operation.
2. If justified by the situation, protective measures to reduce shock, blast over-pressure, and fragmentation will be taken. The USAESCH Directorate of Engineering will assist in any design work and will review for approval all proposed protective measures.
3. Minimum separations distances for personnel during MEC disposal will be IAW DOD 6055.9-STD, chapter 5.
4. During open detonation operations, lifting lugs, strong backs, base plates, etc., will be oriented away from personnel locations.
5. Once disposal operations are completed, a thorough search of the immediate area will be conducted, with a magnetometer to ensure that a complete disposal was accomplished.
6. Inert ordnance will not be disposed of as scrap until the internal tillers/voids have been exposed and unconfined.

GLOSSARY

Section I - Abbreviations

AFM ..... Air Force Manual
AR ..... Army Regulation
CFR ..... Code of Federal Regulations
DA ..... Department of the Army
DA Pam ..... Department of the Army Pamphlet
DOD ..... Department of Defense
EMM ..... Earth-Moving Machinery
EMR ..... Electromagnetic Radiation
EOD ..... Explosive Ordnance Disposal
FUDS ..... Formerly Used Defense Sites
IAW ..... In Accordance With
ICM ..... Improved Conventional Munition
NAVSEA OP ..... Naval Sea Systems Command Ordnance Pamphlet
NFPA ..... National Fire Protection Association
MEC ..... Ordnance and Explosives
POC ..... Point of Contact
PZ ..... Piezoelectric
STD ..... Standard
TB ..... Technical Bulletin.
TEU ..... Technical Escort Unit
TSD ..... Team Separation Distance
USACE ..... U.S. Army Corps of Engineers
USAESCH ..... U.S. Army Engineering and Support Center, Huntsville
UXO ..... Unexploded Ordnance
UXOSO ..... Unexploded Ordnance Safety Officer
WP ..... White Phosphorus

Section II - Terms

MEC Procedures
Procedures which include, but are not limited to, the following actions performed by a UXO-qualified individual:

d. Gaining access to (manual excavation) and identifying subsurface anomalies and assessing the condition of buried MEC.
e. Identifying and assessing the condition of surface MEC.
f. Recovering and making final disposal of all MEC.

MEC-Related Procedures

Procedures which include, but are not limited to, the following actions which may be performed by a non-UXO-qualified individual:

e. Locating and marking subsurface anomalies.
f. Locating and marking suspected surface MEC.
g. Transporting and storing recovered MEC.
h. Utilizing EMM to excavate overburden from suspected MEC..

Ordnance and Explosives (MEC)
Consists of (1) military munitions that have been abandoned, expelled from demolition pits or burning pads, lost, discarded, or buried, (2) UXO, (3) soil presenting explosion hazards, and (4) buildings with explosives residues that present explosion hazards.

Unexploded Ordnance (UXO)
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.

UXO-Qualified Personnel
Personnel meeting the requirements for the positions of UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, and Senior UXO Supervisor. For qualification requirements, refer to EP 1110-1-18.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the excavation of soil to gain access to potential OE anomalies. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving the excavation of possible OE anomalies. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

3.0 REGULATORY REFERENCES

This SOP is to be implemented in conjunction with PIKA SOP-34, Excavation and Trenching, and SOP-33, Heavy Equipment Operations if earth-moving machinery (EMM) is used. This SOP has been designed to addresses the safety and health concerns associated with excavation operations conducted in OE/UXO contaminated areas. Along with the specifications of SOPs 34 and 33, the Occupational Safety and Health Administration (OSHA) standards and U.S. Army Corps of Engineers (USACE) requirements listed below directly apply to the conduct of operations associated with the SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed.

- OSHA Construction Industry Standard 29 CFR Part 1926, Subparts O and P; and
- USACE EM 385-1-1, Section 25.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into

site specific plans, procedures and training for sites where this SOP 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure proper protection of personnel.
3. Providing the UXO Safety Officer (UXOSO) with consultation related to visitor entry and protective measures.
4. Periodically auditing PIKA work sites to ensure compliance with this SOP.

4.3 SENIOR UXO SUPERVISOR

The Senior UXO Supervisor (SUXOS) will ensure that this SOP is implemented for operations that involve personnel exposure to the hazards associated with the excavation of anomalies. The SUXOS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

4.4 UXO SAFETY OFFICER

The UXO Safety Officer (UXOSO) will be responsible for ensuring that the safety and health hazards and control techniques associated with or referenced in this SOP are discussed during the initial site hazard training and the daily tailgate safety briefings. The UXOSO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

4.5 UXO TECHNICIAN III

The UXO Technician III (UXOT3) responsible for supervising excavation operations shall be responsible for the field implementation of this SOP and for implementing the safety and health requirements outlined in section 5.0 of this SOP. In the absence of a SUXOS, the UXOT3 shall be responsible for implementing the SUXOS responsibilities outlined in paragraph 4.3.

5.0 PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in OE/UXO excavation 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 HAZARDS AND OPERATIONAL CONTROL TECHNIQUES

5.1.1 General Excavation Control Measures

The excavation and trenching SOP (SOP-34) and the heavy equipment SOP (SOP-33) 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 OE/UXO excavation operations.

1. Daily tailgate safety meetings will be conducted and noted in the project 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 UXOT3 in coordination with the SUXOS shall establish an exclusion zone (EZ) around the excavation site. The UXOT3 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 and minimize the number of PIKA personnel exposed to the hazards.

5.1.2 Excavation of Anomalies at Known OE Sites

Excavation and identification of anomalies at a known OE contaminated site will be performed using the criteria and procedures outlined below.

1. Only PIKA 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 most probable munitions (MPM) 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.
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. Digging will be initiated to the side of the anomaly, and will not be conducted directly over the anomaly until such time as the depth of the anomaly can be ascertained.

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 ensure no small OE 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 OE-related, its identity and condition will be determined by two UXO personnel.
   b. If it is identified as a fuzed UXO or an item that is unsafe to move, the item will be blown in place (BIP) prior once all requisite safety precautions for demolition operations have been taken.
   c. Non-UXO OE items or non-OE items will simply be removed once inspected and deemed safe to move by the UXOT3.
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, on 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 all UXO/OE located at each site will be made and maintained at the site. A log entry will be made for each UXO/OE item indicating the item's identity, its explosive hazards, location (x, y, and z measurements) and final disposition.
8. If the UXO is determined to be CWM, it will be marked, and all personnel with in 500 meters of the CWM will be evacuated, with the exception of two UXO qualified personnel who will be positioned at a safe location up wind of 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 personnel will secure the area until military EOD arrives and takes control of the site.
9. If an unsafe UXO or a CWM UXO is identified, the SUXOS will be notified and arrangements will be made to BIP the item.

5.2 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 steel-toe safety boots shall be worn when excavation equipment is in operation.
2. The UXOT3 will however, remove the hardhat and safety glasses when UXO is 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 to ensure compliance with this SOP:

1. The Daily Operational and Safety Logs;
2. The Documentation of Training form for the initial site hazard training;
3. The Documentation of Training form for the Daily Tailgate Safety Briefings; and
4. The Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

No attachments associated with this SOP.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of mechanical screening equipment to remove OE items from soil. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving the use of mechanical screening equipment to remove OE items from soil. This SOP is not intended to contain all requirements needed to ensure 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 SOP. Additionally, consult the documents listed in section 3.0 of this SOP for additional compliance issues.

3.0 REGULATORY REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the PIKA resources needed to implement this SOP, and shall ensure that this SOP is incorporated in the plans, procedures and training for sites where mechanical screening is to be implemented.

4.2 SENIOR UXO SUPERVISOR

The Senior UXO Supervisor (SUXOS) will ensure that this SOP is implemented for screening operations, and that relevant sections of this SOP are discussed in the

tailgate safety briefings. Information related to the daily implementation of the SOP is to be is documented in the Site Operational Log maintained by the SUXOS.

4.3 UXO SUPERVISOR

The UXO Supervisor (UXOT3) shall be responsible for ensuring the field implementation of this SOP and for implementing the safety and health requirements outlined in section 5.0 of this SOP. In the absence of a SUXOS, the UXOT3 shall be responsible for implementing the SUXOS responsibilities outlined in paragraph 4.2.

4.4 UXO SAFETY OFFICER

The UXO Safety Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily tailgate safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 PROCEDURE

All PIKA, contractor, and subcontractor personnel involved in screening operations shall be familiar with the potential safety and health hazards associated with this operation. Additionally, all effected personnel shall also be familiar with the control techniques that will used to reduce or eliminate these hazards.

5.1 SAFETY HAZARDS

The safety and health hazards potentially associated with mechanical screening operations on an ordnance and explosives (OE) 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.

1. Unexploded ordnance (UXO), 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 determine the extent of control to be used, however, all of the safety measures listed below will be implemented.

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 fire extinguishers.
3. The excavation operations will not require barricading, however, both the excavator and the UXO Specialist (UXOT2) will be protected behind a plexiglass window of the thickness specified in Figure 08-1. For the loader/excavator operator, the Plexiglas will be mounted over the existing windshield and windows. For the UXOT2 observing the excavation, the plexiglass window will be mounted on a blast shield similar to that portrayed in Figure 08-1. At a minimum, the blast shield shall provide front, side, and overhead protection, and be constructed to the material thickness specifications in Figure 08-1. General design characteristics and dimensions of the Plexiglas and steel sides required have been specified by the Structures Branch, Engineering Directorate, US Army Engineering and Support Center, Huntsville (CEHNC). The dimensions were selected based upon the accidental detonation of the most probable munitions (MPM) 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 UXOT2 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 08-1 of this SOP. 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 UXOT2 monitoring the operation detect an OE item within the screen or screen reject. The location of the UXOT2 monitoring the screening process will be such that the UXOT2 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 described above will be located outside the K24 distance arc for the MPM specified for the site. To fill the sifter hopper, the loader operator will be passing temporarily into and out of the K24 distance arc, and as such will be required to wear hearing protection at all times. This will be in addition to the Plexiglas shielding that will be installed on all excavation and loading equipment.
6. The UXOT2 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 UXOT2 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 UXOT2s. 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 Work Plan (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 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, all sources of immediate power or stored energy shall be controlled (refer to lockout/tagout SOP 36).
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 ensure 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 to ensure compliance with this SOP:

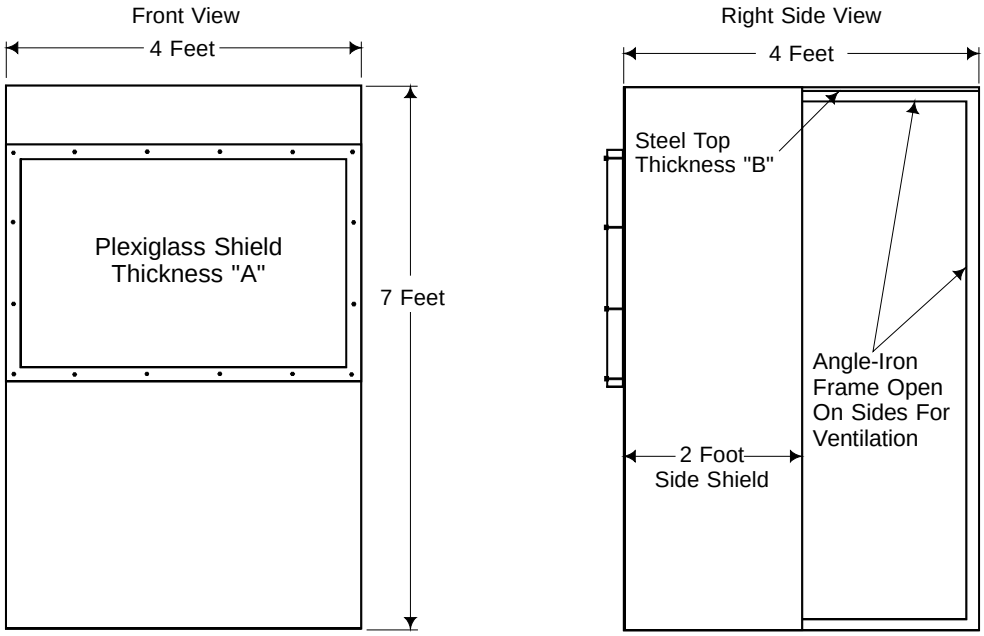
1. The Daily Operational and Safety Logs;
2. The Documentation of Training form for the initial site hazard training;
3. The Documentation of Training form for the Daily Safety Briefings; and
4. The Daily Safety Inspection Checklist.

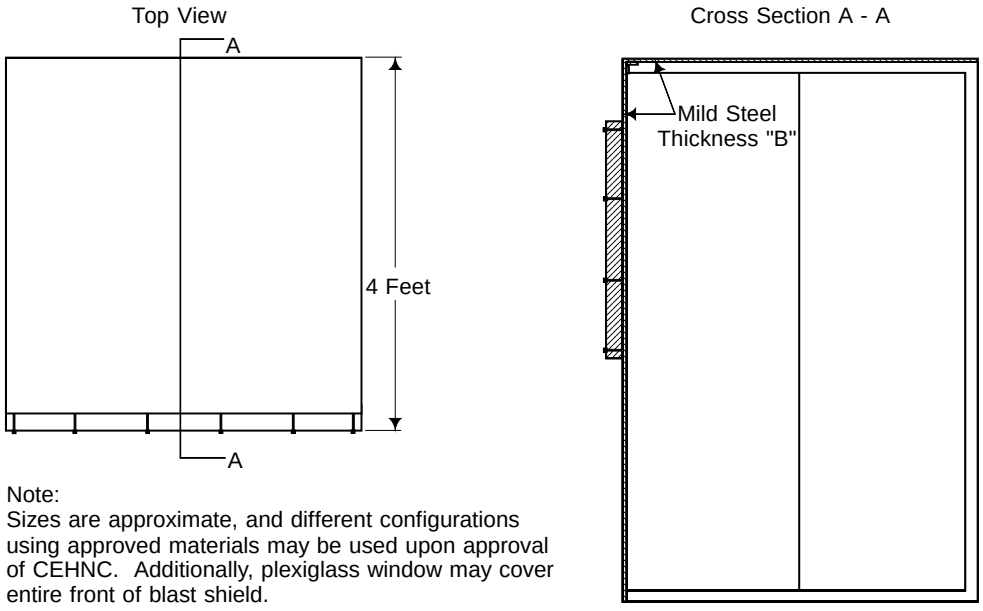
7.0 ATTACHMENTS

No attachments are associated with this SOP

FIGURE 08-1 – BARRIER SPECIFICATIONS

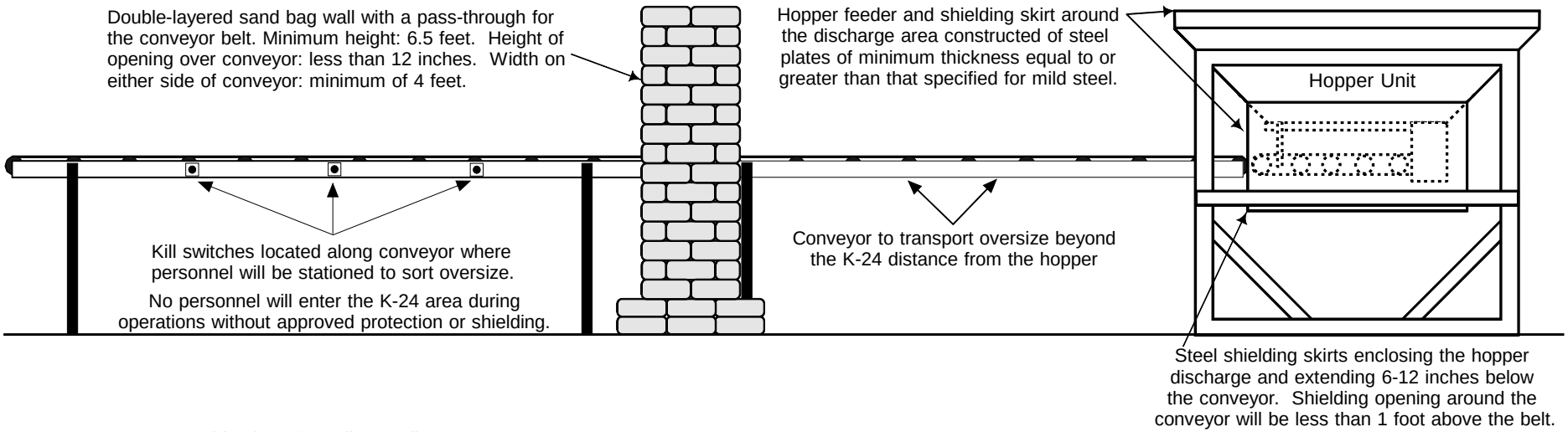
Site Name:	**Site Location:**
MPM:	**Team Separation Distance:**
Thickness "A" for the Plexiglas:	**Thickness "B" for the Steel:**
K24 Distance:	**MSD:**



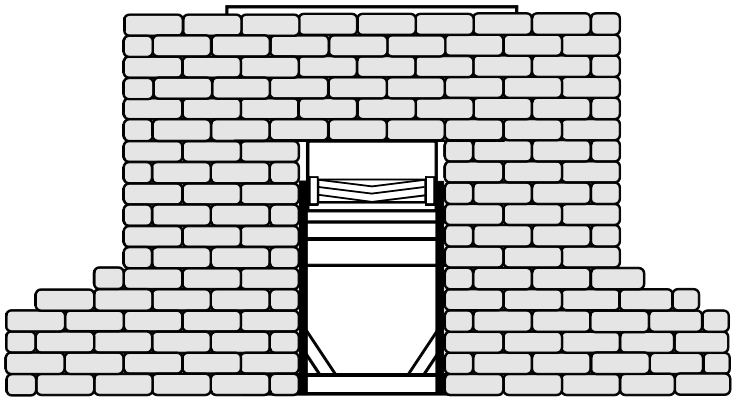


Note:
Sizes are approximate, and different configurations using approved materials may be used upon approval of CEHNC. Additionally, plexiglass window may cover entire front of blast shield.

FIGURE 08-2 – POTENTIAL HOPPER AND CONVEYOR CONFIGURATION

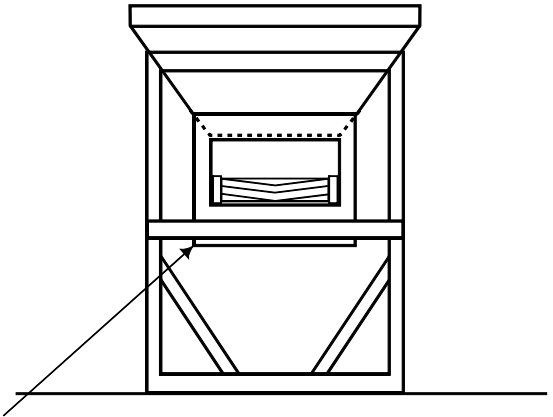


Side view of sandbag wall



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 Standard Operating procedure (SOP) is to provide the procedures applicable to the transport of explosives to include demolition material and unexploded ordnance (UXO).

2.0 SCOPE

This SOP applies to all PIKA site personnel involved in the transport of explosives. This SOP is generic in nature and is not intended to cover all requirements necessary to ensure 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 forms in Attachment 2 and the data contained in this SOP will be sufficient.

3.0 REGULATORY REFERENCES

Procedures and information contained in this document were obtained from the below listed references:

- U.S. Army Corps of Engineers (USACE) Engineering and Support Center, Huntsville (CEHNC) "Basic Safety Concepts and Considerations for Ordnance and Explosives Operations" (most current date)
- PIKA International, Inc. (PIKA) Corporate Safety and Health Program (CSHP)
- Applicable sections of Department of Transportation, 49 CFR Parts 172, 173, and 383, Transportation
- Bureau Alcohol, Tobacco and Firearms (BATF) P 5400.7, Explosives Law and Regulations
- DoD 6055.9-STD, DoD Ammunition and Explosives Safety Standards
- Department of the Army (DA) Pamphlet (PAM) 385-64, Ammunition and Explosives Safety Standards
- Army Regulation (AR) 385-64, Ammunition and Explosives Safety Standards

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 ensure that the appropriate requirements are communicated to the Corporate Safety and Health Manager (CSHM) and that they are incorporated either into site plans or added as an attachment to this SOP if the site-specific requirements differ from the requirements in this SOP. The PM will also be responsible for ensuring that the project-related manpower and personnel resources are available to ensure the safe and effective implementation of this SOP. Any site-specific

attachments added to this SOP will be reviewed and approved by the CSHM and the SUXOS.

4.2 SENIOR UXO SUPERVISOR

The SUXOS will be responsibility for ensuring that the requirements of this SOP, and any site-specific attachments, are enforced and that the pertinent forms in Attachment 2 are property completed and in the vehicle(s) used for explosive transportation.

4.3 EXPLOSIVE VEHICLE DRIVER

Individuals assigned to the transport of explosives will meet the site driver requirements, be thoroughly familiar with this SOP and the emergency procedures in the event of an accident/incident.

5.0 EXPLOSIVES AND OE TRANSPORTATION REQUIREMENTS

5.1 GENERAL REQUIREMENTS

Transportation of OE and explosives will comply with all Federal, state, and local regulations. Permits for the transportation of explosives or OE are not required for on-site or inter-facility transportation within Federal installations. Off-site shipment of OE will be made using commercial carriers approved to transport ammunition and explosives. For off-site shipment:

- OE will be packaged IAW 49 Code of Federal Register (CFR) part 172 and 173;
- Drivers will have PIKA Form 09-1 (Special Instructions for Vehicle Drivers);
- Vehicles will be inspected using PIKA Form 09-2, Motor Vehicle Inspection, 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 OE 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, and wheel chokes 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 at all times;
- 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 driver and 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.)

"(c) Exceptions for less than 454 kg (1,001 pounds). Except for bulk packaging and hazardous materials subject to ¸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 net explosive weight (NEW) of 1.1, 1.2, or 1.3 explosives are transported by PIKA personnel.

TABLE 09-1: 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 09-2

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:

- X 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

- X It has a gross vehicle weight rating of 11,794 or more KG (26,001 pounds or more); or
- X It is designed to transport 16 or more passengers, including the driver; or
- X 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 placarded 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 ensure that the requisite license/permits are obtained.

5.4.4 Mixed Packaging Requirements

Explosives of compatibility Group S may be packed with explosives of all 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 SOP.

6.0 DOCUMENTATION

6.1 PIKA FORMS

Any time explosives are being transported this entire SOP to include the completed copies of supporting forms presented in Attachment 2 of this SOP, will be in the vehicle. A brief description of the relevant forms is included below and shall be used to ensure proper completion of the forms.

1. **PIKA FORM 09-1**

   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. All 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 09-2**

   The form will be completed ensuring the pertinent data for all those transporting explosives is included on the form. As with the other required forms, 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.

3. PIKA FORM 09-3

The form is to be completed prior to placing any explosives in the vehicle and will accompany the shipment.

6.2 BATF PERMIT/LICENSE

A copy of the current BATF license will accompany the vehicle at all times 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.

ATTACHMENT 1

MATERIAL DATA SHEETS

CORD, DETONATING - 1.4D - UN0289

NET EXPLOSIVE WEIGHT (NET):

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 Packagings	Intermediate Packagings	Outer Packagings
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 Packagings 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 Packagings	Intermediate Packagings	Outer Packagings
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 Packagings are not required when they are fastened securely in coils.	Bags ..... Plastics Boxes ..... Fiberboard Tubes ..... Fiberboard Metal Plastics Dividing partitions in the outer Packagings.	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 all 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 Packagings	Intermediate Packagings	Outer Packagings
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).

ATTACHMENT 2

FORMS

SHIPPING PAPER AND 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 all 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 Shipper Representative:			Signature(s) of Vehicle Operator(s):		
24-Hour Emergency Assistance Telephone Numbers:			Work Hours Emergency Phone Numbers:		

THIS VEHICLE IS TRANSPORTING HAZARDOUS MATERIALS

Date Prepared: *January 01, 2000*	Date of Travel: *January 01, 2000*	Page *__1__ of __1__*

Proper Shipping Name	Hazard	ID No.	PG	Qty/Units	Weight
Cord, Detonating 80 gr per foot	*1.4D*	*UN0289*	*II*	*____FT*	
Charges, Shaped Commercial	*1.4S*	*UN0441*	*II*	*____EA*	
Detonators, Non-electric	*1.4B*	*UN0267*	*II*	*____EA*	
Lighters, Fuse	*1.4S*	*UN0131*	*II*	*____EA*	
Fuse, Safety	*1.4S*	*UN0105*	*II*	*____FT*	
Detonators, Electric	*1.4B*	*UN0255*	*II*	*____EA*	

Emergency notification. In all cases of accident, incident, breakdown or fire, prompt notification must be given.

FOR EMERGENCY RESPONSE INFORMATION, SEE BACK OF THIS FORM

Remarks:

PAGE 1 EXAMPLE

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 Shipper Representative:	Signature of Vehicle Operator(s):

24-Hour Emergency Assistance Telephone Numbers:	Work Hours Emergency Phone Numbers:
(915) 555-0229	*(915) 555-2351* *Cellular Phone* *(915) 555-3217*

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 all 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 all 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 (☐ 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 all 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 09-1 (back)

PIKA EXPLOSIVES PURCHASE/RECEIPT/TRANSPORTATION AUTHORIZATION LIST

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 his knowledge and belief, and that he will communicate any additions or deletions to the foregoing list to PIKA International, Inc.

Corporate Officer	**Date**

PIKA FORM 09-2

PIKA EXPLOSIVES PURCHASE/RECEIPT/TRANSPORTATION AUTHORIZATION LIST

Address and County: (Home Office)**: 12919 S.W. Freeway, Suite #190, Stafford, TX 77477**

Address and County: (Field Office): **1000 Main Street, Sink Hole, New Jersey 01020**

Federal License #: *1 TN-001-33-OH-97374* Expiration Date: *August 1, 2000*

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
Sean Connery	**PA 102030405**	**123-34-4567**	**Glencoe, Scotland**
Roger Moore	**NY 01020304**	**987-76-6543**	**Hometown USA**

EXAMPLE FORM

The undersigned certifies the foregoing information to be true and correct to the best of his knowledge and belief, and that he will communicate any additions or deletions to the foregoing list to PIKA International, Inc.

Corporate Officer	**Date**

PIKA VEHICLE INSPECTION CHECKLIST

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

Site Name / Location: _____

SUXOS: _____ **Inspector:** _____ **Vehicle:** _____
(MAKE AND LICENSE PLATE #)

Date Inspected: _____ **Mileage:** _____ **Owner:** _____
(RENTAL, PIKA, GFE, CONTRACT)

USE FOR PASS, X FOR DISCREPANCY

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

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

Description of deficiencies: _____

_____

_____

_____

Deficiencies corrected by: _____ Date: _____

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the on site Quality Control Specialist (QCS) the minimum instruction necessary to professionally and competently perform the job of ensuring a quality product that conforms with agreed upon results. This SOP is also intended to provide the user the understanding of the theories used in the development of specific procedures within this SOP.

2.0 SCOPE

This SOP 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 his/her duties.

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- ISO 9001:2000
- MIL-STD-1916
- DID OE-005-11

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated in plans, procedures and training for sites where this SOP 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure 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 to ensure compliance with this SOP.

4.3 SENIOR UXO SUPERVISOR

The Senior UXO Supervisor (SUXOS) will ensure that the UXO Quality Control Specialist (UXOQCS) is supplied with any and all administrative needs in order to implement this SOP. The SUXOS has overall responsibility to ensure QC department for inspection and acceptance. The SUXOS is responsible to effect any and all 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 ensure any lessons learned are implemented where needed.

4.4 UXO SUPERVISOR

The UXO Supervisor (UXOT3) shall be responsible for understanding all aspects of this SOP that relates to his/her daily activities and the level of workmanship required under each individual task. The UXOT3 has the responsibility to perform any and all actions necessary to ensure all work and products performed or created by his/her team/function meet all 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 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 Quality Control Manager (QCM) is responsible for the implementation and maintenance of this SOP. The PIKA QCM is responsible for ensuring that the UXOQCS understands this SOP and conducts all QC activities in accordance with this SOP. 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 all 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 and all 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 SOP. 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 ensure that relevant sections of this SOP are discussed in the tailgate safety briefings and that information related to its daily implementation is documented in the Site Operational Log. The QCS is responsible for ensuring all data and deliverables are accurate prior to submission to intended receivers.

5.0 PROCEDURES

Quality Control procedures are broken down in this SOP 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 ensure 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 ensure actual work processes match those instructions set forth in the approved work plan as well as all other work instructions and industry standards. It is the responsibility of the UXOT3 and SUXOS to ensure the written procedures are followed by all 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 processes being conducted utilizing the written process (WP or SOW) as a reference. These processes 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 SOP. All surveillances shall be documented IAW section 5.8 of this SOP.

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 all Departments and Agencies of the Department of Defense for ensuring 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 of ensuring 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. This reduction in inspections is outlined in MIL-STD-1916 section five and is accomplished as follows (See attachment 1): 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 to ensure conformance. For most grid clearance type projects where grids are 100 feet square to 400 feet square, a VL of II is sufficient. For AEDA/Range Residue 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 SOP 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. All inspection activities will be documented IAW section 5.8 of this SOP.

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 10-1 for an example). The QCS 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 and

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 SOP.

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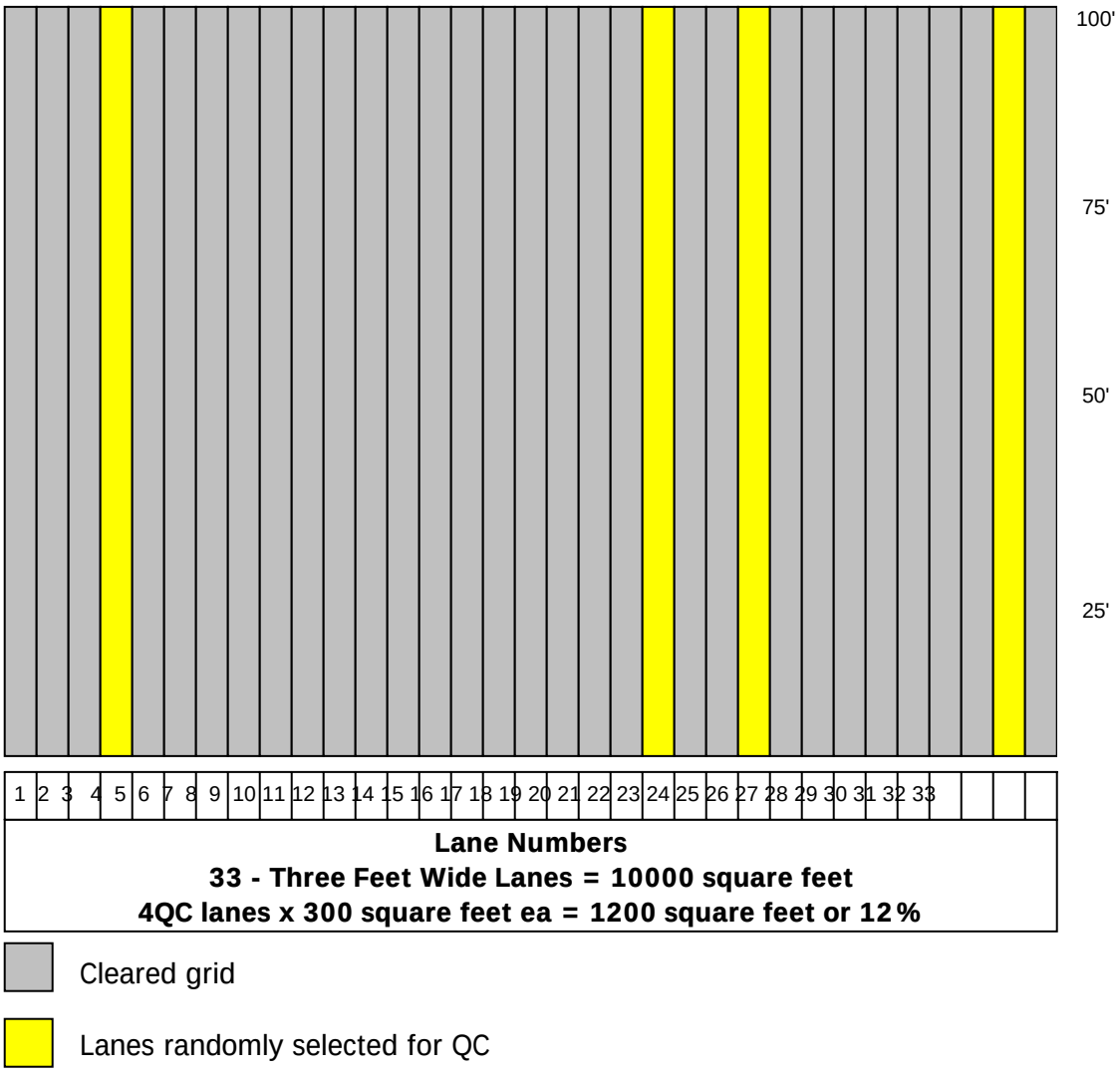
Figure 10-1
Example of 100' x 100' grid divided into 33 three feet lanes.



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 10-4 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 10-2) from the total number of lanes available. The QCS 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 SOP.

5.2.1.3 Inspection Of AEDA/Range Residue

Refer to PIKA SOP-11 Inspection and Disposal of OE-related Scrap for applicable procedures.

5.2.2 NON MIL-STD-1916 QC INSPECTION

For instances when MIL-STD 1916 based inspections are undesirable, conventional inspections will be carried out IAW this SOP, 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 QCS 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 QCS 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 ensuring 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 10-3 for an example search pattern). If the quality of clearance is in question, the QCS can increase the coverage area in order to assure compliance. For OE scrap inspections, the QCS will inspect a minimum of 10 percent of all items IAW SOP-11 Inspection and Disposal of OE-related Scrap.

Figure 10-2
Example of 100' x 100' grid divided into 20 five feet lanes.

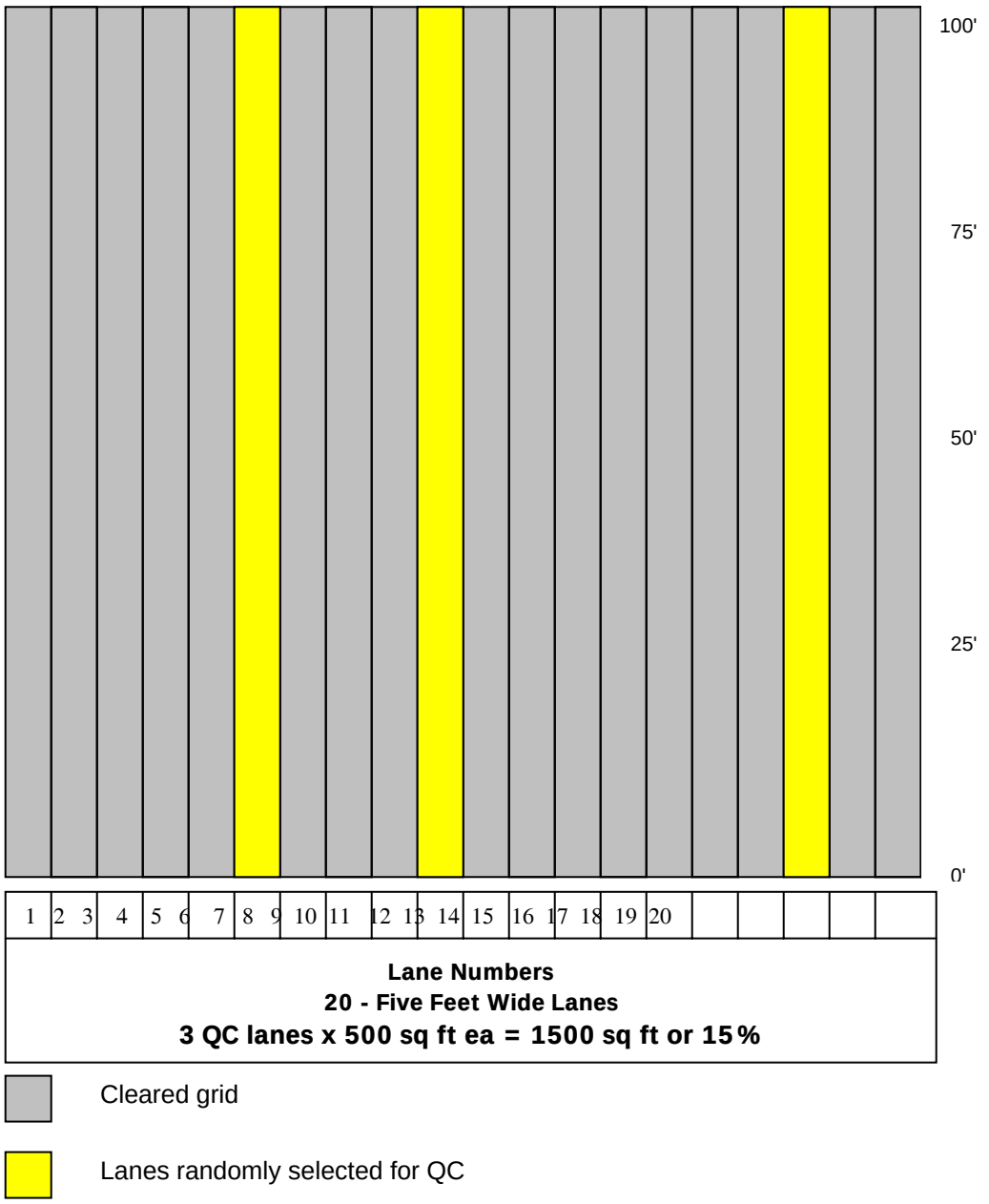
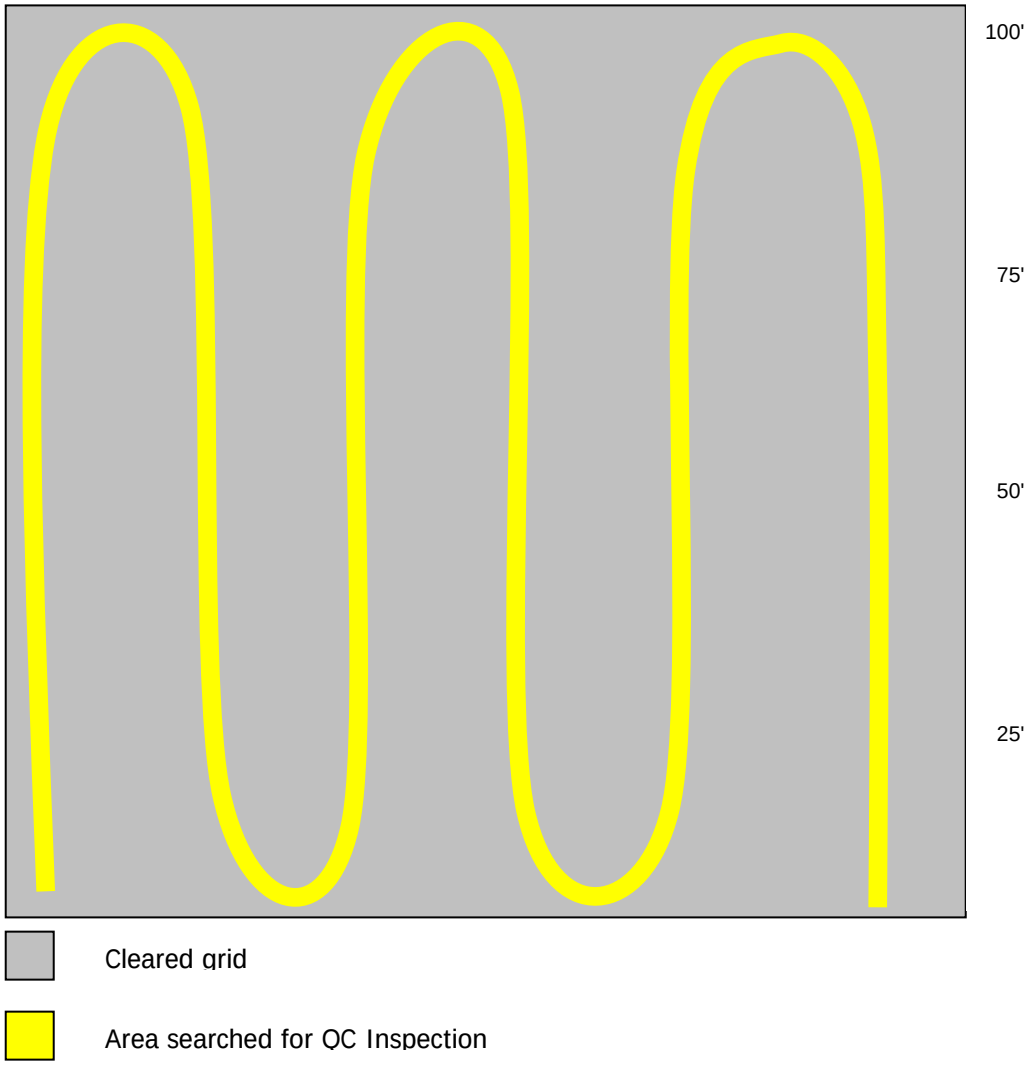


Figure 10-3
Example of 100' x 100' grid randomly sampled using zigzag pattern.



5.3 DATA QUALITY OF GEOPHYSICAL DATA

The UXOQCS will ensure data collected by site geophysical teams is posted correctly soon after the data is collected. The QCM will then work with the geophysicist to ensure the data is complete and appropriate. During data processing, the QCM and geophysicist will ensure that the procedures are complete, appropriate and IAW the data processing SOP. Once the data is processed and anomalies selected for investigation, the QCM will review the data and ensure 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 ensure all 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 all 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 so as to ensure its conformance to acceptance criteria. These nonconformances shall be documented IAW section 5.8 of this SOP. 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 so as to ensure 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 ensure immediate corrective actions take place to return any non-conforming product to a conforming status. Corrective actions may include reworking of product to ensure its conformance to acceptance standards. All non-conformance/corrective actions shall be documented IAW section 5.8 of this SOP.

5.6 ROOT CAUSE ANALYSIS

In the event a nonconforming product or noncompliant procedure is discovered and corrective actions are taken to ensure 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 SOP. 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 an 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. All site documentation will be kept at the project site and copies forwarded to the QCM for analysis.

6.0 AUDIT CRITERIA

The following items related to inspection, certification, and chain of custody of AEDA/RR items will be audited to ensure compliance with this SOP:

- PIKA Weekly Report
- PIKA Grid/Ordnance Tracking Log
- PIKA QC Surveillance Report
- PIKA QC Inspection Report
- PIKA Nonconformance/Corrective Action Report

7.0 ATTACHMENTS

- MIL-STD-1916

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to outline the accountability requirements and procedures associated with the turn in of Ammunition, Explosives, and Dangerous Articles (AEDA) and Range Residue (RR) cleared from UXO project sites.

2.0 SCOPE

This SOP applies to all site personnel, to include PIKA, contractor, and subcontractor personnel, who conduct operations involving the collecting, inspecting, certifying, demilitarizing, segregating, and transporting AEDA/RR recovered from UXO project sites. This SOP is not intended to contain all requirements needed to ensure 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 SOP for additional regulations governing these matters.

3.0 REGULATORY REFERENCES

The following regulations outline requirements associated with managing AEDA/RR collected from UXO project sites:

- Technical Manual 11A-1-60, "Inspection of Reusable Munitions Containers and Scrap Material Generated from Items Exposed to, or Containing Explosives," 21 November 1995;
- "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.
- Local regulations pertaining to turn-in and disposal of AEDA.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager is responsible for ensuring the availability of PIKA resources needed to implement this SOP, and will ensure that the requirements of this SOP are incorporated into plans, procedures, and training at sites where AEDA/RR is managed.

4.2 SENIOR UXO SUPERVISOR

The Senior Unexploded Ordnance (UXO) Supervisor (SUXOS) has overall responsibility for implementing this SOP at sites where range clearance operations include the removal of AEDA/RR. The SUXOS will maintain all information related to the daily implementation of this SOP in the Site Operational Log.

4.3 UXO SUPERVISOR

The UXO Supervisor (UXOT3) is responsible for implementing this SOP in the field at the team level. In the absence of the SUXOS, the UXOT3 will be responsible for implementing SUXOS responsibilities outlined in Section 4.2 of this SOP.

4.4 QUALITY CONTROL SPECIALIST

The UXO Quality Control Specialist (UXOQCS) is responsible for randomly sampling AEDA/RR that has been inspected and certified by PIKA personnel as described in Section 5.1 of this SOP. The UXOQCS ensures each item requiring demilitarization in accordance with DoDD 4160.21-M-1 is appropriately demilitarized as described in Section 5.4 of this SOP except in the case that final disposition will satisfy the demilitarization requirements. Additionally, the UXOQCS is also responsible for checking documents that track the AEDA/RR 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 SOP.

4.5 UXO SAFETY OFFICER

The UXO Safety Officer (UXOSO) is responsible for ensuring removal of AEDA/RR is done with due care and attention to the hazards involved in the operation. The hazards associated with AEDA/RR operations will be detailed within each project specific Site Safety and Health Plan (SSHP).

The UXOSO will ensure 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 AEDA/RR 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 ORS or non-ORS 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 AEDA/RR; and
- Any PPE worn when inspecting ORS will be secured to the wearer to ensure it does not fall from the worker and strike any suspect UXO items.

5.0 PROCEDURES

All personnel, including PIKA, contractor, and subcontractor personnel involved in processing AEDA/RR removed from project sites will familiarize themselves with the procedures outlined below.

5.1 INSPECTION OF AEDA/RR

All AEDA/RR to be disposed of will first be 100 percent visually inspected to ensure 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), or vented. All 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 AEDA/RR will involve the steps outlined below. This multi-step process will ensure that all AEDA/RR that is released for disposal is free of explosive hazards.

A. UXO Specialist (UXOT2) will:
   1. Inspect each item as it is recovered and determine the following:
      - Is the item a UXO 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 OE. A UXOT2 will be required to inspect any located OE and make a determination if it presents an explosive hazard or not.

B. UXO Supervisor (UXOT3) will:
   1. Inspect all items recovered by the team to ensure proper segregation of scrap from AEDA/RR and to confirm the condition of those items classified as free of dangerous fillers or residue.
   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. UXO scrap recovery team will:
   1. Respond to scrap consolidation areas as directed by the SUXOS.
   2. Inspect all items before placing them into transport vehicle.
   3. Determine separation requirements of material recovered. (i.e., scrap that resembles ordnance, sort by metal types, AEDA requiring processing, etc.).
   4. Deliver all 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 UXO teams and individuals for processing AEDA or Range Residue.
   2. Perform and document, a minimum of 10% (100% in some cases), random sampling of all AEDA/RR collected from the various teams to ensure no items of a dangerous or explosives nature are identified as scrap metal. The UXOQCS performs these random checks to satisfy the UXOQCS that the AEDA/RR is free from any explosive hazards, necessary for completion of the required documentation.
   3. Inspect the prepared documentation. At a minimum, the Requisition and Turn-in DOD document form, DD 1348-1A and PIKA's **AEDA/RR INSPECTION, CERTIFICATION, AND CHAIN OF CUSTODY FORM.**

E. UXOSO will:
   1. Ensure the specific procedures and responsibilities for processing AEDA/RR 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 random checks of processed AEDA/RR to ensure items being identified as scrap are safe and free from any explosive hazards.

F. Senior UXO Supervisor will:
   1. Be responsible for ensuring Work and Quality Control (QC) Plans specify the procedures and responsibilities for processing AEDA/RR for the final disposition as scrap metal.
   2. Ensure a Requisition and Turn-in Form, DD Form 1348-1A is completed for all AEDA/RR to be transferred.
   3. Perform random checks to ensure that the AEDA or range residue is free from explosive hazards, necessary to complete the DD 1348-1A.
   4. Certify all scrap metal generated from AEDA or Range Residue as free of explosive hazards or other dangerous material.
   5. Be responsible for ensuring 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 Engineers, 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 shall be clearly marked with the seal's identification, if different than the container.

c. An AEDA/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 AEDA/RR 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 all 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, steel hoppers may be used, provided the hopper has a lid/cover that can be secured and sealed after inspection. **Any evidence of tampering after sealing will require re-inspection and re-certification**. Containers/hoppers 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 AEDA/RR 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 AEDA/RR SCRAP CERTIFICATION AND VERIFICATION

PIKA will ensure that AEDA/RR generated from UXO 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 Senior UXO Supervisor will certify, and the client representative will verify, that the AEDA/RR is free of explosive hazards.

DD form 1348-1A will be used as documentation. All 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 AEDA/RR.

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; e.g., 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 OE 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 AEDA 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 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."

5.4 DEMILITARIZATION

When required by DOD 4160.21-M-1, or the Scope of Work where this directive is not applicable, AEDA/RR will be demilitarized before being released from PIKA custody. The purpose of demilitarization is to render the item unusable and/or unrecognizable as a military item. Explosives or mechanical means can be used to demilitarize an item.

5.5 CHAIN OF CUSTODY

The containers/hoppers and individual pieces of AEDA/RR 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. Figure 11-1 will be used to document this chain of custody. It identifies the quantity, composition, and the origin, routing, and destination of each container/hopper or item during its handling and transportation life cycle, and provides evidence that all containers/lots were properly segregated and secured at all times until final disposition. At random times during the scrap process, photographs of a representative sample of containers/lots will be taken by PIKA personnel, to verify that this SOP is being followed.

5.6 FINAL DISPOSITION

The certified and verified OE scrap will only be released to an organization that will:

a. Upon receiving the unopened labeled containers each with it's unique identified and unbroken seal ensuring a continued chained of custody, and after reviewing and concurring with all 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 AEDA/RR items will be audited to ensure compliance with this SOP:

1) Requisition and Turn-in Form, DD Form 1348-1A completed for all scrap metal to be transferred;
2) Copies of Figure 11-1 for each container/hopper or item;
3) Daily Operational and Safety Logs;
4) Documentation of Training Form for the initial site hazard training;
5) Documentation of Training Form for the Daily Tailgate Safety Briefings; and
6) Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

No attachments are associated with this SOP

Figure 11-1. AEDA/RANGE RESIDUE INSPECTION, CERTIFICATION, AND CHAIN OF CUSTODY FORM

Project Location:		Contract No:		DO No:	Page __of
Line	Description	Source (e.g., Grid or Range	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:

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to the acquisition, storage, and accountability of explosives and unexploded ordnance (UXO) or ordnance and explosives (OE) waste.

2.0 SCOPE

This SOP applies to all site personnel, including contractor and subcontractor personnel, involved in the conduct of operations on a site with UXO contamination. This SOP is not intended to contain all requirements needed to ensure compliance. Consult the documents listed in section 3.0 of this SOP for additional compliance issues.

3.0 REGULATORY REFERENCES

Procedures and information contained in this document were obtained from the references below:

- U.S. Army Corps of Engineers (USACE) Engineering and Support Center, Huntsville (CEHNC) Basic Safety Concepts and Considerations for Ordnance and Explosives Operations (most current date);
- PIKA Corporate Safety and Health Program (CSHP);
- OSHA, 29 Code of Federal Register (CFR) 1910, Industry Standards;
- OSHA, 29 CFR 1926, Construction Standards;
- ATF P 5400.7, ATF-Explosives Law and Regulations;
- USACE EM 385-1-1, Safety and Health Requirements Manual;
- DoD 6055.9-STD, DoD Ammunition and Explosives Safety Standards;
- DA PAM 385-64, Ammunition and Explosives Safety Standards;
- AR 385-64, Ammunition and Explosives Safety Standards;
- AR 90-11, Physical Security;
- AR 385-16, System Safety Engineering and Management;
- AR 385-40 w/USACE Supplement, Accident Reporting and Records;
- TM 9-1300-200, Ammunition General.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM), in conjunction with the Senior UXO Supervisor (SUXOS), will be responsible for the initial quantity and type of demolition material ordered. When possible, the initial requisition should be of sufficient quantity to support the project for a 90-day period.

4.2 SENIOR UXO SUPERVISOR

The SUXOS will be responsible for all subsequent requisitions for demolition materials. He will accomplish this by submitting a purchase order (PO) request through the PM, who approves it and forwards it to accounting for the preparation of a PO. Accounting then forwards the PO to the Program Administrator for action. The SUXOS will also be responsible for the proper storage of explosives and the accountability and tracking of usage.

4.3 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that this SOP is properly implemented and that all explosives are stored properly.

5.0 REQUISITION PROCEDURES

The requisition of explosives will be in accordance with PIKA International, Inc. (PIKA) purchasing policy to ensure 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.

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 Authorization List (See Figure 12-2) 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 shoot the 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 ensure 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 Figure 12-1). 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. In all cases, only the amount received will be entered on the Explosives Accountability Record/Magazine Data Card (See Figure 12-3).

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 ATF 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;
- Install a lightning protection and grounding, and have it checked by an electrician for specification conformance;
- Establish security, such as fencing and lighting as needed, to prevent unauthorized access and theft.

8.1 MAGAZINES

Generally, Type 2 outdoor magazines 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 of not less than 3-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 3 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 all 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. This will require that the magazine area be posted for the most hazardous items stored in the magazine area. For example, a Fire Division Class 1 is needed for recovered UXO, and a Fire Division Class 3 for the demolition material, excluding detonators, which are Fire Division Class 4. 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. 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 all 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. 12-1 lists the various storage compatibility groups and Table No. 12-2 is the compatibility chart. 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 if needed, will be approved prior to implementation.

8.1.8 Key Control

Magazines will remain locked except when receipts and issues are being made. The two locks on the magazines will require two different keys to unlock. The SUXOS will maintain one copy of the key, and the designated Ordnance Accountability Officer (OAO) will maintain the second key. This procedure ensures that access to the magazines cannot be made without obtaining the two keys and no one individual can gain access to the magazines.

9.0 EXPLOSIVES ACCOUNTABILITY

Upon receipt and verification of explosive demolition material, the magazine data card is filled out as shown in Figure 12-3 and kept in the magazine on top of the listed item. A duplicate copy is maintained by the OAO, who is either the SSHO or the UXO Quality Control Specialist.

9.1 USAGE INVENTORY

Following each occurrence of a receipt or issue of explosive material, the OAO will conduct a joint inventory in conjunction with the demo team leader, drawing out or returning the explosives. Only those items issued/returned will be inventoried. The OAO will appropriately annotate the two sets of magazine data cards.

9.2 WEEKLY INVENTORY

The last day of each work week, the SUXOS, the OAO and a third individual (who will be changed each week) will conduct an inventory and record results on the two sets of magazine data cards.

9.3 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, the 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 to ensure compliance with this SOP:

1. The PIKA Demolition Shot Record
2. The Site Daily Operational and Safety Logs;
3. The OE Operations Daily/Weekly Report;
4. The Daily Safety Inspection and Audit Log; and
5. The PIKA Explosives and Accountability Log.

11.0 ATTACHMENTS

1. Figure 12-1 PIKA Form Emergency Response Information Form
2. Figure 12-2 PIKA Form Explosives Authorization List
3. Figure 12-3 Explosives Accountability Record / Magazine Data Card

TABLE 12-1: STORAGE COMPATIBILITY GROUPS FOR EXPLOSIVES AND AMMUNITION	
GROUP A	
Cyclonite (RDX), dry	Mercury fulminate, wet
HMX, dry	PETN, dry
Lead azide, wet	RDX (cyclonite), dry
Lead styphnate, wet	Tetracene, wet
GROUP B	
Fuses (except chemically-actuated fuses containing ampules which may initiate, directly or indirectly, explosives and explosives-loaded components which are assembled in the conventional manner to form the finished explosive fuse).	Detonators
	Mines, practice, AP, M17
	Percussion elements
	Primer detonators
GROUP C	
Ammunition, blank and saluting, cannon	Cartridge, 90mm, canister, AP
Ammunition, .50 caliber, except API/incendiary	Cartridges, practice, over 40mm
Ammunition, 20mm, practice & high pressure test	Catapults, aircraft ejection seat, M3A1, M4A1, M5
Ammunition, 25mm, with inert projectile	Charge, propelling, not assembled to projectiles
Ammunition, 27mm, caseless	Detonating cord (primacord)
Ammunition, 30mm, ball and high pressure test	Nitrocellulose
Ammunition, 30mm, practice and training	Fuel (solid), emergency power unit
Ammunition, 37mm and 40mm, TP and AP	Propellant
Ammunition, 40mm, TP, M407A1, M382, & M385	Rockets, practice, 3.5-inch
Benite	Rocket motors, M3, M5, M6, M10, M13, M26, M30, M37, M42, M53, M66; Pershing 1st and 2nd stages; Spartan 1st, 2nd, and 3rd stages
Baron potassium nitrate	
GROUP D	
Adapter booster	Explosive D
Ammonium nitrate, except in original shipping container or equivalent	Explosives, cratering
Ammonium perchlorate, except when particle size is over 15 microns and in original shipping container or equivalent	Grenades, rifle, AT (except pentolite loaded)
Ammonium picrate (Explosive D)	HMX, wet
Bangalore torpedoes	Mine, APERS, MN, M14 (w/integral fuse)
Baratol	Mines, antipersonnel (bounding type
Black powder, bulk	Mines, antipersonnel (cast iron block)
Bombs, demolition	Mines, HEAT Nitrocellulose wet 8-30% water exposed to detonation hazards at less than intra line distance
Bombs, fragmentation	Nitroguanidine
Bombs, general purpose	Nitrostarch Octol
Boosters	PBX
Boosters, auxiliary	Pentolite
Bursters	PETN, wet
Charge, demolition, snake	Picratol
Charge, springing earth rod, blast driven	Picric acid
Charge, supplementary, HE	Projectiles, HE, fuzed or unfused
Compositions A, A-2, A-3, A-4, B, B-3, C, C-2, C-3, and C-4	RDX (Cyclonite), wet

TABLE 12-1: STORAGE COMPATIBILITY GROUPS FOR EXPLOSIVES AND AMMUNITION	
Cutter, cable M1	Rocket heads, HE and HEAT (except pentolite loaded) w/o motors
Cyclonite (RDX), wet	Shaped charges
Cyclotol	Tetranitrocarbazole (TNC)
Demolition Blocks	Tetryl
Destructor, HE, M10	Tetrytol
Detonating cord (primacord)	TNT
Dynamite	Tritonal
Ednatol	Torpex
GROUP E	
Ammunition, HEP	Ammunition, fixed and semifixed, 90mm through 106mm, loaded with ammonal, amatol, Explosive D, composition B or TNT
Ammunition, 20mm, HE, HEI and functional packs containing HE and HEI	Cartridge, heavy mortar, over 81mm (including 81mm M56), except chemical loaded
Ammunition, 30mm, HEDP	Cartridge, light mortar, 81mm or less (excluding 81mm M56), except chemical loaded
Ammunition, 37mm, HE	Redeye guided missiles, packaged 3 complete rounds w/launcher
Ammunition, 40mm, HE, RDX loaded	
Ammunition, 40mm, HE, M406, M386, M441, and M463	Rockets, HEAT, 3.5-inch, complete round
Ammunition, 57mm through 81mm, except WP smoke, HEP and blank	Rockets, HE, 2.75-inch (in LAU-3/A rocket launcher)
GROUP F	
Grenades, hand offensive	Grenades, fragmentation
GROUP G	
Ammunition, .50 caliber API and incendiary	Grenades, hand, CN1, ABC, M25A1, w/fuse C12
Ammunition, 20mm, API	Grenades, hand, CM1, ABC, M25A2, w/fuse C12
Ammunition, 20mm, incendiary and functional packs containing incendiary, except those containing HE or HEI	Grenades, illuminating and incendiary
Ammunition, 40mm, riot control and pyrotechnic loaded, except WP smoke	Grenades, practice, w/spotting charge
Bombs, photoflash	Grenades, rifle, smoke, XM48E1, M22 and M23
Cartridge, igniter, M2	Grenades, smoke (except WP and PWP)
Cartridge, illuminating	Grenades, riot control, CS1, M25A2
Cartridge, photoflash	Igniter, spotting charge
Cartridge cases, primer (w/o propellant)	Igniters for rocket motors (e.g., M12, M18, M20)
Charge, igniter assembly, for practice hand grenades	Ignition cartridge for trench mortar ammunition
Charge, spotting, APR practice, M8	Illuminating compositions (consolidated in final press operations)
Chemical ammunition, Group B, tear or smoke producing, w/explosive components, over 40mm	Mines, practice, w/spotting charge and/or fuse
Chemical ammunition, Group B, tear or smoke producing, w/o explosive components	Nuclear fire marker device 11-F2
Chemical ammunition, Group D, containing flammable solids, except for TEA or TPA, w/o explosive components	Photoflash powder

TABLE 12-1: STORAGE COMPATIBILITY GROUPS FOR EXPLOSIVES AND AMMUNITION	
Chemical ammunition, Group D, fixed or semi-fixed rounds, containing flammable solids	Primers, artillery and cannon, percussion and electric
Clusters, incendiary bomb, M31 and M32 (w/o fuzing components)	Projectiles, illuminating
Destroyer, file, M4	Rocket, riot control, CS, 2.75-inch FFAR, MX99
Detonation, simulator, explosive M80	Simulators, M110, M115 – M119 and XM142
Grenade, hand, smoke, HC, M8	Smoke pots
Grenades, hand, CN, M7A1, w/fuse M201A1	Spotting charges (cartridge for miniature practice bombs)
Grenades, hand, CS, M7A3, w/fuse M210A1	
GROUP H	
Chemical ammunition, Group C	Grenade rifle, WP, M19 Grenades, WP
GROUP J	
Chemical ammunition, Group D, containing flammable liquids or gels, with or w/o explosive components	Chemical ammunition, Group D, fixed and semifixed rounds, containing flammable liquids or gels with or without explosive components
GROUP K	
Chemical ammunition, Group A, with or without explosive components	Chemical ammunition, Group B, with or without explosive components, designed for toxic or incapacitating effects greater than lachrymation
Rockets, toxic chemical agents, complete rounds	
GROUP L	
Aluminum powder	Fuzes, chemically-actuated, containing ampoules which may initiate directly or indirectly, explosives and explosives loaded components which are assembled in the conventional manner to form the finished explosive fuse
Ammonium nitrate	Magnesium powder
Ammonium perchlorate	Grenades, rifle, AT (pentolite loaded)
Ammunition, pentolite loaded	Nitrates (inorganic), except ammonium nitrate (in original shipping container or equivalent)
Chemical Ammunition, Group A, without explosive components	Perchlorates
Chemical ammunition, Group B, without explosive components, designed for toxic or incapacitating effects more severe than lachrymation	Peroxides, solid
	Rocket heads, pentolite loaded, w/o motors
Chemical ammunition, Group D, TEA or TPA components	Zirconium (types I and II, spec. FED 1665)
Chlorates	DNT
GROUP S	
Ammunition, 40mm, canister and multiple projectile	Fuse lighters
Ammunition, small arms, less than .50 caliber	Fuse safety
Explosive bellows	Squibs commercial
Firing devices	

TABLE 12-2: 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.

SHIPPING PAPER AND 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 all cases of accident, incident, breakdown or fire, prompt notification must be given.
FOR EMERGENCY RESPONSE INFORMATION, SEE BACK OF THIS FORM

Remarks:

Certification:
This certifies 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 Shipper Representative:	Signature of Vehicle Operator(s):
24-Hour Emergency Assistance Telephone Numbers:	Work Hours Emergency Phone Numbers:

Figure 12-1 (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). Mark 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 all 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 all 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 (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 all 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.

Figure 12-1 (back)

PIKA EXPLOSIVES PURCHASE/RECEIPT/TRANSPORTATION AUTHORIZATION LIST

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 his knowledge and belief, and that he will communicate any additions or deletions to the foregoing list to PIKA International, Inc.

Corporate Officer:	Date

Figure 12-2:

EXPLOSIVES ACCOUNTABILITY RECORD/MAGAZINE DATA CARD

Product Code / FSN:		Nomenclature:			Site Name: Address:			
Date Code / Lot Number:		Hazard Class	UN or NA	Quantity / Case:				
Date	Bill of Lading / Voucher Number	Received From	Quantity Received	Quantity Issued	Issued To	Current Balance	Initials	
							Issuer	Receiver

Figure 12-3

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to the conduct of demolition/disposal operations on sites contaminated with unexploded ordnance (UXO) or ordnance and explosives (OE).

2.0 SCOPE

This SOP applies to all site personnel, including contractor and subcontractor personnel, involved in the conduct of UXO/OE demolition/disposal operations on a OE contaminated site. This SOP is not intended to contain all of the requirements needed to ensure 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 SOP 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 UXO demolition/disposal operations:

- PIKA International, Inc. (PIKA) Corporate Safety and Health Program
- OSHA General Industry Standards, 29 CFR 1910
- OSHA Construction Standards, 29 CFR 1926
- Basic Safety Concepts and Considerations for Ordnance and Explosives Operations
- USACE EM 385-1-1, Safety and Health Requirements Manual
- DoD 4160.21-M, Defense Reutilization and Marketing Manual
- DoD 6055.9-STD, DOD Ammunition and Explosives Safety Standards
- AR 385-64, U.S. Army Explosives Safety Program
- AR 385-10, Army Safety Program
- DA PAM 385-64, Ammunition and Explosives Safety Standards
- TM 9-1300-200, Ammunition General
- TM 9-1300-214, Military Explosives
- TM 60A-1-1-31, EOD Disposal Procedures
- AR 190-11, Physical Security of Arms, Ammunition and Explosives
- ATF 5400.7, Alcohol Tobacco and Firearms Explosives Laws and Regulations
- Applicable sections of DOT, 49 CFR Parts 100 to 199

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The PIKA Project Manager (PM) shall be responsible for ensuring the availability of the personnel and equipment resources needed to implement this SOP, and shall also

ensure that this SOP is incorporated in plans, procedures and training for sites where this SOP is to be implemented.

4.2 SENIOR UXO SUPERVISOR

The Senior UXO Supervisor (SUXOS) will be responsible for assuring that adequate safety measures and housekeeping are taken during all phases of site operation, to include demolition activities, and shall visit site demolition locations as deemed necessary to ensure 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 all 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 all demolition operations within the area. The DS shall be responsible for providing a pre-demolition briefing as outlined in paragraph 8.1 of this SOP. The DS will also ensure that Daily Operational Log, the Ordnance Accountability Log, the PIKA Demolition Shot Record, and the explosives inventory record are properly completed, and that these 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 ensuring that all demolition operations are being conducted in a safe and healthful manner. As such, an PIKA employee designated as the demolition SSHO will be present on-site during all OE demolition operations. However, in the event that a given project has multiple sites where varying types of UXO 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 ensure the compliance of the demolition team while the primary SSHO attends to the remaining project teams. In this situation, the temporary SSHO will maintain a supplementary Safety Log and report all safety related events to the primary site SSHO. 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 ensuring the completeness of demolition operations and for weekly inspecting the Ordnance Accountability Log, the Daily Operational Log, the PIKA Demolition Shot Record and the

inventory of OE 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 ensure there are no kick outs, hazardous UXO/OE components or other hazardous items. In addition, 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 UXO/OE discovered during the QC check will be properly disposed of fusing the demolition procedures in the WP. Extreme caution must be exercised when handling UXO/OE that has been exposed to the forces of detonation.

5.0 GENERAL OPERATIONAL AND SAFETY PROCEDURES

All personnel, including contractor and subcontractor personnel, involved in operations on UXO/OE 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 all demolition personnel, at all times. 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:

- Complying with all safety regulations applicable to demolition range activities, demolition materials, and OE materials.
- Demolition of any kind is prohibited without the express permission from the client.
- The quantity of OE to be destroyed will be determined by the range limit and frag distance calculations.
- For projects where OE items may be consolidated for demolition, the US Army Engineering and Support Center, Huntsville, document entitles “Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites,” (current edition) 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 all 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 all 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 SOP will be reported immediately to the DS or SSHO, and operations will be halted until the condition is addressed and resolved.
- Demolition operations shall be conducted IAW this procedure and any approved changes.
- Adequate fire protection and first aid equipment shall be provided at all times.
- All personnel engaged in the destruction of OE 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 smallest 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.
- All hand tools shall be inspected prior to use, and maintained in a good state of repair.
- Each heavy equipment and/or vehicle operator will have in his possession a valid operator's permit, i.e., state driver's license.
- 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 UXO/OE.
- Lifting and carrying require care. Improper methods cause unnecessary strains. Observe the following preliminaries before attempting to lift or carry:
  a. When lifting, keep your arms and back as straight as possible, bend your knees and lift with your leg muscles, and
  b. 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 OE or demolition materials must meet the following requirements:
  a. Exhaust systems shall be kept in good mechanical repair at all times.
  b. Lighting systems shall be an integral part of the vehicle.
  c. 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.

   d. Wheels of carriers must be chocked and brakes set during loading and unloading.
   e. No demolition material or OE shall be loaded into or unloaded from, motor vehicles while their motors are running.
- Motor vehicles and MHE used to transport demolition material and OE shall be inspected prior to use to determine that:
   a. Fire extinguishers are filled and in good working order.
   b. Electrical wiring is in good condition and properly attached.
   c. Fuel tank and piping are secure and not leaking.
   d. Brakes, steering and safety equipment are in good condition.
   e. 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.
- Unless otherwise directed, all demolition shots will be tamped with a minimum of two feet of clean earth/dirt.
- An observer will be stationed at a location where there is a good view of the air and surface approaches to the demolition range before material is detonated. It 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 13-2 and 13-3 (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 UXO/OE 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 OE, and no person shall be allowed to ride in the trailer/bed.
- Vehicles shall not be refueled when carrying demolition material or OE, 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.
- All explosive vehicles will be cleaned of visible explosive and other contamination before releasing the vehicles for other tasks.
- Prior to conducting any other task, personnel shall wash their face and hands after handling demolition material or OE.
- 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 REQUIREMENTSERROR! BOOKMARK NOT DEFINED.

The general demolition range requirements listed below shall be followed at all times:

- Attachment 1 of this SOP, Explosive Hazards Tables, will be complied with in all demolition operations.
- 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.
- OE or bulk explosives to be destroyed by detonation should 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 ensure detonation of all pits. After each series of detonations, a search shall be made of the surrounding area for unexploded UXO and OE. 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 before each shot or round of shots.
- All 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 all applicable environmental regulations. All collected scrap metal will be 100% inspected for absence of explosive materials by demolition range personnel and certified by the SUXOS and the QCS.
- 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, all disturbed demolition areas will be thoroughly inspected for OE. 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 is to be filled out by the DS with all applicable information. This record will be kept with the Ordnance Accountability Log 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 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 all detonators have been tested. This process shall be accomplished at least 50 feet and down wind from any OE or demolition materials and out of the demolition range, personnel and vehicle traffic flow pattern. In addition, all personnel on the demolition range shall be alerted prior to the test being conducted.

NOTE: When testing the detonator, prior to connecting the detonator to the firing circuit, the leg wires of the detonator must be shunted by twisting the bare ends of the wires together immediately after testing. The wires 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) at all times, except when actually testing

the circuit or firing the charge. The connection between the detonator and the circuit firing wires must not be made unless the power 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.
- OE to be detonated/vented shall be placed in the demolition pit and the demolition material placed/attached in such a manner as to ensure the total detonation/venting of the OE. Once the OE 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 ensure that they are grounded. The detonators will then be carried to the demolition pit with the end of the detonators pointed away from the individual. The detonators are then connected to the detonation cord, Non-El, etc., ensuring that the detonator is not covered with tamping material to allow for ease of recovery/investigation in the event of a 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 ensure 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 all 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 at all times. When using the panel, the switch must be locked in the open position until ready to fire, and the single key must be in the blaster's possession.
- Prior to initiating a demolition shot(s), a warning will be given, the type and duration of such 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.
- 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. To ensure 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 UXO/OE. The cord is then strung out of the hole and secured in place with soil, being sure to leave a one-foot tail 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.
- In all cases, ensure 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 ensure 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 ensure 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 UXO/OE, 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 minimum burn time of 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, place the det cord through the slot on the perforator and knot the det cord, ensuring 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.

- 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 away from other demolition materials, the UXO/OE, 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 13-1 will be followed at all 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 13-1: 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 ensure 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 all phases of the task, which is presented to all affected personnel. The DS will brief all personnel involved in range operations in the following areas:

- Type of OE 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 OE.
- 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 all 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 OE 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 all access roads to the range area.
- Visually check range for any unauthorized personnel.
- Check firing wire for continuity and shunt.
- Prepare designated pits as required.
- Check continuity of detonators.
- Check time/safety 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 UXO/OE 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:

- Insure firing wire is shunted.
- Connect detonator to the firing wire.
- Isolate or insulate all connections.
- Prime the demolition charge.
- Place the demolition charge on OE.

- 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 all equipment.
- Notify police, fire, etc. that the operation is complete.

10.0 MISFIRE PROCEDURES

A thorough check of all equipment, firing wire and detonators will prevent most misfires. However, if a misfire does occur, the procedures outlined below shall be followed.

10.1 ELECTRIC MISFIRES

To prevent electric misfires, one technician will be responsible for all electrical wiring in the circuit. If a misfire does occur, it must be cleared with extreme caution, and the responsible technician will investigate and correct the situation, using the steps outlined below:

- Check firing line and blasting machine connections and make a second initiation attempt.
- If unsuccessful, disconnect and connect to another blasting machine (if available) and attempt to initiate 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 all operations. Occasionally, despite all 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 ensure 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 ensure 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 ensure it is det cord and not time fuze. Also, check to ensure 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 ensure that the demolition charge and the OE 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 ensure 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, ensure that the next connection is secure (use duct tape if necessary).
- If it is evident that the perforator was moved, ensure 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 OE, the following record keeping requirements shall be met:

- The client or PIKA (as directed) will obtain and maintain all required permits.
- The DS will ensure 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 Ordnance Accountability Log and the Demolition Shot Record, to reflect the OE destroyed, and shall complete the appropriate information on the Explosives Accountability Log (a.k.a. the Magazine Data Card) that indicates the demolition materials used to destroy the OE.
- The quantities of OE recovered must also be the quantities of OE destroyed or disposed.
- PIKA will retain a permanent file of all demolition records, including permits, magazine data cards, training and inspection records, waste manifests if applicable, and operating logs.
- Copies of 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 UXO/OE 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 UXO/OE contaminated site will be audited to ensure compliance with this SOP:

1. The PIKA Demolition Shot Record
2. The Site Daily Operational and Safety Logs
3. The OE Operations Daily/Weekly Report
4. The Safety Training Attendance Forms, for the initial and daily site hazard training
5. Daily Safety Inspection and Audit Log
6. Explosives Accountability Log

14.0 ATTACHMENTS

No attachments are associated with this SOP.

TABLE 13-2: 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 all 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 13-3: 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)
3. EED's Leads = Tuned to match the transmitter's frequency
4. 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

This Standard Operating Procedure (SOP) 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 SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving the potential for exposure to biological hazards. This SOP is not intended to contain information on all biological hazards that may be encountered on all sites. Rather it is intended to give general guidance on the most common biological hazards. All 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

There are no regulatory references that govern the conduct of operations on sites with biological hazards.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

Project Manager (PM) is responsible for the overall implementation of the PIKA Corporate Safety and Health Program (CSHP) on those project sites the PM manages. As such, the PM is responsible for ensuring the availability of the PIKA resources needed to implement this SOP.

4.2 CORPORATE SAFETY AND HEALTH MANAGER

The Corporate Safety and Health Manager (CSHM) is responsible for the continued development and improvement of the PIKA Corporate CSHP and this SOP. To accomplish this end, the CSHM will:

1. Conduct an annual review of this SOP and make modifications as necessary;
2. Review technical information to maintain current knowledge regarding biological hazards and their control;
3. Research and review site characterization data to identify potential biological hazards and including relevant data in the site plans;
4. Review planned site activities to identify those tasks with the greatest risk of biological hazard contact; and
5. Design/identify methods or procedures for controlling biological hazards.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) is the senior PIKA employee on the site in charge of project performance. The SS is responsible for ensuring that the safety and health procedures associated with the SOP are implemented to control biological hazards. As such the SS will provide the necessary personnel and equipment resources to ensure effective implementation of this SOP.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for implementing this SOP and any site-specific biological hazard procedures outlined in either this SOP or the SSHP. The SSHO will also provide site personnel with the training required by the SOP and will brief personnel daily as to the biological hazards that may be encountered.

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 U.S., there are five different types of poison ivy, poison oak, and poison sumac (see Figure 14-1). All contain 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 14-2 through 14-9.

1. Climbing Poison Ivy (Toxicodendron radicans) is the most widespread of the species. It is found in South Canada and through out 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 axiallary 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 all the way 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 14-10 through 14-16. Additional site-specific snake descriptions and photos will be included in each site-specific SOP.

5.3.2 **Eastern Diamondback**

The Eastern diamondback (Figure 14-10) 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 with out 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 14-11) 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 all 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 Rattlesnake**

The timber rattlesnake or canebrake rattlesnake (Figure 14-12) is a large snake 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. All 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 14-13) 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 snakebites 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 14-14) 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 14-15) 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 all 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 all of these habitats must have in common is that they are all in close proximity to water, and it is 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 14-16) rattlesnake has a geographic a 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 14-17) 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 occurs 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 assure 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 all 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. All 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 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 14-18), 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 appear 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, all 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 at all times.

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 14-19) 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 14-20 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 14-22), 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 14-23). 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, which normally does not appear for several hours after exposure. This reddening is associated with "sun burn" 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 14-24 of this SOP. 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 hantavirus pulmonary syndrome (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 all 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 all 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 my 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 CSHM 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 all 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 ensure compliance with this SOP:

1. The Daily Operational and Safety Logs;
2. The Safety Training Attendance Log for the initial site hazard training;
3. The Daily Tailgate Safety Briefings log; and
5. The Safety Inspection Checklist.

7.0 ATTACHMENTS

No attachments are associated with this SOP.

8.0 DOCUMENTATION

8.1.1 With the exception of documentation placed in the site logbooks, this SOP requires no additional documentation.

Figure 101-1: Poison Ivy, Oak and Sumac Leaves and Ranges

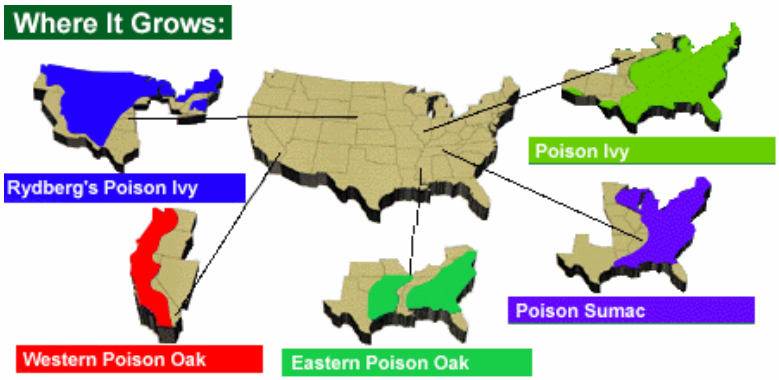


Figure 14-2

Figure 14-3

Figure 14-4

Figure 14-4

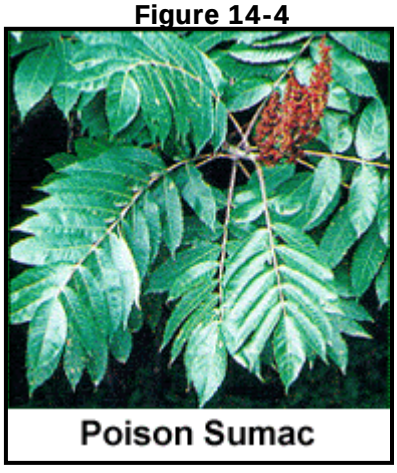


Figure 14-5

Figure 14-6 Poison Ivy Rootlets

Figure 14-7:
Poison Ivy Fall Colors

Figure 14-8:
Poison Oak Fall Colors

Figure 14-9:
Poison Ivy Berries

Figure 14-10: Eastern Diamondback

Diamondback

Figure 14-11: Western

Figure 14-12: Canebrake (l) & Timber (r) Rattlesnakes

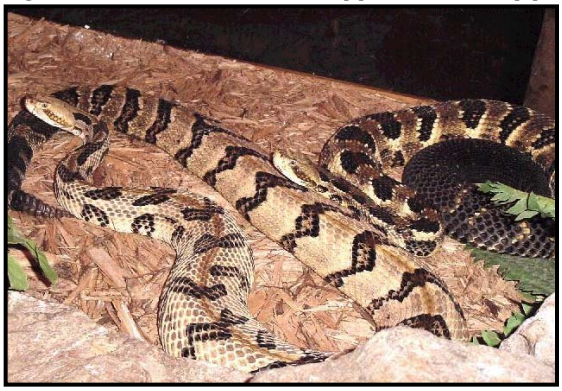


Figure 14-13: Copperhead

Figure 14-14: Cotton Mouth

Figure 14-15: Pigmy Rattlesnake

Figure 14-16: Eastern Massasauga

Figure 14-17: Coral Snake

Figure 14-18: Ticks

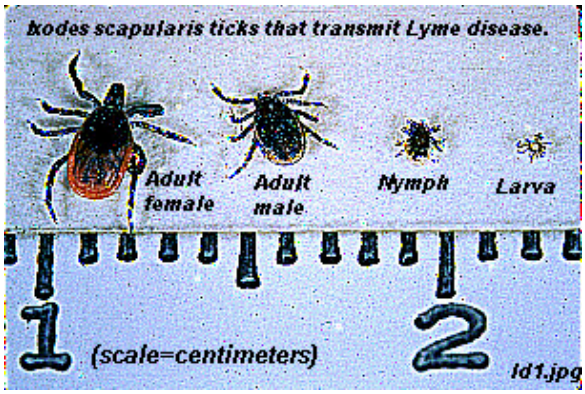


Figure 14-19: Black Widow Spider

Figure 14-20: Brown Recluse

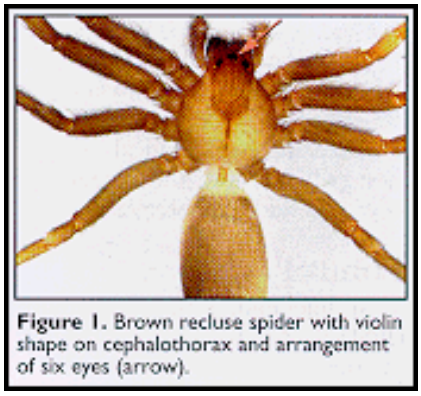


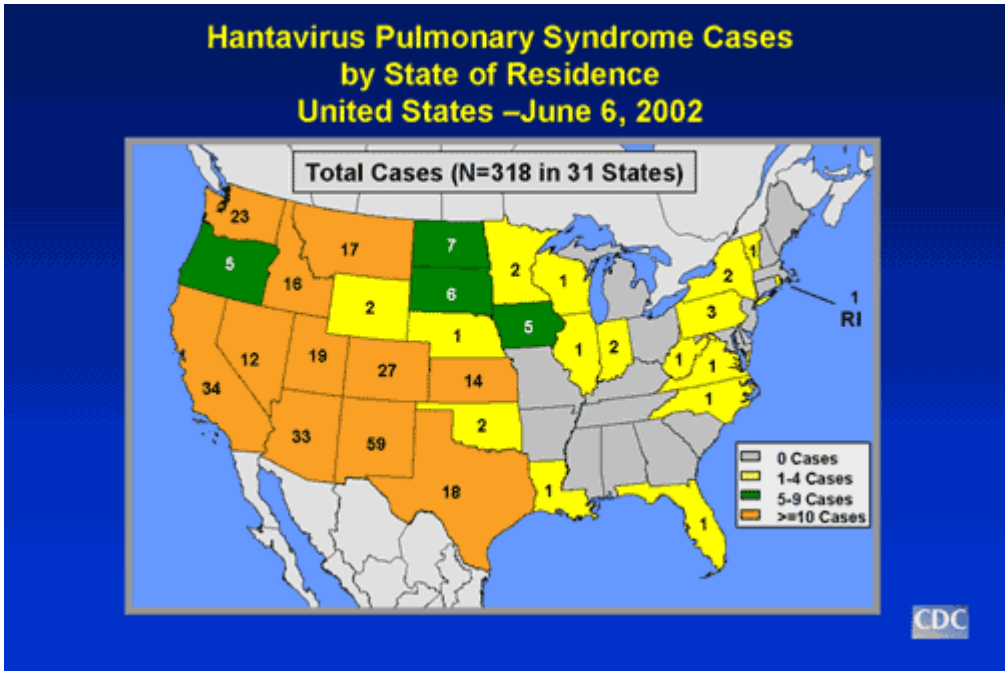
Figure 1. Brown recluse spider with violin shape on cephalothorax and arrangement of six eyes (arrow).

Figure 14-21: Brown Recluse

Figure 14-22: Bark Scorpion

Figure 14-23: Southern Devil Scorpion

8.1.2 Figure 6-24: Incident of Hantavirus Cases by State



1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the evaluation and entry into confined spaces. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all site personnel, to include subcontractor personnel, and operations involved with confined space entry. This SOP is not intended to contain all requirements needed to ensure regulatory compliance. Consult the documents listed in section 3.0 of this SOP for additional 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated in plans, procedures and training for sites where this SOP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for all confined space entry operations. The SS will also ensure that relevant sections of this SOP are discussed in the tailgate safety briefings and that information related to its daily implementation is documented in the Site Operational Log.

4.3 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are

discussed during the initial site hazard training and the daily tailgate safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in confined space 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 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 **all** of the following:

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 CSHM 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-Risk Confined Spaces

When a confined space has been classified as a low-risk confined space, the SSHO will complete the Low-Risk Confined Space Certification Form and post the form at the space prior to entry. A permit-required confined space may be reclassified as a low-risk 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 SOP; and
4. Entry into low-risk confined spaces is conducted in accordance with the procedures outlined in Section 6.0 of this program.

5.2 PROCEDURES FOR ENTRY INTO LOW-RISK CONFINED SPACES

Prior to entry into a Low-Risk 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 SOP.
4. The air monitoring results will be posted on the Low-Risk Confined Space Certification Form.
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 SOP 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 risk 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 CSHM, will complete a Confined Space Entry Permit prior to employee entry into the space. The SSHO will use the guidelines listed below for completion of each section of the 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 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 all 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. Lock out/tag out - 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)

A. Self contained breathing apparatus - When confined space atmospheric conditions are unknown or are potentially IDLH (Immediately Dangerous to Life and Health), 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 their 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 SOP, and any special procedures required by the CSHM 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 SOP 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 lock out/tag out 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 Sheets (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 (PPE)

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 CSHM 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-risk 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 confined space entry permit. Test equipment and results for each contaminant shall be listed on the 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 Lower Explosive Limit (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 SOP. The basis for determining that the hazards are eliminated will be documented using the Permit-Required Confined Space Reclassification Form (See Figure 15-3) 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 SOP, 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 EODT 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 EODT 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 CSHM 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. General training topics to be covered with all confined space 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 self-contained breathing apparatus (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
   B. Radio familiarization and operation;
   C. Lifelines and safety belts/harnesses; and
   D. 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 ensure compliance with this SOP:

1. The Daily Operational and Safety Logs;
2. Canceled Entry Permits;
3. Confined Space Entry / Exit Logs;
4. Confined Space Entry Training Certificated for entrants, attendants and supervisors;
5. The Documentation of Training form for the initial site hazard training;
6. The Documentation of Training form for the Daily Tailgate Safety Briefing; and
7. The Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

The following are attached to this SOP for use during its implementation:

1. Figure 15-1, Low-Risk Confined Space Certification Form;
2. Figure 15-2, Confined Space Entry Permit;
3. Figure 15-3, Permit-Required Confined Space Reclassification Certificate; and
4. Figure 15-4, Confined Space Entry / Exit Log.

LOW-RISK CONFINED SPACE CERTIFICATION FORM

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							

CONFINED SPACE ENTRY PERMIT

Location/Description of Space:	Purpose of Entry:		
Potential Hazards:	Permit Duration:	Date: Time:	To: 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: □ All persons trained □ All persons 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							

PERMIT-REQUIRED CONFINED SPACE RECLASSIFICATION CERTIFICATE

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 all 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, all 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.

CONFINED SPACE ENTRY / EXIT LOG

Date:	Entrants Name:	Time In:	Attendants Initials:	Time Out:	Attendants Initials:

Figure 15-4

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the personnel exposure to high noise levels. This SOP will be used in conjunction with the PIKA Hearing Conservation Program contained in the PIKA Corporate Safety and Health Program (CSHP) Manual. The Hearing Conservation Program in the CSHP contains guidelines for the performance of audiometric hearing tests and the evaluation of standard threshold shifts.

2.0 SCOPE

This SOP applies to all site personnel, including contractor and subcontractor personnel, and operations involving noise exposure. This SOP is not intended to contain all requirements needed to ensure regulatory compliance. Consult the documents listed in section 3.0 of this SOP for additional 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 the SOP.

- OSHA Construction Industry Standard 29 CFR Part 1926.59;
- OSHA General Industry Standard 29 CFR Part 1910.95; and
- ACGIH 2002 TLVs® and BEIs®

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to high noise sources. The SS will also ensure that relevant sections of this SOP are discussed in the tailgate safety briefings and that information related to its daily implementation is documented in the Site Operational Log.

4.3 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily tailgate safety briefings.

The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in 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 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 work place 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 Hearing Conservation Program (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.

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 all 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 all personnel whose noise exposure exceeds the OSHA PELs listed in Table 16-1 of this SOP. 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 16-1: 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 ensure compliance with this SOP:

- The Site Daily Operational, Safety and Monitoring Logs;
- The Safety Training Attendance Log for the initial site hazard training;
- The Safety Briefing Attendance Log; and
- The Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to operations conducted in hot environments. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving personnel exposure to heat stress. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 the SOP. However the references listed below contain relevant data regarding cold stress prevention.

1. 2002 TLVs and BEIs, Threshold Limit Values, ACGIH 2002.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure 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 to ensure compliance with this SOP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to hot environments and heat stress. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 PROCEDURE

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 UXO and waste sites, hot environmental conditions can create serious safety and health threats to site workers. This SOP addresses the potential hazards associated with heat stress and outlines the procedures for monitoring and controlling those hazards. For the remainder of this SOP, reference to "liquids" shall indicate water or an electrolyte replacement solution - not tea, coffee or carbonated drinks.

5.2 HEAT STRESS AND STAIN

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, elevate the feet, 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 collapse (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 17-1 will be used for this evaluation. The guidance provided in Figure 17-1 represents conditions under which it is believed that nearly all adequately hydrated, unmedicated, 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 SOP to ensure adequate protection of site personnel working in high heat environments.

5.4.1 Heat Stress Evaluation

The effective use of Figure 17-1 requires an initial decision about whether heat stress in expected. For this SOP, 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 SOP 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 17-1 below presents modifications to be made to the Wet-bulb, Dry Globe (WBGT) monitoring results if clothing other than the traditional work uniform are worn. The values in Table 17-1 will be added to the WBGT monitoring conducted in Step 2.

FIGURE 17-1: HEAT STRESS EVALUATION FLOWCHART

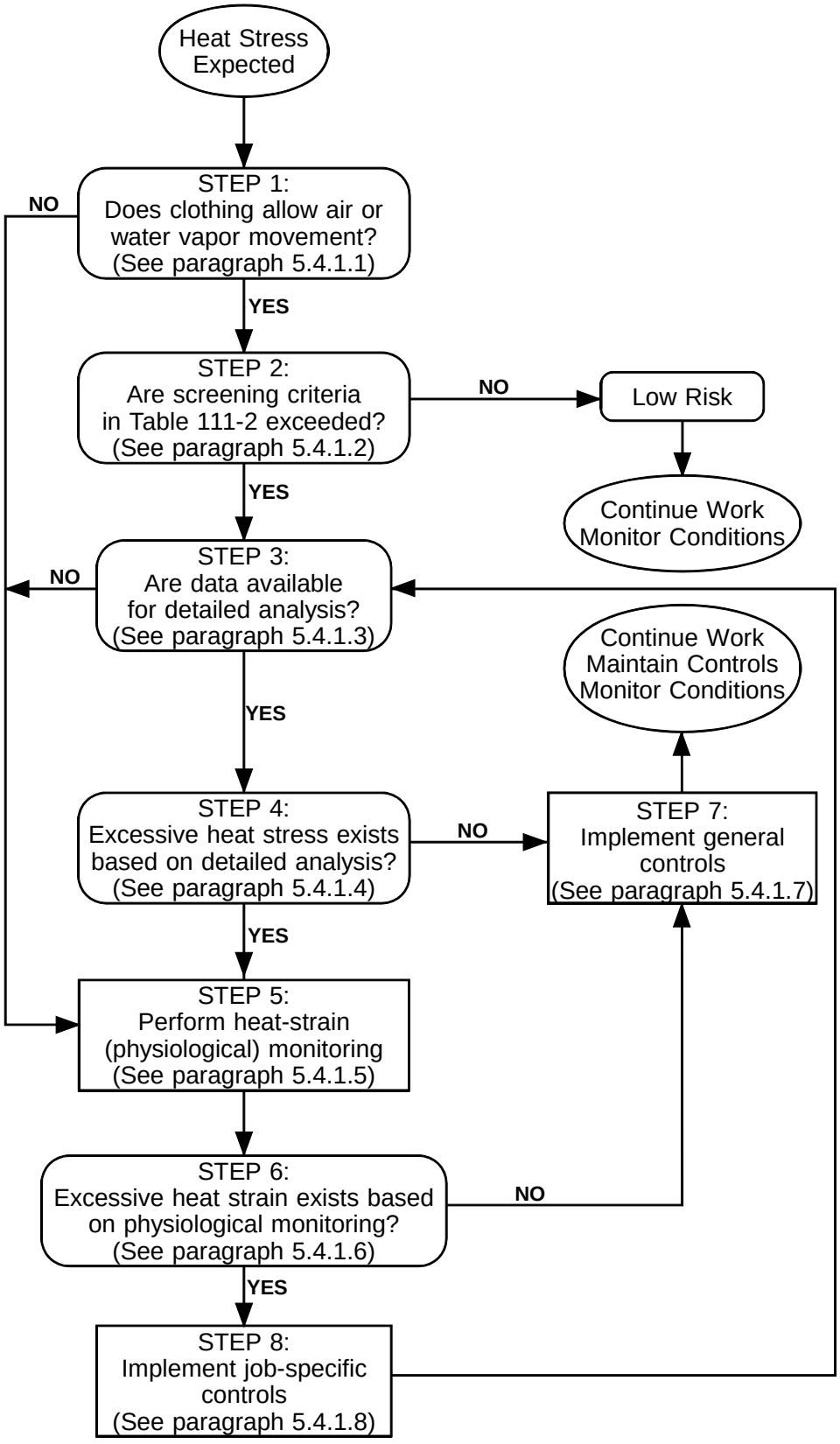


TABLE 17-1: ADDITIONS TO MEASURED WBGT VALUES FOR CLOTHING

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

5.4.1.2 STEP 2 - Are screening criteria in Table 17-2 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 17-2 provides WBGT criteria that can be used as a screening tool to assess the potential for adverse health affects. For clothing presented in Table 17-1, the WBGT screening limits in Table 17-2 can be used when the clothing adjustment factors are added to the environmental WBGT measurement. The acclimatization factor presented Table 17-2 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 17-2 will be used for screening. Further information related to acclimatization is presented in paragraph 5.4.1.7 of this SOP.

TABLE 17-2: PERMISSIBLE WBGT HEAT EXPOSURE THRESHOLD LIMIT VALUES

Work Demands*	Acclimatized				Unacclimatized			
	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 SOP.
6. Source: ACGIH. 2000 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 17-2 are exceeded. As work demand increases, the criteria values in Table 17-2 are decreased to ensure that most workers will not 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 17-3 provides broad guidance for selecting the work demand category to be used in Table 17-2. 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 17-2 are exceeded, it is critical to use the appropriate work/rest allocation and metabolic rate category as provided in the table.

TABLE 17-3: 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 17-2 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 SOP will be conducted alternately in the high and lower exposure areas.

If the on-site WBGT monitoring indicates that the screening criteria of Table 17-2 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 17-2 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 SOP. In the event that the nature of site operations and conditions allow for the application of a rational model, the CSHM will conduct the analysis and make recommendations for control to the SSHO. This determination will be made by the CSHM 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 17-1, 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 CSHM 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 all 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 17-1, 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 individuals 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 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 4.5. 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 ensure 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 CSHM will be notified and job-specific controls as discussed in Step 8 will be determined by the CSHM in consultation with the SUXOS 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 17-1 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 UXOT3 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 anyone exhibits factors that will make them more susceptible heat strain. Workers exhibiting factors that make them susceptible to heat stress will be closely monitored by the responsible UXOT3 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 SOP, 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 CSHM 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 days 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 UXOT3 and counseled by the SSHO to closely monitor themselves for heat strain signs and symptoms.
9. Personnel will be encouraged to maintain a health 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 under go 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 handy/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 CSHM so that an assessment and assignment of job-specific controls can be made by the CSHM.

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 CSHM after being advised of the site conditions by the SSHO. The CSHM's selection of job-specific controls will be made in conjunction with the SSHO and the SUXOS, 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 CSHM. 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 17-4. However, this frequency may need to be increased dependant upon the 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 4.5.1 and 4.5.2 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 17-4).
2. Heart rate monitoring to determine if the individuals sustained heart rate (over several minutes) exceeds 180 bpm minus the individuals 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 UXOT3 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 4.5.4 to ensure they are maintaining 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 17-4. SUGGESTED FREQUENCY OF PHYSIOLOGICAL MONITORING

ADJUSTED TEMPERATURE [b]	NORMAL WORK ENSEMBLE	IMPERMEABLE ENSEMBLE
90°F (32.2°C) 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 (ATadj) by using this equation: ATadj = : ATmeas + (13 x % sunshine) where : ATmeas is the measured air temperature. Atmeas 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 17-4, 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 and 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 UXOT3, but will at a minimum meet the requirements of Table 17-4. 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 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 UXOT3.

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 17-4. 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 17-4, 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 ensure that 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 4.5.1 and 4.5.2 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 ensure that effectiveness of the physiological controls be evaluated. Therefore, the SSHO will notify the CSHM 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 ensuring all heat stress related information is properly documented. This will include training sessions and, WBGT and physiological monitoring data. Training sessions shall be documented using the PIKA Documentation of Training Form. Pulse rate monitoring data will be recorded on the Heat Stress Monitoring Log (see Section 7.0, figure 17-2), with the environmental conditions, WBGT, OT and/or water loss calculations being recorded in the Site Safety Log, and/or Site Monitoring Log.

6.0 AUDIT CRITERIA

The following items related to operations conducted in hot or cold environments will be audited to ensure compliance with this SOP:

1. The Daily Operational Log.
2. The Site Safety and Monitoring Logs.
3. The Safety Meeting Attendance Log for the initial site hazard training.
4. The Safety Meeting Attendance Log for the Daily Tailgate Safety Briefings.
5. The Heat Stress Monitoring Log.
6. The Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

The Heat Stress Monitoring Log (Figure 17-2) is attached to this SOP and will be used for documenting the results of pulse rates to assess the physiological affects of heat on exposed personnel.

FIGURE 17-2: HEAT STRESS MONITORING LOG

Site Name: _____ Location: _____

Date	Name	Start Time	Pulse Rate	Time	Pulse Rate	Time	Pulse Rate	Time	Pulse Rate	Time	Pulse Rate

Remarks and Observations:

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations in cold temperatures. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving working in cold environments. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 the SOP. However the references listed below contain relevant data regarding cold stress prevention.

- 2002 TLVs and BEIs, Threshold Limit Values, ACGIH 2002.
- USACE EM 385-1-1, Section 06.J.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure 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 to ensure compliance with this SOP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to cold temperatures. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 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 UXO and waste sites, cold and/or windy environmental conditions can create serious safety and health threats to site workers. This SOP 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 all 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;
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 18-1, and recorded, in all cases when air speed measurements are required;
5. The UXOSO shall utilize the applicable TLV limits listed in Table 18-2 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 UXOSO will use the tailgate safety briefing to inform site personnel of the temperature and wind conditions anticipated for the day's

site activities. The UXOSO 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 inner most 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 of all exposed skin and use of 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 18-1: 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 18-2: ACGIH COLD STRESS TLVS

TLV Temp.	Working Conditions or Task to be Performed	Required Control Measures
< 60.8ıF	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.
< 39.2ıF	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 ensure clothing does not become soaked with liquid.
	Tasks with light work load	Gloves are to be used by workers.
. 35.6ıF	Workers who become emersed in water or whose clothing becomes wet	Treatment for hypothermia and immediate change of dry clothing provided.
< 30.2ıF	Any task	Air temperature and wind speed (if over 5 mph) recorded at least every 4 hours; cover metal handles with insulating material.
< 19.4ıF Air	Tasks with moderate work	Gloves to be used by workers.
< 19.4ıF 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.
< 10.4ıF 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.
< -11.2ıF or < 0ıF with 5 mph wind	Personnel who routinely work at this temperature	Personnel are to be medically certified as suitable for this level of exposure.
. -25.6ıF 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 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:

Soapy water wash and clean water rinse of outer chemical resistant gloves, boots, and if needed suits;

1. Removal of outer and inner chemical resistant gloves; and
2. Washing of exposed hands, face and neck, using handy/baby wipes.

5.2.3.4 Additional Work/Rest Cycles

To date, there are no Federally 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 all cold weather conditions that may be encountered. The ACGIH has published a work/rest schedule, which is provided in Table 18-3 of this SOP. 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, frostnip, the feeling of excessive fatigue, drowsiness, irritability or euphoria.

TABLE 18-3. 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 UXOSO shall be responsible for recording all cold stress related information. This will include training sessions, environmental conditions, and environmental monitoring data. Training sessions shall be documented using the PIKA Training Roster. Environmental conditions and monitoring data will be recorded in the Safety Log, and/or Site Monitoring Log.

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 radiological hazards, and toxic gases, vapors and dusts will be conducted as specified in the SSHP or APP for drum and container operations;
3. Personnel entering tanks or vaults will wear the retrieval and safety equipment specified in the Confined Space Entry SOP; and
4. All provisions and requirements specified in other SOPs that apply to drum and container-handling 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 SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;
3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist.

8.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations in extreme weather conditions. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving exposure to hazards associated with extreme weather conditions. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP for additional for compliance issues.

3.0 REFERENCES

No regulatory references directly apply to this SOP.

4.0 DEFINITIONS

As used in this procedure, the following terms and definitions apply:

- **Tornado Watch** – favorable conditions have been observed in the watch area for the development of a tornado.
- **Tornado Warning** –a tornado has been observed either visually or by radar in the warning area.
- **Severe Thunderstorm Watch** - indicates that severe thunderstorms are possible in and close to the watch area.
- **Severe Thunderstorm Warning** - indicates that a severe thunderstorm has been spotted and will soon move through the area.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

5.2 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure 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 to ensure compliance with this SOP.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to extreme weather hazards. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

5.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

6.0 PROCEDURES

6.1 HEAVY RAIN

Heavy rain can create working and driving hazards, ranging from increased slip / fall hazards and reduced visibility to flash flooding in low-lying areas. If heavy rains occur while personnel are outside, the SSHO will instruct the teams to halt operations and to seek shelter. The SM, in consultation with the SSHO, will determine when site conditions are safe for re-entry and continuation of operations. Personnel shall be cautioned to never attempt to walk through or drive a vehicle in flooded areas.

6.2 THUNDERSTORMS

Thunderstorms, with their associated lightning, present a significant hazard to site personnel. A PIKA site personnel may continue working during severe thunderstorm watches but will stop work and evacuate the work zone during a thunderstorm or

severe thunderstorm warning or when lightning, as determined by the SSHO, is detected within 10 miles of the work zone.

Lightning typically takes the shortest path and hits the highest object such as a tall tree or building, a tower or an object standing alone in a flat field. Lightning can strike many miles away from its parent storm and lightning has been known to routinely travel eight miles horizontally before striking the ground. In the event of a severe thunder/lightning storm, follow general safety steps outlined below.

1. Stay indoors and away from windows, and unplug televisions, computers and other appliances.
2. If you are away from buildings, get inside an all-metal, non-convertible automobile, and avoid contact with the metal.
3. Avoid using telephones, unless it is an emergency.
4. Do not stand under a natural lightning rod such as a tall isolated tree.
5. Do not stand on a hilltop, an open field, or on the beach.
6. Get away from open water.
7. Stay away from metal objects since it is a good conductor of electricity.
8. Get away from heavy equipment.
9. Stay away from wire fences, clotheslines, metal pipes, rails, and other metallic paths that could carry lightning to you from some distance away.
10. Avoid standing in small isolated sheds or other small structures in open areas.
11. If in a forest, seek shelter in a low area under a thick growth of small trees. In open areas, go to a low place such as a ravine or valley.
12. Personnel should immediately ground themselves by dropping to their hands and knees if their hair starts standing on end. This static sensation indicates that lightning may strike either the individual or a location nearby where the individual will be in danger of injury.

A person struck by lightning does not maintain an electrical charge. The victim will be burnt and be suffering from electrical shock. Many people apparently “killed” by lightning can be revived if quick action is taken. When a group is affected, the apparent dead should be treated first; those unconscious but breathing will probably recover. CPR/First Aid should be rendered to those not breathing within four to six minutes to prevent irrevocable damage to the brain. Check for burns along their extremities and around areas in contact with metal. Treat a lightning victim for shock and burns, and send someone to summon Advanced Life Support/Emergency Medical.

6.3 HIGH WINDS

High winds can create conditions that threaten the safety and health of site personnel and, when coupled with low humidity, can create a static electricity hazard. High winds can cut visibility by creating dust clouds and can cause trees and tree limbs to fall. The SSHO will determine when wind levels present a hazard to site personnel and will call

for the evacuation of the work areas if deemed necessary. The SM, in consultation with the SSHO, will determine when site conditions are safe for re-entry and continuation of operations. At no time will demolition operations be conducted when the wind speed is greater than 20 miles per hour.

6.4 TORNADOS

Tornados with their associated high winds, rain, and potentially damaging hail can create serious threats to personnel on site. If a tornado watch is reported, the SSHO will inform site personnel to maintain an on-site watch and prepare for possible evacuation. If a tornado warning is sounded, the SSHO will instruct personnel to evacuate the site immediately and take cover.

Tornadoes are spawned from powerful thunderstorms, and frequently emerge from near the hail-producing portion of the storm. Before a tornado hits, the wind may die down and the air may become very still. Tornadoes generally occur near the trailing edge of a thunderstorm. A visible, rotating extension of the cloud base is a sign that a tornado may develop. A tornado is evident when one or more of the clouds turn greenish and a dark funnel descends. The high winds of a tornado can cause a “roar” that is often compared to the sound of a train.

During tornado season, a contingency plan shall be worked out in advance for the project site. The local tornado warning, site evacuation procedures, and designated shelter area(s) shall be communicated to all site personnel during the daily safety meetings. If a local warning (i.e. sirens) does not exist, such as in remote areas, an emergency air horn or other similar device shall be used to alert site personnel. During the safety meeting, the tornado alert shall be sounded to ensure all personnel become familiar with the warning sound.
Whenever a tornado watch is in effect, personnel shall monitor the thunderstorm clouds for signs of a funnel. If possible (without risking life or limb) notify the local authorities immediately when a funnel cloud is spotted.

If a tornado is sighted in the area, the following should be done:

1. If inside a permanent building:
   - Go at once to a basement area, storm cellar, or lowest level of a building.
   - If there is no basement, go to an inner hallway or a smaller inner room without windows, such as a bathroom or closet
   - Get away from windows, and go to the center of the room. Stay away from corners because they tend to attract debris.
   - Get under a piece of sturdy furniture such as a workbench or heavy table or desk, hold on to it, and use arms to protect head and neck.

2. If outdoors or in a car:

- If possible, get inside a building; do not stay in car.
- If a shelter is not available or there is no time to get indoors, lie in a ditch or low lying area or crouch near a strong building.
- Beware of the potential for flooding.
- If in an office trailer or mobile home, simply GET OUT!

When the tornado alert is sounded, all personnel will assemble inside the designated tornado shelter. A basement or other below ground room shall be used whenever possible. Otherwise an interior room with no windows shall be used. Windows and doors on the lee side (the side that is opposite the wind direction-usually the northeast) should be opened to allow for internal adjustments to rapid external pressure change. Because tornadoes usually move from the southwest, personnel should be directed to take shelter (under a table or mattress) near the southwest corner of the shelter. Therefore, if the building is ripped down, the pieces will most likely fall on the northeast part of the basement. A battery-powered radio should be stationed inside the tornado shelter and tuned to the local station.

7.0 AUDIT CRITERIA

The following items related to site compliance with this SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;
3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist.

8.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures for controlling employee exposure to bloodborne pathogens. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations where personnel may be exposed to bloodborne hazards. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 - 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 - 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 all 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 needlesticks, 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 all microbial life including highly resistant bacterial endospores.

Universal Precautions - means an approach to infection control, in which all 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 CORPORATE SAFETY AND HEALTH MANAGER

The Corporate Safety and Health Manager (CSHM) shall be responsible for the implementation of the Bloodborne Pathogen Exposure Control Program contained in the PIKA Corporate Safety and Health Program, and for monitoring the implementation of this SOP. To this effect, the CSHM 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. Ensuring that Universal Precautions are implemented for all job classifications involving occupational exposure;
3. Ensuring that appropriate PPE is provided to and properly used by all employees whose job tasks involve the potential for occupational exposures;
4. Developing procedures for the decontamination of items or surfaces contaminated with blood or infectious body fluids;
5. Providing guidance to ensure that regulated waste is properly labeled/identified and disposed of in accordance with all applicable federal, state and local regulations;
6. Ensuring that the Hepatitis B vaccination is made available to occupationally exposed employees at no cost to the employee;

7. Completes Parts II and III of the Post Exposure Evaluation and Follow-up Form (Figure 20-3) after an exposure incident and ensuring the health care professional receives pertinent information for the post exposure evaluation;
8. Providing training to all occupationally exposed workers;
9. Ensuring that medical and training records are maintained as required; and
10. Performing an annual review of the Exposure Control Plan.

5.2 PROJECT MANAGER

The PM will be responsible for the overall implementation of this SOP. As such the PM has the following responsibilities:

1. Ensures that those employees at risk for occupational exposures receive Bloodborne Pathogen Training;
2. Informs the CSHM when an exposure incident has occurred, and
3. Coordinates with the Site Safety and Health Officer (SSHO) to ensure that the program is being implemented on the PM's site(s).

5.3 SITE SAFETY AND HEALTH OFFICER

The SSHO is responsible for the field implementation of this SOP and has the following responsibilities:

1. Ensures that all field activities involving potential contact with blood or other infectious materials are conducted IAW this program;
2. Implements engineering and work practice controls including the use of sharps containers and hand washing facilities;
3. Ensures that appropriate PPE is available and used during tasks with potential for occupational exposure; and
4. Reports to the PM when an exposure incident occurs, conducts the initial investigation, and completes Part I of Post-exposure Evaluation and Follow-up Form, (Figure 20-1).

5.4 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 SOP;
2. Properly uses all 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 all 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 CSHM to identify all 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 forms in Figure 20-1A and 20-1B, as required.

8.0 ENGINEERING CONTROLS, SAFE WORK PRACTICES AND PPE

8.1 ENGINEERING CONTROLS

Engineering controls will be used whenever possible to eliminate or reduce the potential of employee exposure, and will be periodically examined, maintained or replaced to ensure their effectiveness.

8.2 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 all 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.

8.3 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. All 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 all 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 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. All 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 (Figure 20-2). 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 a Post-Evaluation and Follow-Up Form (Figure 20-3).

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 all 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 all the hepatitis B vaccinations and any medical records relative to the employee's ability to receive vaccination;
3. A copy of all 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.

13.2 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 all persons attending the training sessions.

15.0 ATTACHMENTS

The following are attachments to this SOP.

1. Figures 20-1A and 20-1B – Exposure Determination

2. Figure 20-2 – Hepatitis B Vaccine Declination Form
3. Figure 20-3 – Post Exposure Evaluation and Follow-up

16.0 DOCUMENTATION

None.

FIGURE 20-1A: EXPOSURE DETERMINATION

The following job classifications that have been determined to have a reasonably anticipated potential for occupational exposure to blood or other potentially infectious material	Are all employees exposed?	
	Y	N
Site Safety and Health Officer	Y	
Senior UXO Supervisor	Y	
UXO Supervisor (Team Leader)		N
UXO Specialist		N

FIGURE 20-1B: EXPOSURE DETERMINATION

Listed below are all tasks, procedures or groups of closely related task and procedures in which some workers have a reasonable anticipated potential to receive occupational exposure to blood or other infectious materials for the job classification identified below occurs:

Job Classification: Site Worker
Tasks, Procedures or Groups of Closely Related Tasks and Procedures
UXO Specialist, equipment operators, magnetometer operators, field office administrators

FIGURE 20-2: HEPATITIS B VACCINE DECLINATION FORM

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: _____

FIGURE 20-3: POST-EXPOSURE EVALUATION AND FOLLOW-UP

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 _____
  Name of Source (if 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

POST-EXPOSURE EVALUATION AND FOLLOW-UP (CONTINUED)

B. Risk of Source Individual:
- ☐ High Risk Activities (proceed as if **positive** result)
- ☐ Low Risk Activities (provide HIV testing if requested)

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.

POST-EXPOSURE EVALUATION AND FOLLOW-UP (CONTINUED)

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

IV. Comments

Completed by (name printed): _____

Completed by (signature): _____ Date: _____

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of products containing hazardous substances.

2.0 SCOPE

This SOP applies to all PIKA International, Inc. (PIKA) site personnel, to include subcontractor personnel, and operations involving in the use of products containing hazardous substances. This SOP is not intended to contain all requirements needed to ensure regulatory compliance. Consult the documents listed in section 3.0 of this SOP for additional 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed.

- OSHA Construction Industry Standard 29 CFR Part 1926.59;
- OSHA General Industry Standard 29 CFR Part 1910.1200.

4.0 RESPONSIBILITIES

4.1 CORPORATE SAFETY AND HEALTH MANAGER

The PIKA Corporate Safety and Health Manager (CSHM) will be responsible for the administrative implementation of this SOP and the PIKA Hazard Communication Program presented in the PIKA Corporate Safety and Health Program. As such the CSHM will assist in the training required by this SOP and will periodically audit PIKA project sites to ensure their compliance with this SOP. The CSHM will also provide consultation to each PIKA Site Safety and Health Officer (SSHO) regarding the implementation of this SOP.

4.2 PROJECT MANAGER

The Project Manager (PM) shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated in plans, procedures and training for sites where this SOP is to be implemented.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for all operations involving the use of products containing hazardous substances. The SS will also ensure that relevant sections of this SOP are discussed in the tailgate safety briefings and that

information related to its daily implementation is documented in the Site Operational Log.

4.4 TEAM LEADER

The Team Leader shall be responsible for the field implementation of this SOP and for implementing the safety and health requirements outlined in section 5.0 of this SOP. In the absence of a SS, the Team Leader shall be responsible for implementing the SS responsibilities outlined in para 4.2.

4.5 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily tailgate safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

4.6 SITE PERSONNEL

All PIKA site personnel will be responsible for implementing this SOP 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 SOP, site personnel have a responsibility to integrate the requirements of this SOP 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 SHEETS (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 all 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/insufficient, a new MSDS will be requested from the manufacturer.

MSDSs will be available for all 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 all products containing hazardous chemicals. The Hazardous Chemical Inventory Form (See Figure 21-1) 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

To further ensure that employees are readily provided with information concerning chemicals in their work areas, the SSHO will ensure that all secondary containers are properly labeled with an appropriate hazard communication label. 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 project themselves from over exposure 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 HAZCOMP;
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 Hazard Communication and Training Checklist (See Figure 21-2).

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 Site Training Log, 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). The SSHO will ensure that outside clients/subcontractors are provided 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 CIH 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.

1. 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
2. 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 SOP will be audited to ensure compliance with this SOP:

1. The Daily Operational and Safety Logs;
2. The Site Specific Chemical Inventory Forms;

3. The Hazard Communication Training Checklist; and
4. The Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

Attachment 21-1..... Site Specific Chemical Inventory Form
Attachment 21-2.....Documentation of Hazard Communication Training Form

ATTACHMENT 21-1: SITE SPECIFIC CHEMICAL INVENTORY FORM

Site Name/Location: _____ Site Safety Officer: _____

DATE	PRODUCT NAME	SUPPLIER'S NAME AND ADDRESS	HAZARDOUS CHEMICALS	MSDS AVAILABLE	CONTAINER SIZE/TYPE	LOCATION STORED

Figure 21-1

21-2: DOCUMENTATION OF HAZARD COMMUNICATION TRAINING

SITE INFORMATION			
Site Name:			Date:
Location:		Instructor:	
TRAINING ELEMENTS COVERED			
Initial	Topic	Initial	Topic
	Requirements of 29 CFR 1910.1200		Target organs affected
	Elements of HAZCOM Program		Physical hazards (fire, explosion, etc.)
	Local of Program, MSDSs & Inventory		Detection of and protection from exposure
	Hazardous substance operations/processes		Spill/emergency response
	Acute/chronic health hazards		Labeling requirements
HAZARDOUS SUBSTANCES/PRODUCTS AND MSDSS REVIEWED			
Initial	Hazardous Substance/Product	Initial	Hazardous Substance/Product
TRAINING COURSE ATTENDANTS			
My signature below 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	

Figure 21-2

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of hazard warning signs, tags, or labels. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving the need to post site hazards with signs, tags or labels. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated in plans, procedures and training for sites where this SOP is to be implemented.

4.2 CORPORATE SAFETY AND HEALTH MANAGER

The Corporate Safety and Health Manager (CSHM) is responsible for the continued development, improvement, and implementation of the PIKA Corporate CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure proper protection of personnel.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to sign and label posting.
4. Periodically auditing PIKA work sites to ensure compliance with this SOP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for all operations where safety and health hazards require the posting of signs and labels. The SS will also ensure that relevant sections of this SOP are discussed in the tailgate safety briefings and that information related to its daily implementation is documented in the Site Operational Log.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily tailgate safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 PROCEDURE

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 ensure 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 hazard communication requirements found in SOP 21;
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 all 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 the type and level of PPE specified in the SSHP to prevent or reduce exposures associated with hazardous operations which must be posted with signs.

6.0 AUDIT CRITERIA

The following items related to the posting of signs, labels and tags will be audited to ensure compliance with this SOP:

1. The Daily Operational and Safety Logs;
2. The Documentation of Training form for the initial site hazard training;
3. The Documentation of Training form for the Daily Tailgate Safety Briefing; and
4. The Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures required to ensure adequate fire prevention and protection. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including contractor and subcontractor personnel and operations conducted where fire prevention measures and fire protection precautions are needed to ensure the safety and health of site personnel. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure fire hazards. The SS will also ensure that relevant sections

of this SOP 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 Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 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 SOP, 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

To ensure adequate fire protection, the SSHO will inspect the site daily to ensure that all flammable and combustible materials are being safely stored in appropriate containers in properly configured and segregated storage areas. The SSHO will also ensure that sources of ignition are removed 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 Site Inspections

To ensure adequate fire protection, the SSHO will inspect the site daily to ensure that all flammable and combustible materials are being safely stored in appropriate containers in properly configured and segregated storage areas. The SSHO will also ensure that sources of ignition are removed a safe distance from storage areas.

5.2.4 Storage of Flammable and Combustible Materials

5.2.4.1 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.

5.2.4.2 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 outdoors storage areas.

5.2.5 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.

5.2.6 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.

5.2.7 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 all 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.

5.2.8 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 SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;
3. The Safety Meeting Attendance Log for the Daily Safety Briefing;
4. The Daily Safety Inspection Checklist; and
5. The fire extinguisher inspection cards.

7.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to site sanitation, house keeping and illumination practices. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations involved in PIKA projects. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 shall be responsible for ensuring the availability of the resources required to implement this SOP, and shall also ensure that this SOP is incorporated in plans, procedures and training for sites where this SOP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is properly implemented, and for assuring safe and sanitary conditions are maintained during site activities. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefing and that information related to its daily implementation is documented in the Site Operational Log.

4.3 SAFETY AND HEALTH OFFICER

The Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily tailgate safety briefing. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 PROCEDURE

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 SOP which will be used to ensure 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 SZ. Chemical, recirculating, 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

ensure 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 support zone (SZ), and shall be utilized by all 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. All 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 ensure that site personnel have the minimum level of lighting needed, or if site operations must be conducted at night, illumination levels in Table 24-1 shall the minimum allowed during the conduct of site related activities.

Table 24-1: 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 ensure compliance with this SOP:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;
3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) 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 SOP 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 SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving the use of respiratory protection. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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.

4.0 DEFINITIONS

As utilized in this SOP, the following definitions will apply.

1. **Air-Purifying Respirator:** 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:** An air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.
25. **Program Manager:** The single point of contact within NASA ARC or 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 SAFETY AND HEALTH MANAGER

The Corporate Safety and Health Manager (CSHM) will act as the Respirator Program Administrator (RPA) and will be responsible for the continued development of this SOP and the PIKA Respiratory Protection Program. As the RPA, the CSHM will also be responsible for ensuring the proper field implementation of this SOP, and the RPA will

1. Conduct an annual review of the REP and providing 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. Ensure that all PIKA employees required to use respirators are placed on the PIKA Medical Surveillance Program and receive biological monitoring, when required, that is relevant to the type of hazards to which they could be exposed.
5. Ensure that all PIKA employees required to wear respirators are fit tested and trained initially and at least annually thereafter;
6. Conduct or coordinates 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 National Institute of Safety and Health (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 (PM) is responsible for ensuring the implementation of this SOP on all sites for which the PM is responsible. The PM will also ensure that project resources are provided to allow for effective implementation of this SOP.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) is responsible for the proper implementation of the respiratory protection procedures outlined in this SOP. 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 SOP 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 OSHM, the respiratory protective equipment and other resources required for implementing the REP/RPP;
2. Arranging for, or providing, respirator specific training, in accordance with (IAW) Paragraph 14.0 of this SOP to site personnel who are required to use respiratory protection;
3. Ensuring that all respiratory protective equipment is used, sanitized, inspected, and maintained IAW the applicable sections of this SOP;
4. Ensuring that all 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 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 effect 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 CSHM 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;
1. Use only those respirators for which they have been specifically authorized, trained, and fitted;
3. Report to the SSHO any changes in medical status that may impact the user's ability to safely wear a respirator;
4. Report to work clean shaven in the area of the face piece if respirators are to be used;
5. Inspect the respirator and perform a negative and positive pressure fit test prior to respirator use;
6. Use the respirator IAW general and job specific training;
7. Leave the respirator area immediately if doubt arises as to the ability of the respirator to provide sufficient protection; and
8. 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. Air-Purifying Respirators
   - Particulate removing
   - Vapor/Gas removing
   - Combination
2. Atmosphere (Air)-Supplying Respirators

- Self-Contained Breathing Apparatus (SCBA)
- Supplied-Air Respirator (Air-line)

6.1.1 Air-Purifying Respirators

6.1.1.1 General Limitations

Air-purifying respirators 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. Air-purifying respirators may not be used for protection in the following circumstances:

- Air-purifying respirators 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.
- Air-purifying respirators 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 Air-purifying Respirators

Full face-piece air-purifying respirators 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. All 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 Supplied-Air Respirators (Air-line):

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 National Institute for Occupational Safety and Health (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 air-purifying respirator equipped with a filter certified by NIOSH under 30 CFR part 11 as a high-efficiency particulate air (HEPA) filter, or an air-purifying respirator equipped 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 CSHM may provide respirators at the request of site personnel or permit personnel to use their own respirators in nonhazardous areas if the CSHM determines that such respirator use will not in itself create a hazard. If the CSHM determines that voluntary respirator use is permissible, the CSHM, 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 all 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 SOP 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 all 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 immediately dangerous to life or health (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 prefilters, 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 and canisters should be changed 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.
- Cartridges or canisters should be replaced when they reach their end of service life as determined using the calculation methods outlined in the OSHA Respiratory Protection Advisor. The end of service life calculations shall be established by the CSHM based upon the concentration of contaminants, the type of filter being used, as well as other relevant data related to the respirator and work area exposures.

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 all 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 CSHM shall be conducted and documented on all persons who will wear a negative-pressure respirator. The procedure contained in Attachment 1 of this SOP 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.
   - **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, CLEANING, MAINTENANCE, AND STORAGE

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 all 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 all 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 Authorization Card. 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 Authorization Card.

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 SOP:

1. The Daily Operational and Safety Logs;
2. The Documentation of Training form for the initial site hazard training;
3. The Daily Safety Briefing Attendance Log; and
4. The Daily Safety Inspection Checklist.

19.0 ATTACHMENTS

Attachment 1: Qualitative Fit-testing Procedures

ATTACHEMENT 1
IRRITANT SMOKE FIT-TESTING PROCEDURE
QUALITATIVE FIT-TESTING

General The employer shall include the following provisions in the fit-test procedures. All 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 SOP 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 SOP will be used to select the PPE necessary to ensure the health and safety of site personnel.

2.0 SCOPE

This SOP will be applicable to all 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 SOP (herein referred to as Safety Plans). This SOP does not apply to the issuance or use of respiratory protective equipment. Respirator use is addressed in PIKA SOP-25.

3.0 RESPONSIBILITIES

3.1 CORPORATE SAFETY AND HEALTH MANAGER

The PIKA Corporate Safety and Health Manager (CSHM) is responsible for the continued development and review of this SOP and for providing consultation to the project-specific Site Safety and Health Officer (SSHO). The CSHM 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 conducted on site and identifying the chemical, physical and biological hazards from which site personnel will require protection;
3. Completing the PIKA Activity Hazard Analysis (AHA) form (see Figure 26-1) for each task conducted on site and specify in the AHA the PPE that will be required to reduce exposure risks;
4. Developing the PPE requirements for each project site IAW the anticipated hazards and incorporating that information into the project Safety Plans; and
5. Periodically inspecting the PIKA project sites to ensure the provisions of this SOP are being implemented.

3.2 PROJECT MANAGER

The Project Manager (PM) will be responsible for the safe planning and conduct of each project to which they are assigned. The PM will ensure that all PPE required by the

project Safety Plans is available for use by the site workers and that adequate resources are provided to acquire, store and maintain PPE at the project site. The PM will also be responsible for consulting with the CSHM regarding identification of task hazards prior to and during the project.

3.3 SITE SUPERVISOR

The Site Supervisor (SS) will be responsible for the implementation of the project Safety Plans that may have PPE requirements within the plans. The SS will ensure that all the requirements of this plan have been incorporated into site operations, to include employee training and documentation, and the provision of PPE storage and maintenance facilities. The SS will also ensure that the PPE required by the project Safety Plans is available to the personnel on the site.

3.4 SITE SAFETY AND HEALTH OFFICER

The SSHO is responsible for the on-site implementation of this SOP. As such, the SSHO will:

1. Provide initial training, as specified in paragraph 5.0 of this SOP, 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 AHA and project Safety Plans;
3. Assist site personnel with the inspection and maintenance of PPE;
4. Consult with the CSHM to determine the levels and types of PPE to be used for tasks not previously addressed in a AHA;
5. Completing the AHA form for any new tasks that were not previously addressed in the project Safety Plans, and forwarding that form to the CSHM for approval.
6. Conducting daily inspections and weekly audits of the site to ensure site workers are complying with this SOP.

4.0 SELECTION OF PPE

4.1 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 CSHM. The level and type of PPE to be used will be identified and the SSHO will complete the Activity Hazard Analysis (AHA) form. Any changes in PPE that involve downgrading the level of PPE will be allowed only after review by the CSHM.

4.2 SELECTION CRITERIA

The CSHM will utilize the general chemical resistance information found in Appendix B and Table 26-2, 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 CSHM 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 CSHM will ensure that the items purchased will properly fit each employee designated to wear PPE. Selection of respiratory protection will be conducted IAW SOP-25 of the PIKA CSHP.

5.0 TRAINING

5.1 TRAINING SCHEDULE

All 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 CSHM prior to personnel participating in site operations where PPE is required. This, and all other subsequent PPE training, will include the relevant topics outlined in paragraph 5.2 of this SOP. 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.

5.2 REQUIRED TRAINING TOPICS

PIKA will provide all affected site personnel with PPE training that covers the following topics:

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

All personnel receiving PPE training will be required to demonstrate an understanding of the training topics and the ability to correctly use the PPE. This will be accomplished through the SSHO supervising and visually inspecting each individual's ability to properly don and use the PPE during 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 Certification of Personal Protective Equipment Training form (see Figure 26-1), which identifies: the employees who attended the training course and successfully demonstrated the required knowledge; the date(s) of the training and demonstration session(s); and the PPE covered by the training session.

6.0 LEVELS OF PPE

The following paragraphs outline the different levels of PPE that may be used by 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 SOP, and may be referenced when selecting specific PPE required for each level described below.

6.1 SPECIAL CONSIDERATIONS

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

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

6.2 LEVEL D PPE

This level of PPE is not allowed in areas of the site where atmospheric hazards are known or expected to exist. Level D should 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.

6.3 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.

6.4 LEVEL C PPE

Level C affords moderate protection from airborne hazards and should be worn during site activities where the potential exposure to hazardous substances may exceed the OSHA PEL or other published exposure limits. 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.

6.5 LEVEL B PPE

Level B PPE offers superior protection against the inhalation of airborne contaminants. This is due to the fact that supplied air or self-contained breathing apparatus (SCBA) respirators are used as the respiratory protection for this level. However, the type of protective suit used with this level of protection is not 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.

6.6 LEVEL A PPE

Level A PPE provides the highest available level of protection against both inhalation and skin contact of extremely hazardous materials. The Level A suit is fully encapsulating, but unlike the Level B encapsulating suit, the Level A suit is air tight and must be tested prior to use 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 all instances where potential for contact with liquid CWM exists, or when the nature and degree of potential exposure are unknown. Level A will also be worn in the event that site personnel are exposed 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 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.

7.0 PPE DONNING PROCEDURES

7.1 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 CSHM. 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.

7.2 GENERAL REQUIREMENTS

This paragraph contains general procedures and requirements for donning all levels of PPE. Specific procedures for donning each level of PPE are discussed in the paragraph immediately following the description of 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 or tape, or if the tear/rip compromises the structural integrity of the clothing, that article of clothing will be replaced, even if this involves leaving the EZ to do so;
6. Whenever protective boots/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.

7.3 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 all other PPE (hard hat, safety glasses, splash shield, etc.) and proceed toward the CRZ access point;
5. If ear plugs are to be worn, insert them before putting on inner and outer gloves, or any other PPE that might obstruct the proper insertion of the plugs;
6. Don all other PPE (hard hat, safety glasses, splash shield, etc.), saving the inner and outer gloves for last;
7. Put on inner and outer glove of one hand and have buddy tape that hand, then tape one of the buddy's hands, and so on, until both hands are gloved and taped;
8. Proceed to the EZ access control point to be checked by the EZ access control attendant prior to being cleared for entry.

7.4 DONNING PROCEDURE FOR LEVEL C PPE

To don Level C, follow the general 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 all 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 ensure that the mask is not leaking;
9. Don all other PPE (hard hat, safety glasses, splash shield, etc.), saving the inner and outer gloves for last;
10. Put on inner and outer glove of one hand and have buddy tape that hand, then tape one of the buddy's hands, and so on, until both hands are gloved and taped;

11. Proceed to the EZ access control point to be checked by the EZ access control attendant prior to being cleared for entry.

7.5 DONNING PROCEDURES FOR LEVEL B PPE WITHOUT ENCAPSULATING SUIT

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

1. Report to the SSHO or the designated representative to check out the proper SCBA respirator assembly;
2. Assemble and inspect the SCBA system for cleanliness and function;
3. Make sure that all required PPE have been assembled at the location where it is to be donned, and make any adjustments to the equipment prior to starting the donning process;
4. While sitting, insert one leg after the other into the encapsulating suit, stand and don 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 ensure 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 ensure 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.

7.6 DONNING PROCEDURE FOR LEVEL A AND FULLY ENCAPSULATING LEVEL B PPE

To don Level A, or Level B with an encapsulating suit, follow the general considerations listed in paragraph 7.6, then follow the steps listed below:

1. Report to the SSHO or the designated representative to check out the proper SCBA respirator assembly;
2. Assemble and inspect the SCBA system for cleanliness and function;

3. Make sure that all required PPE have been assembled at the location where it is to be donned, and make any adjustments to the equipment prior to starting the donning process;
4. While sitting, insert one leg after the other into the encapsulating suit, stand and 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 ensure 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 ensure the wearer is breathing freely, the assistant will zip up the suit and check all closures and valves;
13. Proceed to the EZ access control point to be checked by the EZ access control attendant prior to being cleared for entry.

8.0 INSPECTION PROGRAM

8.1 INSPECTING INCOMING SHIPMENTS OF PPE

The SSHO or a designated appointee will inspect all incoming shipments of PPE received from the 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.

8.2 PRE-DONNING INSPECTION

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

- 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 all 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 SOP-25 of the PIKA CSHP

8.3 PERIODIC INSPECTIONS

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

9.0 CLEANING AND DECONTAMINATION

The SSHO will be responsible for ensuring that PPE is in good, clean, working order prior to issuing the PPE the first time. Once issued, site personnel will ensure that re-usable articles of PPE are maintained in a clean sanitary fashion. For PPE items used inside an exclusion zone, 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 exclusion zone.

10.0 MAINTENANCE

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

11.0 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.

12.0 ATTACHMENTS

Certificate of PPE Training Form

13.0 RELATED REFERENCE

OSHA 29 CFR 1910 Subpart O; Motor Vehicles, Mechanized Equipment, and Marine Operations

Figure 26-1: CERTIFICATE OF TASK HAZARD ASSESSMENT

TASK NAME: **DATE:** July 24, 2002

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 and wildlife
[ ] Cold Stress	[ ] High noise (>85 dBA)	[ ] UV radiation (strong sunlight)
[ ] Heavy equipment operations	[ ] Overhead hazards	[ ] Hand/Power Tool use
[ ] Man lift operations	[ ] Underground utilities	[ ] Biological materials
[ ] Fire hazards (underline)	[ ] Intrusive activity (underline)	[ ] Skin contact w/ hazardous materials
• Establish fuel storage area	• Soil drilling	[ ] Inhalation of hazardous substances
• 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 CONTROL MEASURES: Items with an [x] are required. Items with a number in the [ ] are required as specified in the section entitled PPE Modifications Allowed/Required

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) [ ]
Medical Examinations	[ ] Hazardous Waste Physical [ ] Respirator Assessment	[ ] Asbestos Worker [ ] Lead Abatement Worker	[ ] Task-specific tests List:
Monitoring and Sampling	[ ] Real-Time Monitoring 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 [ ] Chemical protective gloves
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 in accordance with 29 CFR 1910.132 by the individual identified below.

Printed Name: Drew Bryson, CIH, MPH **Signature:** _____

FIGURE 26-2: PIKA INTERNATIONAL, INC. CERTIFICATION OF PPE TRAINING

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

TYPES AND LEVELS OF PPE ADDRESSED DURING TRAINING

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

PPE TRAINING COURSE ATTENDANTS

The following personnel have attended the site PPE training course, and demonstrated, through use, an understanding of the donning/doffing procedures, inspection, cleaning, maintenance, storage, limitations, and proper disposal of the PPE listed on this certificate. These personnel are now qualified to use the site and task specific PPE as required by the project Safety Plans.

Name	Organization	Name	Organization

CERTIFICATION

I the undersigned do hereby certify that the above listed personnel have received the requisite training and successfully demonstrated their ability to use the PPE listed above, in accordance with the PIKA Personal Protective Equipment SOP.

Name (printed)	Signature:	Date:

Table 1 - Comparative Chemical Resistance

Key: E-excellent; G-good; F-fair; P-poor; NR-non recommended; *-limited service

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

	CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
	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
	Perchloric acid	E	F	G	G
	Perchloroethylene	F	NR	G	NR
		E	NR	G	NR

	CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
	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
	Toluene diisocyanate	F	G	F	G
	*Toluol	F	P	F	NR
	Trichlor	F	P	G	P

	CHEMICAL	NEOPRENE	LATEX OR RUBBER	MILLED NITRILE	BUTYL
	*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 SOP 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 all 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; and
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. It 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 Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of on and off road motor vehicles. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving the use of on and off road motor vehicles. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure 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 to ensure compliance with this SOP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to the hazards associated with the operation of on and off road vehicles. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in motor vehicle operations shall be familiar with the potential safety hazards associated with the conduct of this operation, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

5.1 GENERAL REQUIREMENTS

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

All motor vehicles shall be inspected and maintained IAW this program. Motor vehicles being used shall be checked at the beginning of each day to assure that the all parts,

equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use. The 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 all 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, all 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 UXO/OE.
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 all persons 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. All 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 all-purpose utility vehicles (APUV's), every operator shall possess a valid state driver's license and have completed, as a minimum, an on-site APUV training course prior to operation of the vehicle. The operation of APUV's shall be conducted according to the procedures listed below.

1. The manufacturer's recommended payload shall not be exceeded at any time.

2. Gloves and an approved motorcycle helmet with full-face shield or goggles, or a hard hat and safety glasses shall be worn at all times while operating an APUV.
3. APUV'S are to be used on off-road 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 SOP.

6.0 AUDIT CRITERIA

The following items related to power and hand tool operations will be audited to ensure compliance with this SOP:

1. The Daily Operational and Safety Logs;
2. The Documentation of Training form for the initial site hazard training;
3. The Documentation of Training form for the Daily Tailgate Safety Briefing; and
4. The Weekly Vehicle Inspection Checklist.

7.0 ATTACHMENTS

The PIKA Vehicle Inspection Checklist – Attachment 27-1, is attached to this SOP. While daily pre-operational inspections of vehicles are required by this SOP, the attached form shall be completed by the vehicle operator at least weekly, and prior to any transportation of explosives.

ATTACHMENT 27-1: PIKA VEHICLE INSPECTION CHECKLIST

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

Site Name / Location: _____

Site Supervisor: _____ **Vehicle:** _____
(MAKE AND LICENSE PLATE #)

Date Inspected: _____ **Mileage:** _____ **Owner:** _____
(RENTAL, PIKA, GFE, CONTRACT)

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

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

Description of deficiencies (Discrepancies are to be reported to the PIKA S&H Manager and the Site Supervisor):

_____

_____

_____

_____

Corrective Actions Taken: _____

_____

_____

_____

Inspection conducted by: _____ _____
Name Printed Signature

Deficiencies corrected by: _____ Date: _____

1.0 PURPOSE

This standard operating procedure (SOP) 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 SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 SOP applies to all PIKA personnel, including contractor and subcontractor personnel, and tasks involving crane operations. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP for additional for compliance issues. This SOP does not apply to 'Hammerhead' Tower Cranes since their construction and application to is not typically 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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. Mobile Power Crane and Excavator and Hydraulic Crane Standards PCSA Standard No.4.
3. WCB 54.18
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 resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to the hazards associated with crane operations. The SS will also ensure that relevant sections of this SOP 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 Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 DEFINITIONS

As used in this SOP, 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 manufacturers 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 (Attachment 1).

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
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:
8. More than 1/64” for up to and including 5/16”
9. More than 1/31” for 3/8” to ½”
10. More than 3/64” for 9/16” to ¾”
11. More than 1/16” for 7/8” to 1 1/8”
12. More than 3/32” for 1 ¼” to 1 1/2”
13. 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.
14. Wire rope safety factors will be in accordance with American National Standards Institute B.30.5.

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 all equipment, and be visible to the operator. Additionally, the following practices shall be generally applied to crane operations:

1. All 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. All employees must be kept clear of suspended loads
4. Operators will not leave the controls while a load is suspended

5. All custom-made lifting devices, such as lifting beams, must be designed by a qualified engineer and will be proof tested to 125% of it's rated load prior to its initial use. Records will be kept at the job site.
6. Tag lines will be used on all 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 not 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

All 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:
4. For lines rated 50 kV or less: 4 feet
5. For lines rated at 50 kV to 345 kV: 10 feet.
6. 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. A
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 ensure 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 and prior to the actual lift, the platform will be lifted a few inches and inspected to ensure it is 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:

6. The condition and air pressure of the tires will be checked.
7. The operation must be within 50 percent of the cranes rated capacity while operating in a pick-and-carry mode.
8. Outriggers may be partially retracted to permit travel as required.

7.0 ATTACHMENTS

Crane Inspection Checklist - Attachment 1

8.0 DOCUMENTATION

Annual Crane Inspection Record

CRANE INSPECTION CHECKLIST (ATTACHMENT 1)

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 _____

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of drill rig operations. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations involving the use of a drill rig. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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; and
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 resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to the hazards associated with the use and maintenance of drill rigs. The SS will also ensure that relevant sections of this SOP 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 Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 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 SOP-36 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 downhole 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 nearest power line to the mast must not be less than 20 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 (Attachment 1). If a crane is involved, see SOP 28 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 ordnance and explosives (OE) contamination, an OE avoidance survey shall be conducted to locate an anomaly free access path and work area for the drill rig. Additionally, a down-hole OE survey will be conducted to ensure the auger does not contact any OE 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.
23. 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.
4. The drill will not be driven from hole to hole with the mast in the raised position.
5. Operation of the drill will only occur from the position of the controls.
6. Drill operations will cease during an electrical storm.
7. All unattended boreholes will be adequately covered, protected, or back-filled.
8. A safety chain and cable arrangement will be used to prevent water swivel and mud line whip.
9. Drill operators will brake or set the chucks to prevent engagement of the transmission prior to removal of the chuck wrench.
10. A catline or hoisting cable and plug will be used for braking prior to tightening of the chuck.
11. After braking, drill rods will be allowed to drain completely before removal from the working area.

12. 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.
13. 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 ensure compliance with this SOP:

1. The Daily Operational and Safety Logs;
2. The Documentation of Training form for the initial site hazard training;
3. The Documentation of Training form for the Daily Safety Briefing; and
4. The Equipment Inspection Checklist.

7.0 ATTACHMENT

Equipment Inspection Checklist (Attachment 1)

PIKA Equipment Inspection Checklist (Attachment 1)

Contract No.:	**Date:**	**Time:**	**Log Number:**
Site Name & Location:			
Site Supervisor:		**SSHO:**	
Odometer Reading:	Hour Meter Reading:		Fuel Level:

Make/Description: _____ Model: _____ Serial No.: _____

Place a ✓mark in the "In Order" column to indicate that the item is present and in working condition. If absent or deficient describe the discrepancy and the corrective action taken in the "Discrepancy/Comments" box. If item does not apply to equipment being inspected, enter "NA". All listed items must have a response.

Item	In Order	Discrepancies/Comments
Service Brakes		
Emergency Brakes		
Parking Brake		
Brake Lights		
Back-up Alarms		
Horn		
Tires		
Spare Tire and Tire Changing Equip.		
Steering		
Seat Belt		
Operating Control		
First Aid Kit, Burn Blanket, Eye Wash		
Emergency Numbers/Hospital Map		
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		
ROPS		

Inspection conducted by: _____ _____
Name Printed Signature

Deficiencies corrected by: _____ Date: _____

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of rigging to ensure safe material handling. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving the rigging of materials. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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
- USACE EM 385-1-1, Section 15, Rigging.
- WCB regulation 54.18.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure 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 to ensure compliance with this SOP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to the hazards associated with rigging equipment for material handling. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 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, shorteners 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, in accordance with WCB regulation 54.18.

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 SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;
3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

This SOP establishes safety practices, means, methods and operations for tree felling and chipping. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel and subcontractors involved in the clearing and removal of trees. This SOP addresses the use of chain saws and chippers used to cut trees and chip vegetation. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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.

4.0 DEFINITIONS

The definitions provided below directly apply to this SOP.

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. Designated person - An employee who has the requisite knowledge, training and experience to perform specific duties.
6. Domino felling - The partial cutting of multiple trees which are left standing and then pushed over with a pusher tree.
7. 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.
8. Fell (fall) - To cut down trees.

9. Feller (faller) - An employee who fells trees.
10. 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.
11. Landing - Any place where logs are laid after being yarded, and before transport from the work site.
12. Limbing - To cut branches off felled trees.
13. Lodged tree (hung tree) - A tree leaning against another tree or object which prevents it from falling to the ground.
14. Log - A segment sawed or split from a felled tree, such as, but not limited to, a section, bolt, or tree length.
15. Logging - For this SOP, logging is defined as any operation conducted on site that involves the use of chain saws for tree felling, limbing or sizing.
16. Snag - Any standing dead tree or portion thereof.
17. 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.
18. Undercut - A notch cut in a tree to guide the direction of the tree fall and to prevent splitting or kickback.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

The Project Manager (PM) shall be responsible for ensuring the availability of the personnel and equipment resources needed to implement this SOP. The PM shall also ensure that this SOP is incorporated into site-specific plans, procedures and training for sites where this SOP is to be implemented.

5.2 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure 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 to ensure compliance with this SOP.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to the hazards associated with chain saw or wood chipper use. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation. The SS will also be responsible for the provision of on-site resources required by this SOP for its successful application.

5.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

6.0 PROCEDURES

6.1 ENVIRONMENTAL CONDITIONS

All chain saw and wood chipping 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

Employees involved with tree felling 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. Work areas shall be assigned so that trees cannot fall into an adjacent occupied work area. 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.

The buddy system will be used anytime personnel are involved in tree felling, limbing, and sizing procedures. Each employee involved with these logging operations shall work in a position or location that is within visual or audible contact with another employee.

6.3 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. 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.
2. The chain saw shall be operated and adjusted in accordance with the manufacturer's instructions.
3. The chain saw shall be fueled at least 10 feet from any open flame or other source of ignition.
4. The chain saw shall be started at least 10 feet from the fueling area.
5. 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.
6. 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.
7. The chain saw shall not be used to cut directly overhead.
8. The chain saw shall be carried in a manner that will prevent operator contact with the cutting chain and muffler.
9. 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.
10. 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.).

6.4 TREE FELLING

6.4.1 General requirements

The general requirements listed below shall be followed during all 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. 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.
7. 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.
8. Domino felling of trees is prohibited, unless this method is used to fell a single danger tree by felling another single tree into it.

6.4.2 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 pieces of it. 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 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 all 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 truck 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.

6.6 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. Sarting 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.

6.7 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. Infeed and discharge ports 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 SOP-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. All guarding and emergency control mechanisms will be maintained in place and operational at all times when the machine is running.

6.8 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.

6.9 FLAMMABLE AND COMBUSTIBLE LIQUIDS

Flammable and combustible liquids shall be stored, handled, transported, and used in accordance with the requirements of PIKA SOP-23, Fire Protection.

6.10 CHAIN SAW AND CHIPPER INSPECTION AND MAINTENANCE

6.10.1 General Requirements

All equipment used in the logging or chipping of trees will be inspected prior to use each day. Chain saw inspections will also be conducted periodically through 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 a chain saw or chipper 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 the chain saw or chipper being placed into operation.

6.10.2 Chain Saw Inspection

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.

6.10.3 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. Any defects shall be repaired prior to the chipper being placed into operation.

6.11 TRAINING

Chain saw and operation 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 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.

6.12 FIRST-AID TRAINING AND SUPPLIES

6.12.1 First-aid Training Requirements

Each affected employee, including supervisors, shall receive or will have received first-aid and CPR training by a recognized first aid/CPR training agency (i.e., Red Cross or National Safety Counsel). PIKA shall assure that each employee's first-aid and CPR training and/or certificate of training remain current, and the most recent training certification shall be maintained.

6.12.2 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 contents of the first-aid kit listed are considered to be adequate for small work sites, consisting of approximately two to three employees. When larger operations or multiple operations are being conducted at the same location, additional first-aid kits should be provided at the work site or additional quantities of supplies should be included in the first-aid kits. First aid kits will be inspected at least weekly and maintained in operational order.

1. Gauze pads (at least 4 x 4 inches).
2. Two large gauze pads (at least 8 x 10 inches).
3. Box adhesive bandages (band-aids).
4. One package gauze roller bandage at least 2 inches wide.
5. Two triangular bandages.
6. Wound cleaning agent such as sealed moistened towelettes.
7. Scissors.
8. At least one blanket.

9. Tweezers.
10. Adhesive tape.
11. Latex gloves.
12. Resuscitation equipment such as resuscitation bag, airway, or pocket mask.
13. Two elastic wraps.
14. Splint.
15. Directions for requesting emergency assistance.

6.13 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 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 all 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.

7.0 AUDIT CRITERIA

The following items related to site compliance with this SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;
3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist.

8.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the safe operation and maintenance of forklifts. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving the use and maintenance of forklifts. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 SOP, 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 shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

5.2 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure 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 to ensure compliance with this SOP.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to the hazards associated with the use and maintenance of forklifts. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

5.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

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 form (Attachement 1) 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 all 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 ensure three points of contact before climbing.

6.2 SAFETY PRECAUTIONS

PIKA personnel will follow the safety precautions outlined below to ensure 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. All 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 (15.24 cm) 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 all 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 all equipment that is, or needs to be serviced.
- Batteries on all 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 ensure 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), the employer shall ensure that each operator has successfully completed the training required by this SOP. 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 all 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 ensure that 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; or
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 SOP. 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

PIKA Equipment Inspection Checklist – Attachment 32-1

PIKA INTERNATIONAL, INC.

Attachment 32-1: PIKA Equipment Inspection Checklist

Contract No.:	**Date:**	**Time:**	**Log Number:**
Site Name & Location:			
SUXOS:		**SSHO:**	
Odometer Reading:	**Hour Meter Reading:**		**Fuel Level:**

Make/Description: _____ **Model:** _____ **Serial No.:** _____

Place a ✓ mark in the "In Order" column to indicate that the item is present and in working condition. If absent or deficient describe the discrepancy and the corrective action taken in the "Discrepancy/Comments" box. If item does not apply to equipment being inspected, enter "NA". All listed items must have a response.

Item	In Order	Discrepancies/Comments
Service Brakes		
Emergency Brakes		
Parking Brake		
Brake Lights		
Back-up Alarms		
Horn		
Tires		
Spare Tire and Tire Changing Equip.		
Steering		
Seat Belt		
Operating Control		
First Aid Kit, Burn Blanket, Eye Wash		
Emergency Numbers/Hospital Map		
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		
ROPS		

Inspection conducted by: _____ _____
Name Printed Signature

Deficiencies corrected by: Date:

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving 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 SOP-28, entitled Crane Safety. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations involving the use of heavy equipment. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- Applicable requirements of OSHA Construction Standard 29 CFR Part 1926, Subpart O;
- Applicable requirements of OSHA Industry Standard 29 CFR Part 1910, Subpart N.
- USACE EM 385-1-1, Safety Manual, Section 16.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to the hazards associated with the use and maintenance of

heavy equipment. The SS will also ensure that relevant sections of this SOP 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 Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 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 ordnance and explosives 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 all heavy equipment and an "Equipment Inspection" checklist (Attachment 33-1) shall be completed to ensure 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 all 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).

FOPS will be provided on bulldozers, tractors, 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. All 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 all times 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 operable at all times;
4. While in operation, all 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 all non-essential items and all 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, all 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 all underground utilities and flagging all 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 all 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 ensure compliance with this SOP:

1. The Daily Operational and Safety Logs;
2. The Documentation of Training form for the initial site hazard training;
3. The Documentation of Training form for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

Equipment Inspection Checklist - Attachment 33-1

Attachment 33-1: PIKA Equipment Inspection Checklist

Contract No.:	**Date:**	**Time:**	**Log Number:**
Site Name & Location:			
SUXOS:		**SSHO:**	
Odometer Reading:	**Hour Meter Reading:**		**Fuel Level:**

Make/Description: _____ **Model:** _____ **Serial No.:** _____

Place a ✓ mark in the "In Order" column to indicate that the item is present and in working condition. If absent or deficient describe the discrepancy and the corrective action taken in the "Discrepancy/Comments" box. If item does not apply to equipment being inspected, enter "NA". All listed items must have a response.

Item	In Order	Discrepancies/Comments
Service Brakes		
Emergency Brakes		
Parking Brake		
Brake Lights		
Back-up Alarms		
Horn		
Tires		
Spare Tire and Tire Changing Equip.		
Steering		
Seat Belt		
Operating Control		
First Aid Kit, Burn Blanket, Eye Wash		
Emergency Numbers/Hospital Map		
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		
ROPS		

Inspection conducted by: _____ _____
Name Printed Signature

Deficiencies corrected by: _____ Date: _____

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving excavation or trenching. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all site personnel, to include contractor and subcontractor personnel, and operations involving soil excavation or trenching. This SOP is not intended to contain all requirements needed to ensure regulatory compliance. Consult the documents listed in section 3.0 of this SOP for additional 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 SOP, 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 shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated in plans, procedures and training for sites where this SOP is to be implemented.

5.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for excavation or trenching operations. The SS will also ensure that relevant sections of this SOP are discussed in the tailgate safety briefings and that information related to its daily implementation is documented in the Site Operational Log.

5.3 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily tailgate safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.4 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 Daily Excavation Checklist (see Attachment 34-1) each time the excavation is inspected and a copy of the inspection will be posted at the excavation site.

6.0 PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in excavation or trenching operations shall be familiar with the potential safety and health hazards associated with the conduct of this operation, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

6.1 SAFETY HAZARDS AND OPERATIONAL CONTROL TECHNIQUES

All 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 34-1. 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 34-2). Soil must be classified using at least one visual and one manual test, and all 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 34-3):

- 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 CSHP 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. All 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 all 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 all employees will receive training on the hazards associated with working in a trench or excavation.

8.0 AUDIT CRITERIA

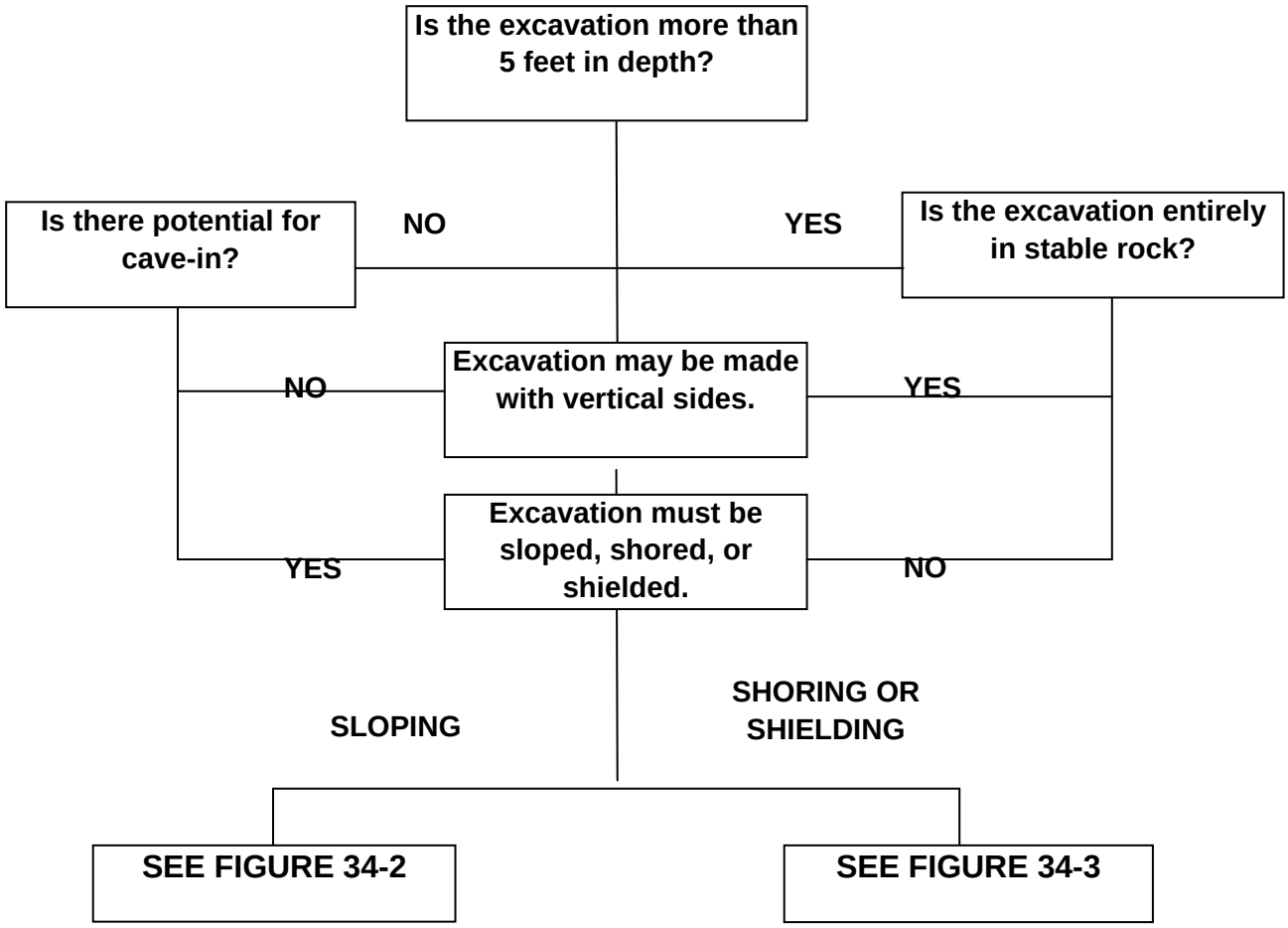
The following items related to excavation or trenching operations will be audited to ensure compliance with this SOP:

1. The Daily Operational and Safety Logs;
2. The Daily Excavation Checklist (Attachment 34-1);
3. The Documentation of Training form for the initial site hazard training; and
4. The Documentation of Training form for the Daily Safety Briefing.

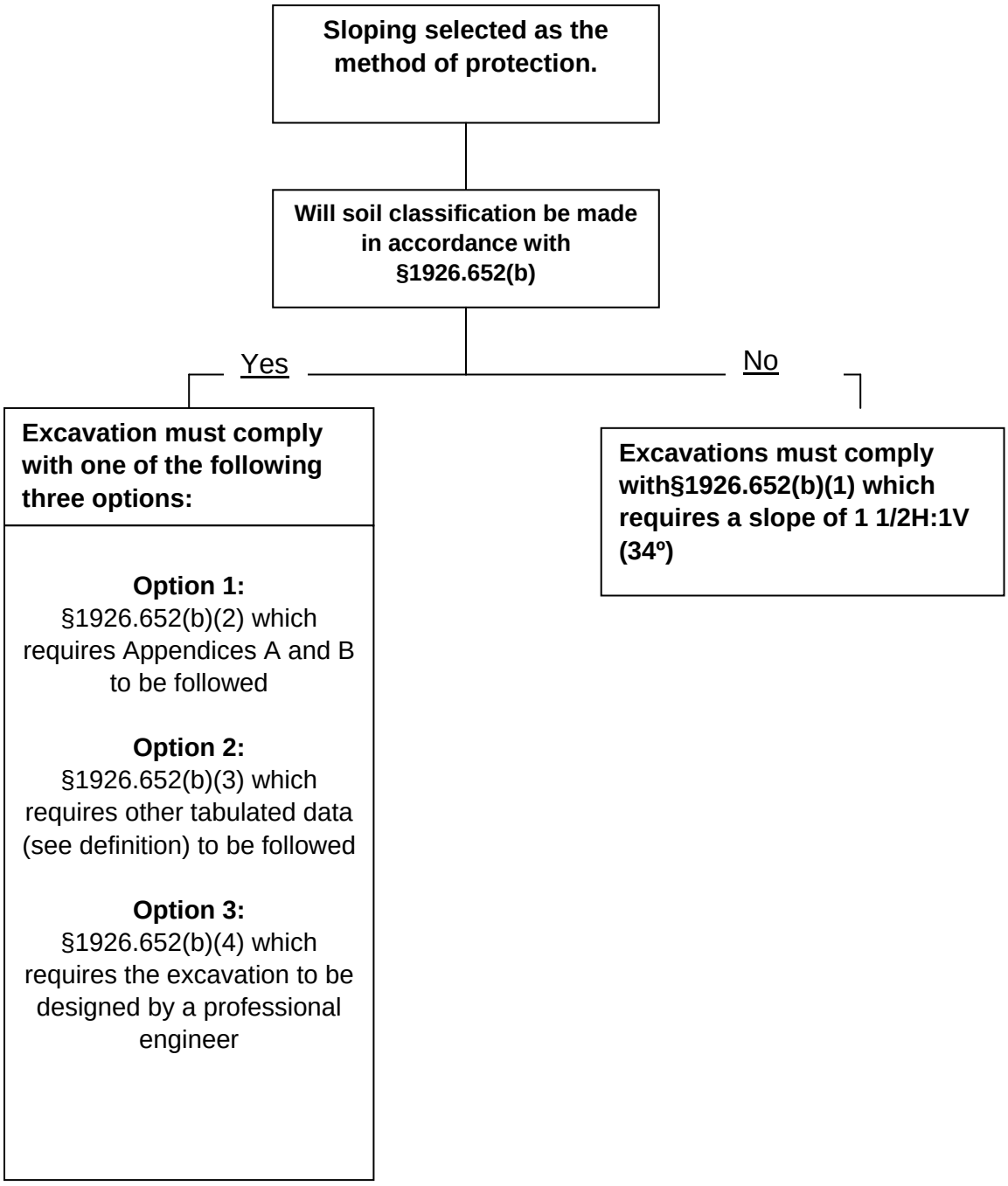
9.0 ATTACHMENTS

- Preliminary Decisions (for excavations 20 feet or less in depth) - Figure 34-1
- Sloping Options (for excavations 20 feet or less in depth) - Figure 34-2
- Shoring and Shielding Options (for excavations 20 feet or less in depth) - Figure 34-3
- Daily Excavation Checklist - Attachment 34-1
- Soil Classification 1926 Subpart P Appendix A - Attachment 34-2
- Protective Systems - Attachment 34-3

PRELIMINARY DECISIONS (FIGURE 34-1)



SLOPING OPTIONS (FIGURE 34-2)



SHORING AND SHIELDING OPTIONS (FIGURE 34-3)

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)

EXCAVATION CHECKLIST (ATTACHMENT 34-1)

Jobsite Location: _____ **Date of Inspection:** _____
Competent Person's Name: _____ **Time of Inspection:** _____

Reason for Inspection (check one)

❑ Prior to start of work (daily) ❑ Routine inspection during work ❑ After a rainstorm
❑ After a hazard occurrence (explain)

_____

❑ Other (explain)

_____

General Observations and Conditions (***Answer Questions 1 - 16 Yes/No)***

1. _____ Weather acceptable
2. _____ Water Accumulation
3. _____ Possible Vibration Sources
4. _____ Proper sloping and/or benching system in use.
5. _____ Surface encumbrances.
6. _____ Underground utilities located.
7. _____ Means of egress:
   - _____ Ramps
   - _____ Stairways
   - _____ Ladders
8. _____ Employees exposed to vehicular traffic.
9. _____ Employees exposed to falling loads.
10. _____ Excavation barricaded properly.
11. _____ Ramps and runways equipped with standard railing.
12. _____ Hazardous atmosphere (complete where applicable).
    - _____Oxygen concentration within limits (19.5% to 23%)
    - _____LEL (lower explosive limits) under 10%.
    - _____Carbon monoxide under 35 PPM.

    NOTE: If hazardous atmosphere exists, see Confined Space Entry Procedure.
13. _____ Protection from hazards associated with water accumulation.
14. _____ Adjacent structures stable.
15. _____ Excavated soil at least two feet from edge of excavation.
16. _____ Equipment and building materials at least two feet from the edge of excavation.

Soil Analysis and Classification

Soil Analysis Methods Used: check all that apply

❑ Visual ❑ Manual ❑ Tabulated data

Soil Characteristics: check all that apply

❑ Cemented ❑ Cohesive ❑ Dry ❑ Fissured ❑ Saturated
❑ Granular ❑ Layered ❑ Moist ❑ Plastic ❑ Submerged

Soil Classification: select one

❑ Type A ❑ Type B ❑ Type C ❑ Stable Rock

Manual Test used: check all that apply

❑ Plasticity ❑ Dry Strength ❑ Thumb Penetration
❑ Pocket Penetrometer ❑ Drying Test ❑ Other

_____

EXCAVATION CHECKLIST (ATTACHMENT 34-1 - CONT.)

Protective System Options

Option Selected: select one (Use table B-1 of 29 CFR 1926 Subpart P)

- ❑ Option (1) slope is 1 ½:1
- ❑ Option (2) Slope is _____Based on Soil type and Table B-1
- ❑ Option (3) slope is _____ Based on Soil Type and Table B-1
- ❑ Option (4) Support System

Support System Selected: Select one if option 4 was selected above

- ❑ Timber Shoring Based on Table:
  - ❑ C-1.1 ❑ C-1.2 ❑ C-1.3 ❑ C-2.1 ❑ C-2.2 ❑ C-2.3
  - ❑ Other RPE Name _____
- ❑ Aluminum Hydraulic Shoring System Based on Table:
  - ❑ D-1.1 ❑ D-1.2 ❑ D-1.3 ❑ D-1.4
  - RPE Name _____ Manufacturer Name _____
- ❑ Trench Shields
  Manufacturer Name _____

Comments: _____

Competent Person's Name: _____

Competent Person's Signature: _____

SOIL CLASSIFICATION 1926 SUBPART P APPENDIX A (ATTACHMENT 34-2)

Standard Number: 1926 Subpart P App A •Standard Title: Soil Classification •SubPart Number: P •SubPart Title: Excavations

(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.

PROTECTIVE SYSTEMS (ATTACHMENT 34-3)

Configurations. Configurations of sloping and benching systems shall be in accordance with Figure B-1.

TABLE B-1
MAXIMUM ALLOWABLE SLOPES

SOIL OR ROCK TYPE (H:V)(1) FOR DEEP(3)	MAXIMUM ALLOWABLE SLOPES EXCAVATIONS LESS THAN 20 FEET
STABLE ROCK	VERTICAL (90 Deg.)
TYPE A (2)	3/4:1 (53 Deg.)
TYPE B	1:1 (45 Deg.)
TYPE C	1 1/2:1 (34 Deg.)

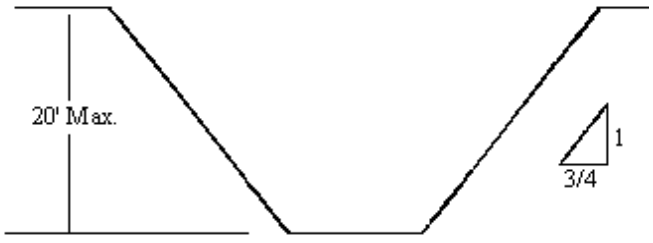
Footnote(1) Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
Footnote(2) A short-term maximum allowable slope of 1/2H:1V (63 degrees) is allowed in excavations in Type A soil that are 12 feed (3.67 m) or less 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.

Figure B-1 - Slope Configurations

(All slopes stated below are in the horizontal to vertical ratio)

B - 1.1 Excavations made in Type A soil.

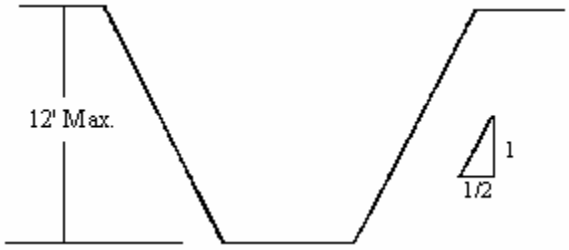
1. All simple slope excavation 20 feet or less in depth shall have a maximum allowable slope of 3/4:1.



(Figure B-1.1a,)

SIMPLE SLOPE - GENERAL

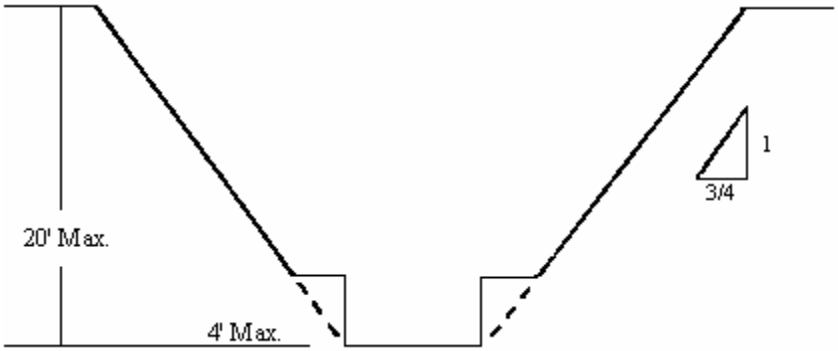
Exception: Simple slope excavations that are open 24 hours or less (short term) and which are 12 feet or less in depth shall have a maximum allowable slope of 1/2:1.



(Figure B-1.1b)

SIMPLE SLOPE - SHORT TERM

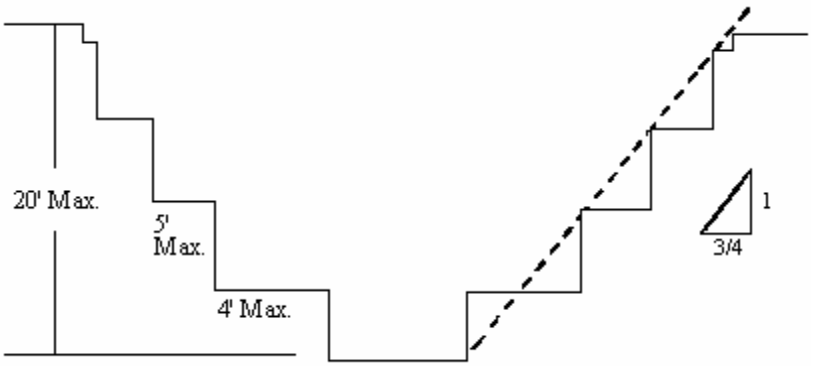
2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 3/4 to 1 and maximum bench dimensions as follows:



(Figure B-1.1c)

SIMPLE BENCH; MULTIPLE BENCH

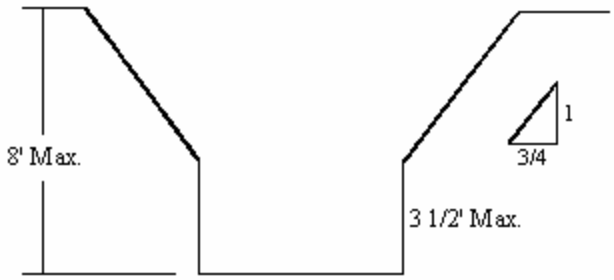
3. All excavations 8 feet or less in depth which have unsupported vertically sided lower portions shall have a maximum vertical side of 3 1/2 feet.



(Figure B-1.1d)

UNSUPPORTED VERTICALLY SIDED LOWER PORTION - MAXIMUM 8 FEET IN DEPTH)

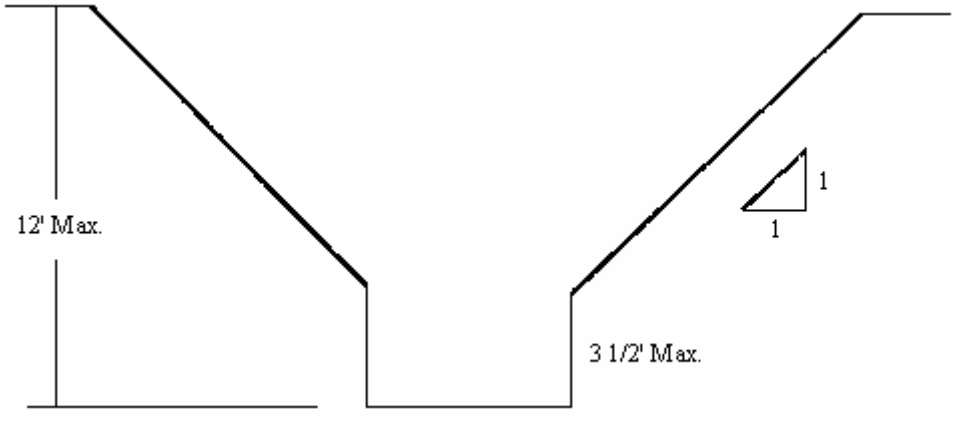
All excavations more than 8 feet but not more than 12 feet in depth with unsupported vertically sided lower portions shall have a maximum allowable slope of 1:1 and a maximum vertical side of 3 1/2 feet.



(Figure B-1.1e)

UNSUPPORTED VERTICALLY SIDED LOWER PORTION - MAXIMUM 12 FEET IN DEPTH)

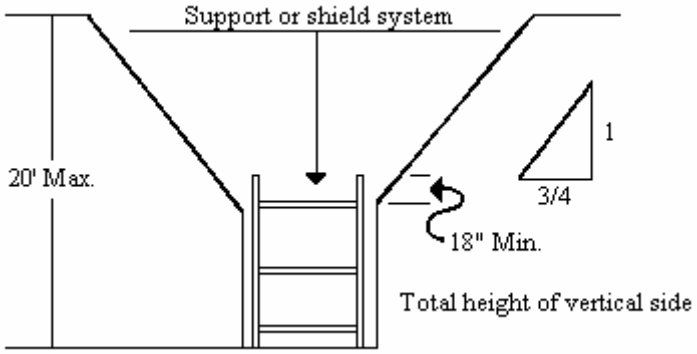
All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maximum allowable slope of 3/4:1. The support or shield system must extend at least 18 inches above the top of the vertical side.



(Figure B-1.1f)

SUPPORTED OR SHIELDED VERTICALLY SIDED LOWER PORTION)

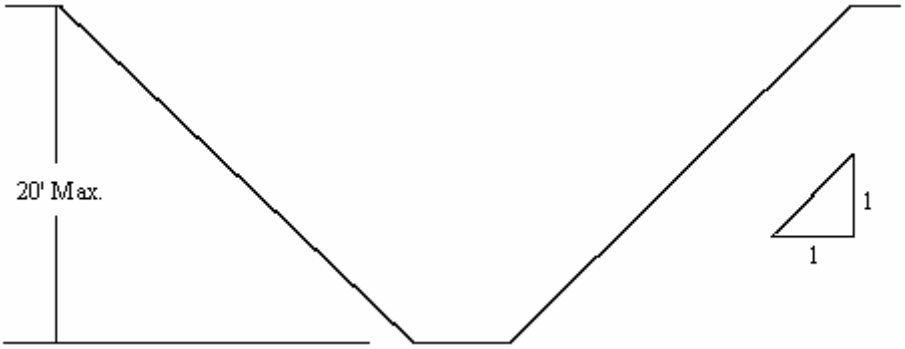
4. All other simple slope, compound slope, and vertically sided lower portion excavations shall be in accordance with the other options permitted under 1926.652(b).



(Figure B-1.1g)

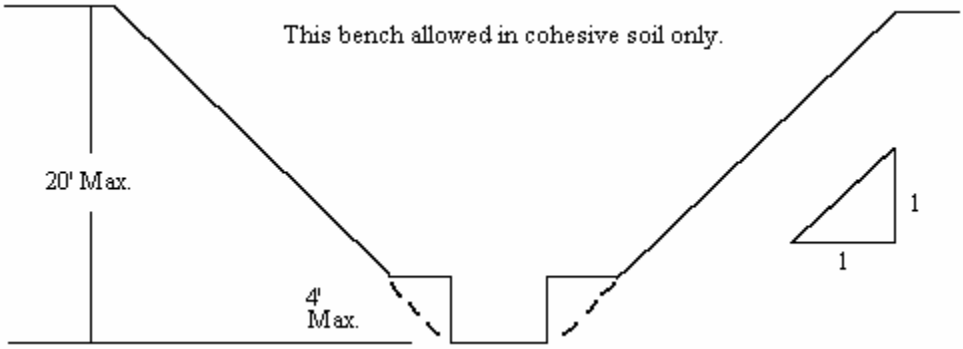
B - 1.2 Excavations Made in Type B Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.



(Figure B-1.2a) SIMPLE SLOPE

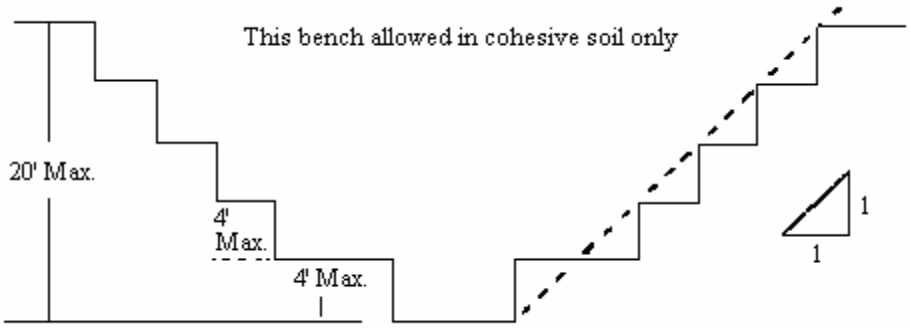
2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions as follows:



(FIgure B-1.2b)

SINGLE BENCH AND MULTIPLE BENCH (These benches allowed in cohesive soil only).

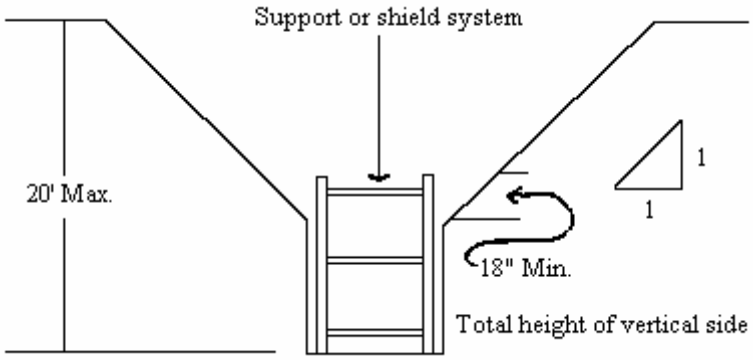
3. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1.



(Figure B-1.2c)

VERTICALLY SIDED LOWER PORTION

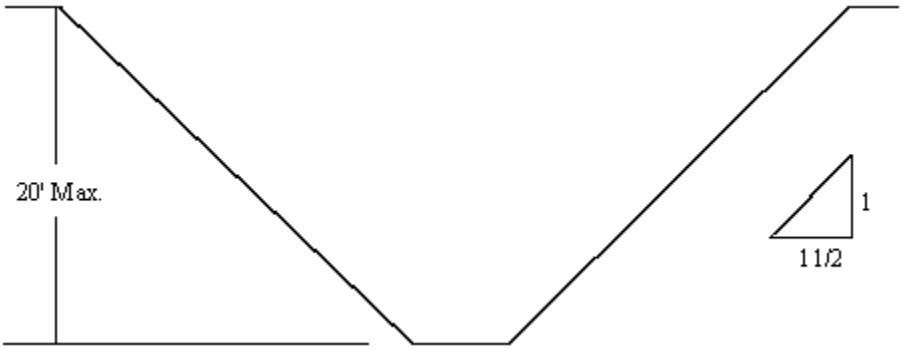
4. All other sloped excavations shall be in accordance with the other options permitted in 1926.652(b).



(Figure B-1.2d)

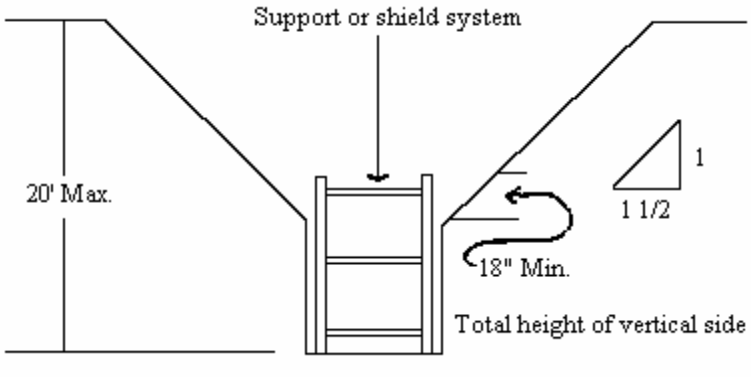
B - 1.3 Excavations Made in Type C Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1 1/2:1.



(Figure B-1.3a)SIMPLE SLOPE

2. All 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 1/2:1.

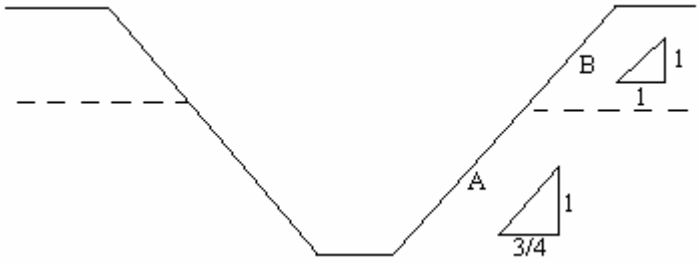


(Figure B-1.3b)
VERTICAL SIDED LOWER PORTION

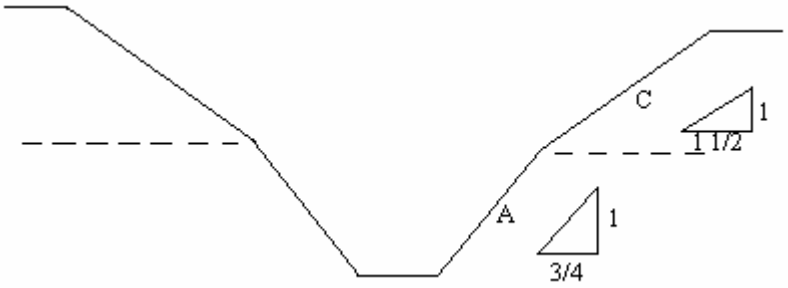
3. All other sloped excavations shall be in accordance with the other options permitted in 1926.652(b).

B - 1.4 Excavations Made in Layered Soils

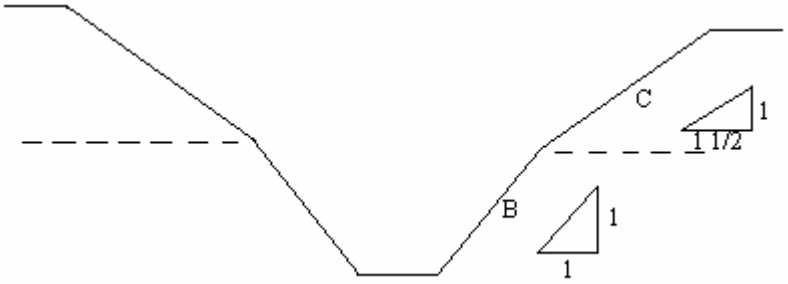
1. All excavations 20 feet or less in depth made in layered soils shall have a maximum allowable slope for each layer as set forth below.



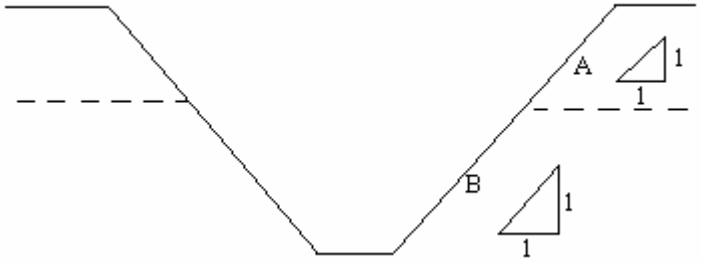
(Figure B-1.4a)
B OVER A



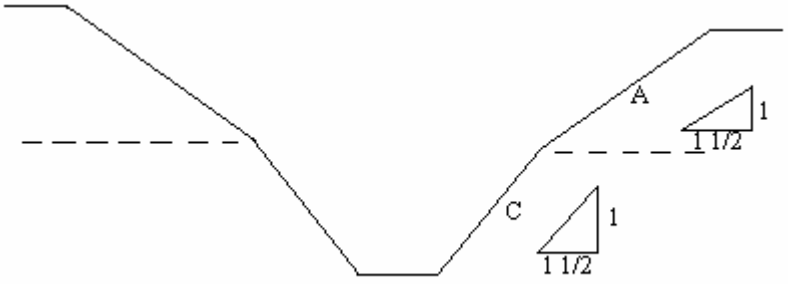
(Figure B-1.4b)
C OVER A



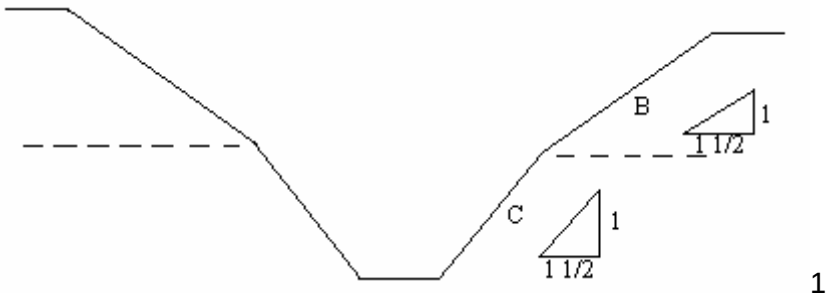
(Figure B-1.4c)
C OVER B



(Figure B-1.4d)
A OVER B



(Figure B-1.4e)
A OVER C



1

(Figure B-1.4f)
B OVER C

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 Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the demolition of buildings. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations involving the demolition of buildings. This SOP is not intended to contain all requirements needed to ensure regulatory compliance. Consult the documents listed in section 3.0 of this SOP for additional for compliance issues. In addition to the referenced OSHA regulation, this SOP will be implemented as part of a written Site Safety and Health Plan or Accident Prevention Plan as outlined in the PIKA CSHP.

3.0 REGULATORY REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards directly apply to the conduct of operations associated with the SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA Construction Industry Standard 29 1926 Subpart T; Demolition.
- USACE EM 385-1-1, Section 23, Demolition.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to the hazards associated with building demolition. The SS will also ensure that relevant sections of this SOP 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 Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 PROCEDURES

5.1.1 GENERAL

This procedure addresses the following items in regards to demolition:

- Preparatory operations;
- Stairs, passageways, and ladders;
- Removal of walls, masonry sections, and chimneys;
- Manual removal of floors;
- Removal of walls, floors, and material with equipment;
- Storage, removal of steel construction;
- Mechanical demolition.

5.2 PREPARATORY OPERATIONS

Prior to initiating demolition activities, an engineering survey of the building must be performed by a competent person to determine the condition of the structure and identify areas subject to potential unplanned collapse. This inspection will be documented on an Engineering Survey Record that will be submitted as part of the project records. As a general rule, the following general preparatory procedures will be conducted:

- If the building being demolished has been previously damaged by fire, flood, explosion or other cause, the walls or floors will be shored or braced.
- All electric, gas, water, steam, sewer or other service lines will be shut off, capped, or other wise controlled, outside the building line before demolition work is started. In each case any utility company that is involved will be notified in advance.
- Service utilities that may be needed during demolition operation will be temporarily relocated and protected.
- A hazard assessment (including testing) will be performed to identify any hazardous chemicals, gases, explosives, flammable materials, or similarly dangerous substances that may have been used on the property. All such materials will be removed to eliminate the hazard before demolition is started. If

the assessment confirms any one and/or more of the following materials: asbestos, PCBs, or lead, the project-specific safety plan shall be modified to include information related to the hazard and the control methods that will be used to control personnel exposure to the hazard. The modifications to the site safety plan will be developed and approved by the PIKA Corporate Safety and Health Manager.

- Hazards to anyone from the fragmentation of glass will be controlled.
- Where a hazard exists to employees falling through wall openings, the opening will be protected to a height of approximately 42 inches.
- Floor openings not used for material drops will be covered with material substantial enough to support the weight of any load that may be imposed.
- Any openings cut in a floor for the disposal of materials will be no larger in size than 25 percent of the aggregate of the total floor area, unless the lateral supports of the removed flooring remain in place. Floors weakened or otherwise made unsafe by demolition operations will be shored to safely carry the intended imposed load.
- When debris is dropped through holes in the floor without the use of chutes, the area onto which the material is dropped will be secured using barricades not less than 42 inches high and positioned at least 6 feet back from the projected edge of the opening above. Appropriate signage will be posted at each level to actively warn personnel of the potential hazard.
- Except for the necessary preparatory work (cutting holes in the floor for chutes, etc.), demolition of exterior walls and floor construction will begin at the top of the structure and proceed downward. Each story of exterior wall and floor construction will be removed and dropped into the storage space before commencing the removal of exterior walls and floors in the story next below.
- Employee entrances to multi-story structures being demolished will be completely protected by sidewalk sheds or canopies, or both, providing protection from the face of the building for a minimum of 8 feet.

5.3 STAIRS, PASSAGEWAYS, AND LADDERS

Access to the building/structure being demolished will be restricted to designated stairways, passageways, and ladders. Other access ways will be entirely closed at all times. All the designated access ways will be periodically inspected and maintained in a clean safe condition. In a multi-story building, when a stairwell is being used, it will be properly illuminated and completely covered over- at a point not less than two floors below the floor on which work is being performed. Additionally, access to the working floor will be from a separate passageway that is also properly lighted and protected.

5.4 REMOVAL OF WALLS, MASONRY SECTIONS, AND CHIMNEYS

In regards to removal of walls, masonry sections and chimneys, PIKA personnel and subcontractors will comply with the following:

- Masonry walls, or other sections of masonry, will not be permitted to fall upon the floors of the building in such masses as to exceed the safe carrying capacities of the floors.
- No wall section, which is more than one story in height, will be permitted to stand without lateral bracing, unless the wall was originally designed and constructed to stand without such lateral support. All walls will be left in a stable condition at the end of each shift.
- Personnel will not work on top of walls when weather conditions constitute a hazard.
- Structural or load-supporting members on any floor will not be cut or removed until all stories above such a floor have been demolished and removed.
- Floor openings within 10 feet of a wall being demolished will be planked solid, except when they are kept out of the area below.
- Steel framing from buildings with “skeleton steel” construction may be left in place during the demolition of masonry. All loose material that collects on structural supports will be cleared off to prevent hazards associated with falling debris if personnel or machinery are required to work under such supports.
- Walls, that serve as retaining walls to support earth or adjoining structures will not be demolished until such earth has been properly braced or adjoining structures have been properly underpinned.
- Retaining walls used to support piled debris will be capable of supporting the imposed load.

5.5 MANUAL REMOVAL OF FLOORS

Prior to and during floor removal, PIKA personnel and subcontractors will ensure compliance with the following:

- Before demolishing any floor arch, debris and other material will be removed from the arch and other adjacent floor area. Planks not less than 2 inches by 10 inches in cross section, full size undressed, will be provided and used by personnel to stand on while breaking down floor arches between beams. Such planks will be so located as to provide a safe support for the workmen should the arch between the beams collapse. The open space between planks will not exceed 16 inches.
- Openings cut in a floor must extend the full span of the arch between supports.
- Safe walkways, not less than 18 inches wide, formed of planks not less than 2 inches thick if wood, or of equivalent strength if metal, will be provided and used

by workmen when necessary to enable them to reach any point without walking upon exposed beams.

- Stringers of ample strength will be installed to support the flooring planks and the ends of such stringers will be supported by floor beams or girders, and not by floor arches alone.
- Planks will be laid together over solid bearings with the ends overlapping at least 1 foot.
- When floor arches are being removed, personnel will not be allowed in the area directly beneath it, and the area underneath will be barricaded to prevent access.
- All debris and other unnecessary materials will be cleared from around the floor area (20 feet) before demolition of the floor arches begin.

5.6 REMOVAL OF WALLS, FLOORS, AND MATERIAL WITH EQUIPMENT

Mechanical equipment will not be used on floors or working surfaces unless the floors or working surfaces are of sufficient strength to safely support the equipment. Curbs or stop logs will be installed around floor openings to prevent equipment from running over the edge. Mechanical equipment will only be used for its intended purpose according to the manufacturer's specifications.

5.7 STORAGE

The storage of waste material and debris on any floor will not exceed the allowable floor loads. In buildings having wooden floor construction, the flooring boards may be removed from not more than one floor above grade to provide storage space for debris, provided falling material is not permitted to endanger the stability of the structure. When wood floor beams serve to brace interior walls or freestanding exterior walls, such beams will be left in place until other equivalent support can be installed to replace them. Floor arches, to an elevation of not more than 25 feet above grade, may be removed to provide storage area for debris provided that such removal does not endanger the stability of the structure. Additionally, storage space into which material is dumped will be blocked off, except for openings necessary for the removal of material. Such openings will be kept at all times when material is not being removed.

5.8 REMOVAL OF STEEL CONSTRUCTION

Steel construction will be dismantled column length by column length, and tier by tier. When floor arches have been removed, planking will be provided for the workers engaged in razing the steel framing. Cranes will be used in accordance with the Rigging Safety and Health Procedure SOP-30. Any structural member being dismembered shall not be overstressed.

5.9 MECHANICAL DEMOLITION

No workers will be permitted in any area, which can be adversely affected by demolition operations, when balling or clamming is being performed or when other heavy equipment is being used to demolish buildings and structures. Only those workers necessary for the performance of the operations will be permitted in this area at any other time. The weight of the demolition ball will not exceed 50 percent of the cranes' rated load, based on the length of the boom and the maximum angle of operation at which the demolition ball will be used, or it shall not exceed 25 percent of the nominal breaking strength of the line by which it is suspended, whichever results in lesser value. During wrecking ball use, the crane boom and load line will be kept as short as possible. The ball will be attached to the load line with a swivel-type connection to prevent twisting of the load line, and shall be attached by positive means in such a manner that the weight cannot become accidentally disconnected. When pulling over walls or portions thereof, all steel members affected shall have been previously cut free, and all roof cornices or other such ornamental stonework will be removed prior to pulling walls over.

During demolition, continuing inspections by a competent person will be made as the work progresses to detect hazards resulting from weakened or deteriorated floors, walls, or loosened material. No employee will be permitted to work where such hazards exist until they are corrected by shoring, bracing, or other affected means.

6.0 ATTACHMENTS

None.

7.0 DOCUMENTATION

None.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) 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. All equipment, process systems, and machines requiring service or maintenance shall be de-energized and secured prior to servicing or maintenance via lockout/tagout practices. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving exposure stored and hazardous energy. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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** - 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** - 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 shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

5.2 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure 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 to ensure compliance with this SOP.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to known or potential hazardous energy sources. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

5.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

6.0 PROCEDURES

All 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. All sources of hazardous energy will be physically located and the equipment or machine will be deactivated so that the equipment or machine is completely isolated from all energy sources (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 (See Figure 36-1); and
6. The authorized personnel conducting the LO/TO will notify all 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

To ensure the complete control of hazardous energy, the following procedural steps will be followed whenever LO/TO must be conducted;

1. Once all energy sources have been identified, all 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 ensure that the status of equipment or machines is in the 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

All authorized personnel responsible for the LO/TO will witness or individually verify that the equipment or machine is completely de-energized to its full capacity by:

1. Checking to ensure that no employees are exposed;
2. Attempting to energize or activate the equipment of machine using the normal operational control; and
3. Testing to ensure the equipment or machine 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 OF LO/TO

In order to ensure the 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 ensure non-essential items (tools, spare parts, etc.) and all affected employees have been safely positioned or removed;
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, LO/TO device(s) shall be removed only by the person(s) to it was assigned.

In the event that the authorized person(s) cannot be located on site, the SSHO will make all reasonable attempts to ensure 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 all 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 ensure 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 ensure 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 are 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 SOP;
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 all 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 SOP reveal inadequacies in the authorized person's knowledge or use of this LO/TO SOP. 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

All 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

All 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 supplied all other protective materials such as blanks, blocks, chains, supports, to ensure that all potentially hazardous energy is controlled.

8.0 PERIODIC INSPECTIONS

The SSHO shall conduct periodic inspections of the on site LO/TO procedures at least monthly to ensure that this SOP 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 ensure compliance with this SOP:

1. The Daily Operational and Safety Logs;
2. Canceled tagout tags;
3. The Lockout/Tagout Issuance Log;
4. The Documentation of Training form for the initial site hazard training;
5. The Documentation of Training form for the Daily Tailgate Safety Briefing; and
6. The Daily Safety Inspection Checklist.

11.0 ATTACHMENTS

Figure 36-1 attached to this SOP is the Lockout/Tagout Issuance Log, which will be used to record the LO/TO equipment issued to each authorized person.

FIGURE 36-1: 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 Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of hand and power tools. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel involved with the use of hand or power tools. This SOP does not address pneumatic tools that are addressed in PIKA SOP-36, Pneumatic Tools. Additionally, this SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site-specific plans, procedures and training for sites where this SOP 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure 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 to ensure compliance with this SOP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to the hazards associated with the use of hand and power tools. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in 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 all 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 SOP 45; and
9. Good housekeeping practices shall be followed at all times.

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 COE 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 Site Safety and Health Plan.

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 at all times 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 all 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 ensure compliance with this SOP:

1. The Daily Operational and Safety Logs;
2. The Documentation of Training form for the initial site hazard training;
3. The Daily Safety Briefing Attendance Log; and
4. The Daily Safety Inspection Checklist.

8.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of pneumatic nail guns and staplers. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving the use of pneumatic nail guns and staplers. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 and
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 resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure 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 to ensure compliance with this SOP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to the hazards associated with pneumatic nail gun and stapler operations. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 PROCEDURES

All site personnel who will be involved with the use of pneumatic nail guns or staplers will read this SOP and the manufacturer's instruction manual. When possible, a copy of the manufacturer's instruction manual will be attached to this SOP 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 ensure 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 ensure 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 all 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. All 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 not 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 affect 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 gunor stapler.

7.0 AUDIT CRITERIA

The following items related to site compliance with this SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;
3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist.

8.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving welding, torch cutting or other hot work. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations involving welding, torch cutting or other hot work. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to the hazards associated with welding, torch cutting or

other hot work. The SS will also ensure that relevant sections of this SOP 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 Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 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 will be secured with ropes or barricades prior to cutting and burning activities. All site personnel will be notified of the location and time of hot work operations. A Hot Work permit (Attachment 1) shall be completed prior to cutting and burning of any material.

5.2 EQUIPMENT INSPECTION AND USE

All 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

All 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. All 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. All 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 ensure 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. All 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.

5.1.5 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.

5.3.5 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.

5.1.7 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.

5.3.6 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.

5.3.7 Regulators and Gauges

Oxygen and fuel gas pressure regulators, including their related gauges, shall be in proper working order while in use.

5.3.8 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.

5.3.9 Arc Welding

5.3.9.1 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.\

5.3.9.2 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.

5.3.9.3 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 ensure that no electrolysis or fire hazard condition exists;
6. The frames of all 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 ensure 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; and
8. All ground connections shall be inspected to ensure that they are mechanically strong and electrically adequate for the required current.

5.3.9.4 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.

5.3.9.5 Arc Welding Shielding

Whenever practicable, all 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, all 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 all 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 of 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
9. The torch is not to be used
10. Or whenever the torch is left unattended for a substantial period of time, such as during the lunch period, and
11. At the end of the work day;
12. 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;

13. 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;
14. 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
15. 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 (6.1) 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 SOP (SOP-15) will be consulted and implemented for any hot work conducted inside a confined space.

5.3.3 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 with appropriate shades will be worn;
2. Leather steel-toed boots;
3. Protective clothing, such as leather welding gloves and aprons; and
4. Hardhat.

6.0 AUDIT CRITERIA

The following items related to site compliance with this SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;

3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

The Hot Work Permit presented in Attachment 1 will be utilized for all welding, cutting and other hot work.

HOT WORK PERMIT (ATTACHMENT 1)

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.
_____ Any available fire protection systems are in service.
_____ There are no flammable dusts, vapors, liquids, or unpurged tanks (empty) in the area.
_____ Explosimeter reading is <10% LEL.
_____ 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.
_____ 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 <u>daily</u> whenever HOT WORK is being conducted and posted at the job site.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to ladders, stairways, and other forms of access. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving ladders, stairways and other means of access. This SOP 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 SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 SOP, 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 resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

5.2 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure 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 to ensure compliance with this SOP.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve the use or construction of ladders, stairways or other means of access. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

5.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO

will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

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. All 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; or

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 SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;
3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist.

8.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of scaffolding. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP. This SOP will also be implemented along with the fall protection requirements outlined in PIKA SOP-42.

2.0 SCOPE

This SOP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations involving the use of scaffolding. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to the hazards associated with the erection, use and dismantling of scaffolds. The SS will also ensure that relevant sections of this SOP 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 Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 DEFINITIONS

For the implementation of this SOP, the following definitions will apply.

1. Body harness means 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.
2. Brace means a rigid connection that holds one scaffold member in a fixed position with respect to another member, or to a building or structure.
3. Competent person means 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.
4. Coupler means a device for locking together the tubes of a tube and coupler scaffold.
5. Fabricated decking and planking means manufactured platforms made of wood (including laminated wood, and solid sawn wood planks), metal or other materials.
6. Fabricated frame scaffold (tubular welded frame scaffold) means a scaffold consisting of a platform(s) supported on fabricated end frames with integral posts, horizontal bearers, and intermediate members.
7. Fall Arrestor means 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.
8. Guardrail system means 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.
9. Lifeline means 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.

10. Lower levels means 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.
11. Maximum intended load means 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.
12. Mobile scaffold means a powered or non-powered, portable, caster or wheel-mounted supported scaffold.
13. Open sides and ends means 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.
14. Outrigger means 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.
15. Platform means a work surface elevated above lower levels. Platforms can be constructed using individual wood planks, fabricated planks, fabricated decks, and fabricated platforms.
16. Rated load means the manufacturer's specified maximum load to be lifted by a hoist or to be applied to a scaffold or scaffold component.
17. Scaffold means any temporary elevated platform (supported or suspended) and its supporting structure (including points of anchorage), used for supporting employees or materials or both.
18. Unstable objects means 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.
19. Walkway means a portion of a scaffold platform used only for access and not as a work level.

6.0 PROCEDURES

6.1 GENERAL

6.1.1 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.

6.1.2 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” (Attachment 41-1) to ensure compliance with OSHA requirements.

7.0 ATTACHMENTS

Scaffolding Inspection Checklist - Attachment 41-1

8.0 DOCUMENTATION

None.

SCAFFOLDING INSPECTION CHECKLIST (ATTACHMENT 41-1)

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				

LINE ITEM	Y	N	NA	C
(or equivalent) used? 1926.451(e)(1)				
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:

Inspector's Name: _____

Inspector's Signature: _____

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures associated with fall protection systems. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving personnel exposure to fall hazards. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 SOP.

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 resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

5.2 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure 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 to ensure compliance with this SOP.

5.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to falls and involve the use of fall protections systems. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

5.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

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 all 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 all employees will be protected from falls exceeding 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. All open-sided floors six feet or more above a lower level will be protected by a standard guardrail system, a safety net system, or all employees shall be protected by a personal fall protection system and a warning line system. All 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

All 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. All training must be documented with name of employee trained, date of training, and signature of the trainer. This training will include:

- X A description of each fall hazard on the project and specific measures will be used to protect the employee from these hazards;
- X Instruction on the use, inspection, and maintenance of fall protection equipment;
- X RRIG's Fall Protection Procedure; and
- X 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 (Attachment 42-1) to ensure compliance with OSHA requirements.

7.0 AUDIT CRITERIA

The following items related to site compliance with this SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;
3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist
5. The Fall Protection Inspection Checklist.

8.0 ATTACHMENTS

Fall Protection Inspection Checklist - Attachment 42-1

FALL PROTECTION INSPECTION CHECKLIST (ATTACHMENT 42-1)

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 snap hooks 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 snap hooks shall have a minimum tensile strength of 5000 pounds.				
5. Fall arrest systems are rigged such that employees 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

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to manual lifting and material handling. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including subcontractor personnel, and operations involving manual lifting and material handling. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP 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 CSHP, to include this SOP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this SOP 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 SOP to ensure 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 to ensure compliance with this SOP.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to the hazards associated with manual lifting and material handling. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in 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., 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 not time will an employee attempt to lift an item individually that 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 ensure 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 ensure 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

To ensure the safety and health of site personnel, 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 5.0 of this SOP.

1. All 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. All materials stored in tiers, whether in bags, containers or bundles, shall be stacked, blocked or interlocked and limited in height to ensure the material is stable and to prevent sliding or collapse;
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. All 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 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 Site Safety and Health Plan.

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 SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;
3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist.

7.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the transportation of hazardous materials. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations involving the transportation of hazardous materials. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 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 resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

5.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve the transportation of hazardous materials. The SS will also ensure that relevant sections of this SOP are discussed in the daily safety briefings and that information related to its daily implementation is properly recorded in appropriate site documentation.

5.3 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

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 SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;
3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. Transportation Manifests, Bills of Lading, Certificates.

8.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of scaffolding. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 CSHP.

2.0 SCOPE

This SOP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations involving the use of scaffolding. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP 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 shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for sites where this SOP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for operations that involve personnel exposure to the hazards associated with the erection, use and dismantling of scaffolds. The SS will also ensure that relevant sections of this SOP 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 Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 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** – (Over 600 volts, nominal) 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

All 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 all 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. All 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 ensure the system is not energized while a potential for exposure exists.

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. All outdoors 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. All lamps shall be protected from breakage or accidental contact by 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 all construction sites either ground fault circuit interceptors or an assured equipment-grounding program shall be in place. For ground fault protection, all 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), cali-

brated to trip with a threshold of 5 milli amps (ma) ± 1 ma, are required on all 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. All 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 all 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. All 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. All 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. The record shall be made available on the jobsite for inspection by the Assistant Secretary and any affected employee.

6.6 OVER-CURRENT PROTECTION

Switches, fuses, and circuit breakers shall be properly labeled to identify their circuits, and all outdoor switches, fuses, and circuit breakers shall be protected from the elements. Additionally, fuses or circuit breakers shall protect all feeder and branch circuits.

6.7 ELECTRICAL OUTLETS

All 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 SOP-36 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 SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;
3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist.

8.0 ATTACHMENTS

No attachments are associated with this SOP.

1.0 PURPOSE

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 SOP to outline general guidelines for establishing site-specific procedures for: work zones; personnel and equipment decontamination and personal hygiene.

2.0 SCOPE

This SOP applies to all PIKA personnel, including contractor and subcontractor personnel, and operations where contamination-control measures are required to protect site personnel from the spread of contamination. This SOP is not intended to contain all requirements needed to ensure complete regulatory compliance. Consult the documents listed in section 3.0 of this SOP 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 SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed. Additionally, this SOP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA General Industry Standard 29 CFR 1910.120.
- USACE EM 385-1-1, Section 28, Hazardous, Toxic, and Radioactive Waste (HTRW) and Underground Storage Tank (UST) Activities.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

Project Manager (PM) is responsible for the overall implementation of the PIKA Corporate Safety and Health Program on those project sites the PM manages. As such, the PM is responsible for ensuring the availability of the PIKA resources needed to implement this Contamination Control SOP.

4.2 CORPORATE SAFETY AND HEALTH MANAGER

The Corporate Safety and Health Manager (CSHM) is responsible for the continued development and improvement of the PIKA Corporate CSHP and this SOP. To accomplish this end, the CSHM will be responsible for the following:

1. Conducting an annual review of this SOP and making modifications as necessary;
2. Reviewing technical information to maintain current knowledge in the methods, materials, and techniques used for contamination control;

3. Researching and reviewing site characterization data to identify sources of potential contamination;
4. Reviewing planned site activities to identify those tasks with the greatest risk of contaminant contact; and
5. Designing/identifying methods or procedures for controlling contamination contact.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) is the senior PIKA employee on the site in charge of the project performance. The SS is responsible for ensuring that the safety and health procedures associated with the SOP are implemented to control contamination migration. As such the SS will provide the necessary personnel and equipment resources to ensure effective implementation of this SOP.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for implementing this SOP 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 ensure that 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. It will be the responsibility of the SSHO to ensure that the control zones and access control points are established in accordance with (IAW) the SSHP, and evaluated daily, to ensure that hazards found inside a given zone do not migrate outside the zone.

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 ensure that personnel and equipment are protected and that contamination located inside the EZ is properly contained. 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: It may become necessary, due to hot weather conditions, 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 ensure that site personnel 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

To ensure availability of water for washing and drinking, 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) 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 ensure 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 SOP, and are graphically depicted in Figures 46-3 through 46-6. 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.

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 46-3 through 46-6.

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 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 ensure personnel do not 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 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 ensure that personnel do 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 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 ensure that personnel do not 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 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 ensure that personnel do not place non-booted 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 ensure 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 6 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; and
- 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 46-1: TYPICAL SITE LAYOUT

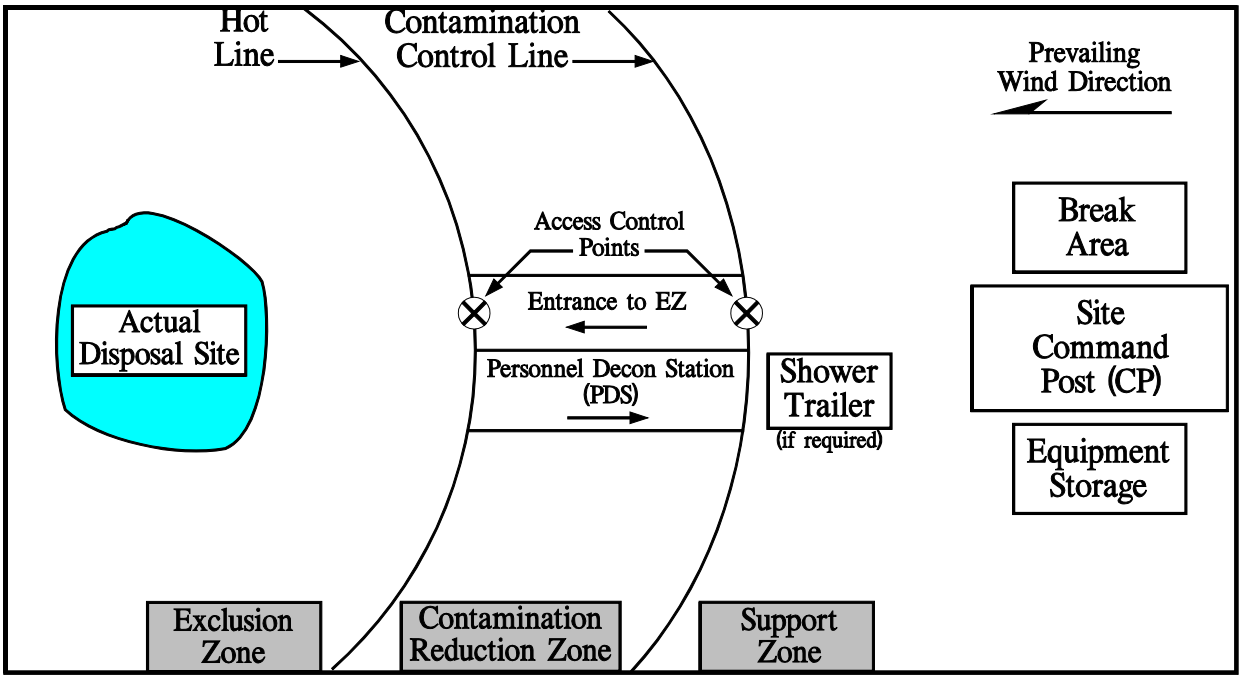


FIGURE 46-2: PDS FOR LEVEL A AND LEVEL B WITH ENCAPSULATING SUIT

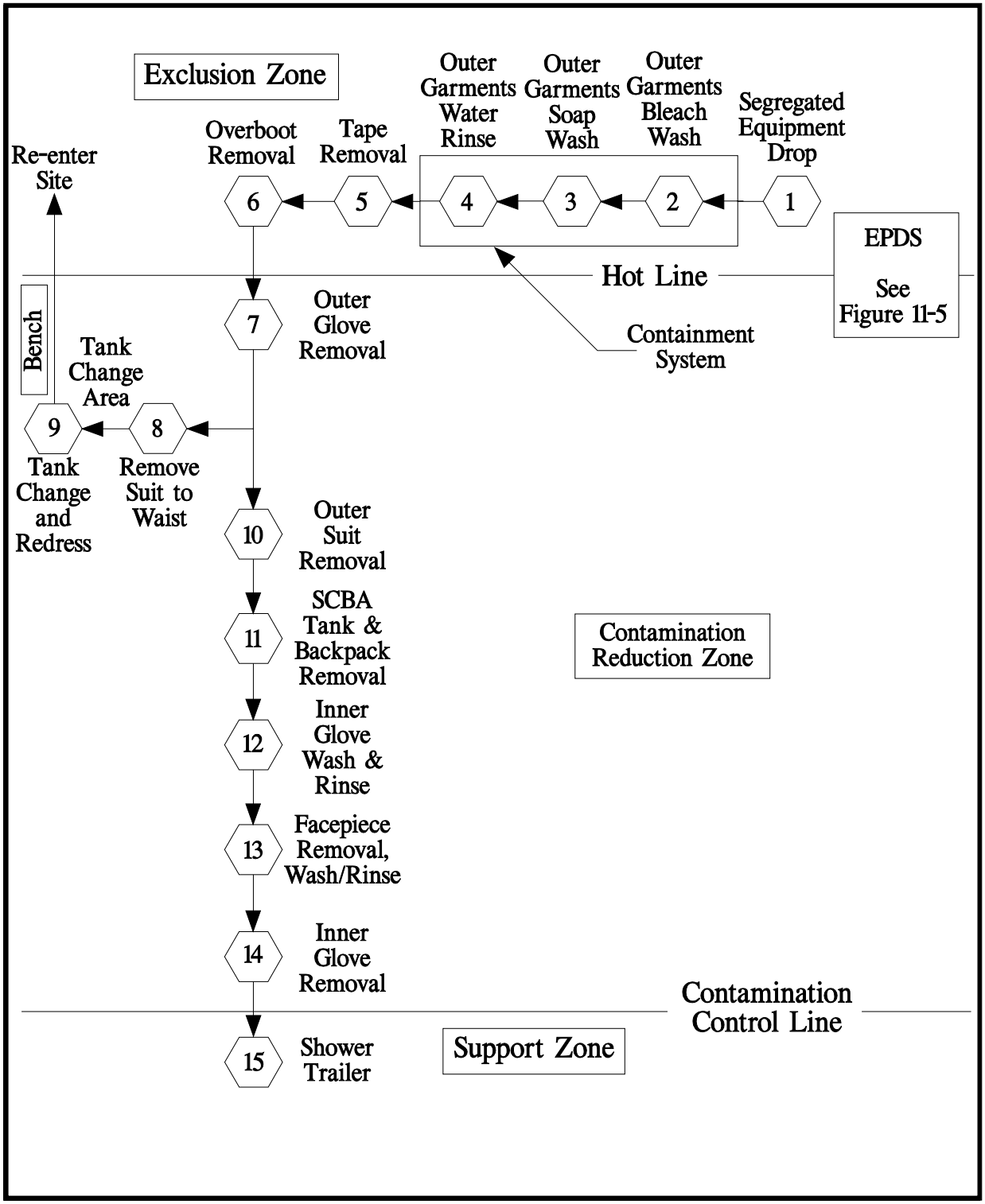


FIGURE 46-3 PDS FOR LEVEL B WITH NON-ENCAPSULATING SUIT

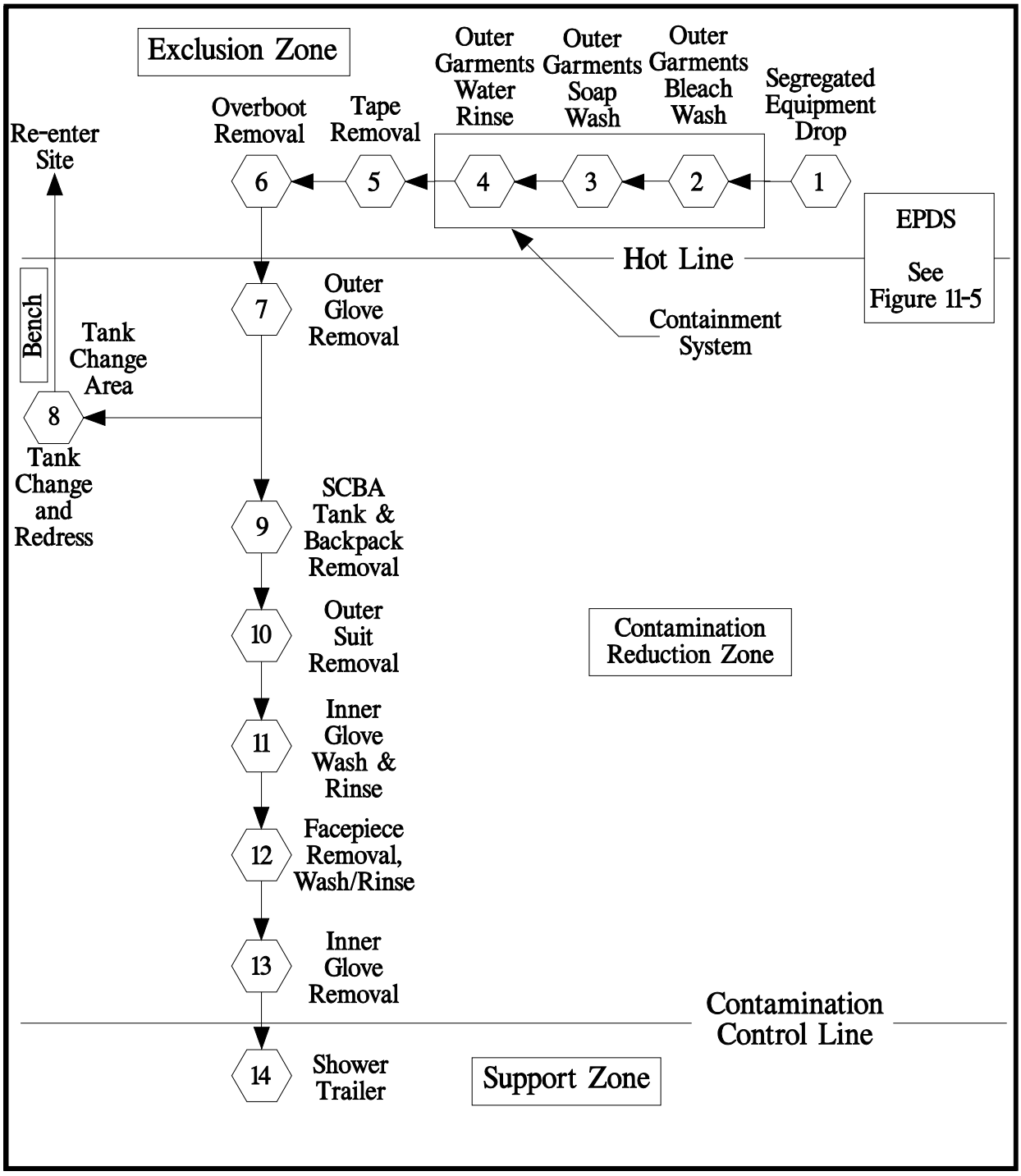


FIGURE 46-4: PDS FOR LEVEL C

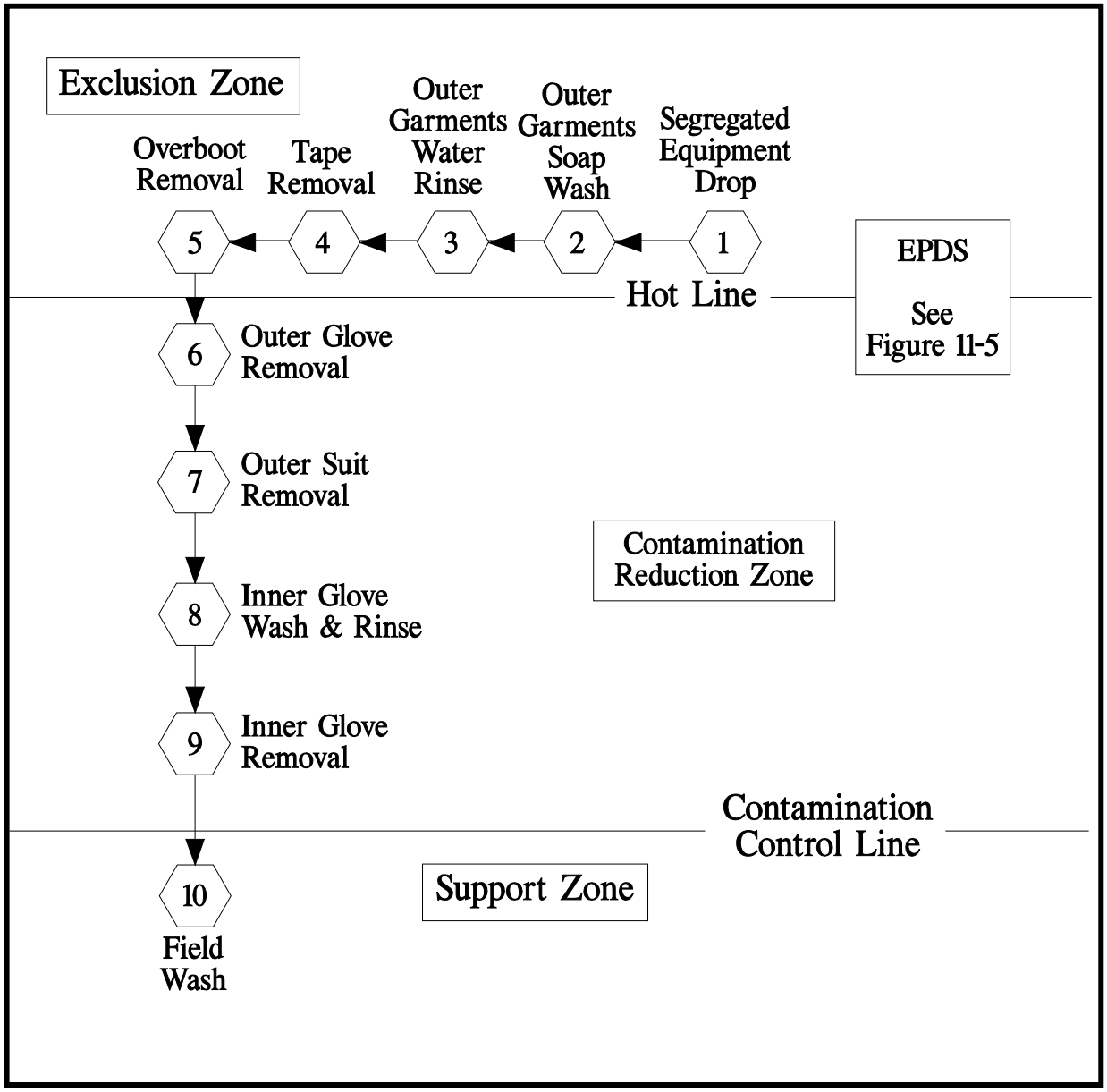


FIGURE 46-5: PDS FOR MODIFIED LEVEL D

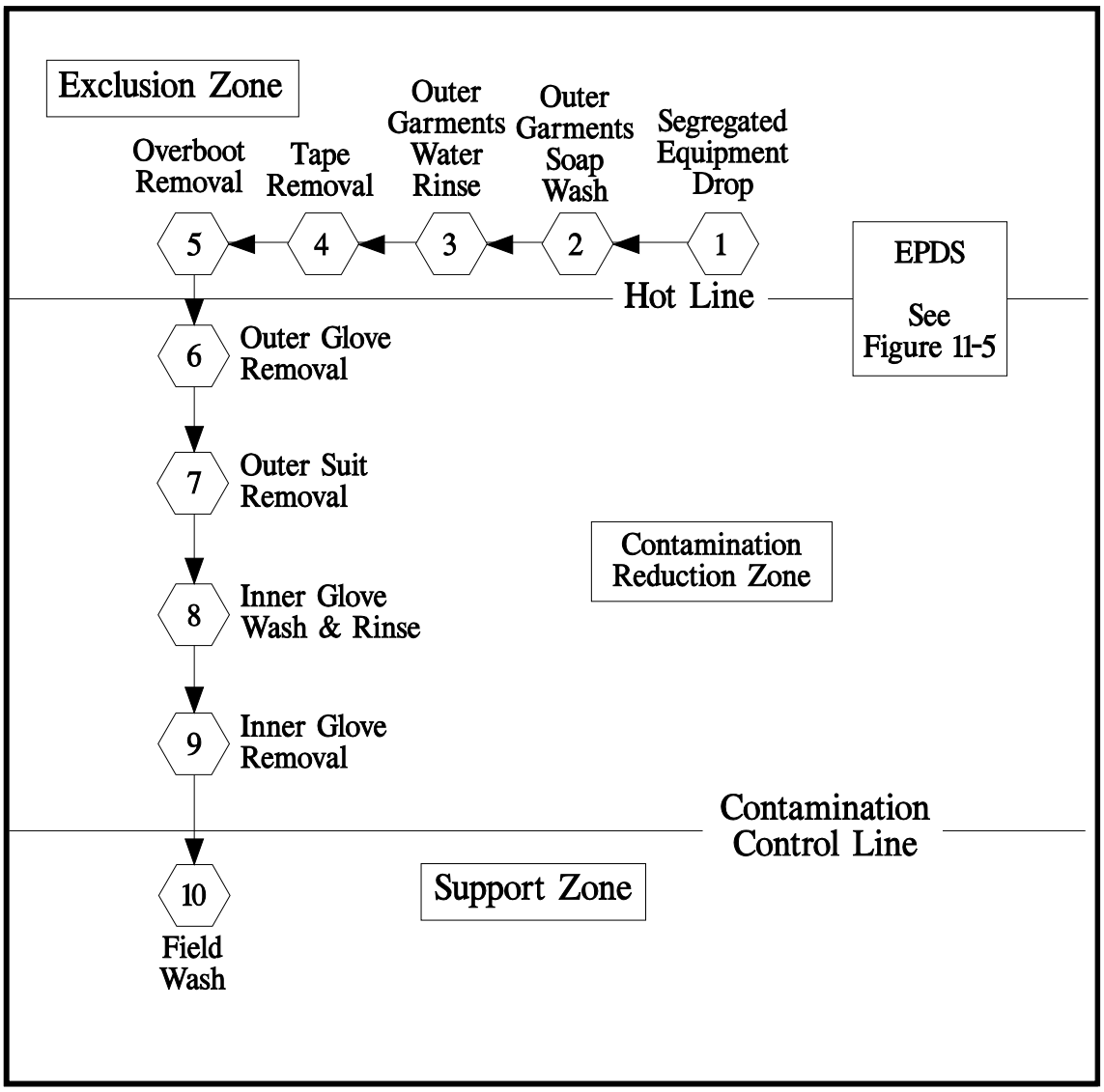
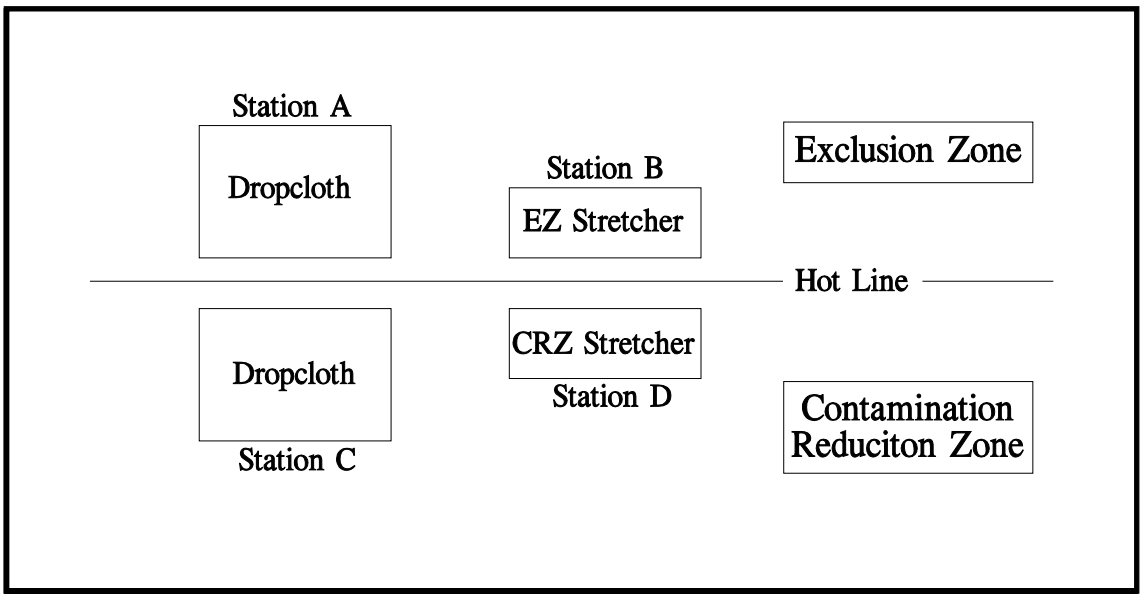


FIGURE 46-6: EMERGENCY PERSONAL DECONTAMINATION STATION



1.0 OBJECTIVE

The objective of this SOP 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 SOP will help ensure that site monitoring and sampling are conducted in a manner which will effectively protect the site workers, the environment and the general public from chemical and physical hazards. This SOP 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 SOP applies to all PIKA unexploded ordnance (UXO) 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

1. OSHA. March 30, 1984. Industrial Hygiene Technical Manual. OSHA Instruction CPL 2-2.20A
2. ACHIG TLVs and BEIs, 2002.
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.

4.0 DEFINITIONS

1. **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).
2. **Breathing Zone (BZ)** - an imaginary hemisphere, forward of the shoulders, with a radius of six to nine inches.
3. **Direct Reading Instruments** - Instruments that provide real-time readings of the chemical or physical hazards to which a worker may be exposed.
4. **Personal Sampling** - The sampling to determine their exposure to chemical or physical hazards.
5. **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.

6. **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.
7. **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.
8. **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 SOP for all PIKA projects. In this role, the PM will also be responsible for the management of the PIKA resources needed for the implementation of this SOP.

5.2 CORPORATE SAFETY AND HEALTH MANAGER

The Corporate Safety and Health Manager (CSHM) is responsible for the continued development of this SOP and for ensuring the proper implementation of its requirements. The CSHM is also responsible for the following:

1. Development of the SSMP to be incorporated in the SSHP;
2. Providing consultation to and assisting the Site Safety and Health Officer (SSHO) with the selection and acquisition of monitoring and sampling equipment;
3. Assisting the SSHO with the field implementation of the SSMP;
4. Periodically reviewing new technologies to identify monitoring/sampling instruments or methods which could more effectively detect and quantify chemical or physical hazards;
5. Periodically (every 30 - 45 days) inspecting site operations to ensure that monitoring activities comply with the SSMP; and
6. Annually reviewing this SOP and providing updates as needed.

5.3 SITE SAFETY AND HEALTH OFFICER

The SSHO is responsible for the field implementation of this SOP and the SSMP. To achieve this goal, the SSHO will also be responsible for the following:

1. Acquiring, with assistance from the CSHM, the instruments and resources required for implementing the SSMP;
2. Arranging for, or providing, training for PIKA personnel who will actively participate in conducting site monitoring;

3. Conducting, or supervising PIKA personnel conducting, monitoring for chemical and physical hazards;
4. Ensuring that all instruments and equipment used for site monitoring and sampling are inspected, calibrated and maintained according to manufacturer specifications; and
5. 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. To ensure completeness, the information listed in this section will be used by the CSHM when designing the SSMP. An effectively designed SSMP will allow for the following:

1. Identification of immediately dangerous to life or health (IDLH) conditions;
2. Assessment of worker's exposure to chemical and physical hazards;
3. Identification of high risk activities;
4. Determination of the need and/or effectiveness of control methods and zones;
5. Selection of appropriate personal protective equipment (PPE);
6. Delineation of areas where PPE is required; and
7. Determination of the need for site-specific medical surveillance monitoring.

6.1 EVALUATION OF SITE CHARACTERIZATION DATA

During the development of the SSHP, the CSHM 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:

1. A review of documents which identify materials placed or buried on site;
2. Interviews of personnel who may have been involved in past disposal operations at the site;
3. A review of data from previous environmental sampling conducted on or near the site;
4. A reconnaissance of the site, conducted from outside the perimeter; and
5. 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 CSHM will review the planned site activities to determine if they will increase the potential for worker exposure. The

CSHM 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 CSHM 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 include personal air sampling pumps and contaminant specific collection media. These, as well as other specific monitoring devices, will be discussed in detail in section 6.0 of this SOP. Whenever possible and feasible, the CSHM 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 CSHM 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:

1. The acute toxicity of the contaminant;
2. The potential health affects caused by exposure;
3. The amount of contamination present in soil/water;
4. The volume of contaminants placed/buried on site;
5. The potential for contaminant release during site activities;
6. The impact site activities will have on the potential for exposure or release; and
7. 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 7.3 of this SOP.

6.5 SELECTION OF MONITORING LOCATIONS AND FREQUENCIES

The CSHM 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 ensure 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 7.0 of this SOP. The frequency for monitoring each contaminant or physical hazard will be selected by the CSHM 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 to ensure protection of the workers. 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 7.1 of this SOP.

All 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 is 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 SOP. 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 CSHM will specify the procedure for their use in the SSMP. Active air sampling will be conducted IAW the procedures specified in Section 7.2 of this SOP.

Whenever active sampling collection media require laboratory analysis to determine the quantitative results, the CSHM 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 CSHM 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 to ensure proper conduct of the SSMP.

8.1 MONITORING DURING INITIAL SITE ENTRY

Personal protective equipment used during initial site entry will be selected by the CSHM and will comply with the provisions of the Personal Protective Equipment Program, Attachment T of the PIKA Corporate Safety and Health Program. 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.

1. Real-time, DRIs will be used to detect potential IDLH (toxic), explosive/flammable and/or oxygen deficient/enriched atmospheres.
2. 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.
3. The monitoring conducted during initial entry will include, as required, monitoring in the following locations:
   a. Along the perimeter of the site;
   b. In and/or around potential release sources identified during off site reconnaissance;
   c. Around/over standing pools of liquid;
   d. Inside naturally occurring or man-made depressions or structures;
   e. Around storage and disposal containers; and
   f. At locations where dead vegetation or other biological indicators signify the potential for contamination.
4. 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 ensure 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:

1. All DRIs used on site will be certified by the manufacturer as being safe for the atmosphere in which they will be used.

2. 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.
3. If work area and/or perimeter monitoring are required, the monitoring locations and heights will be determined by the CSHM and will be specified in the SSMP. This determination will be made based upon the physical properties of the contaminant and the site.
4. 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 trained assistant (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 CSHM 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 CSHM. To calibrate the sample pump, the SSHO or TA will follow the steps outlined in Appendix A of this SOP. These steps will also be used to conduct the post-sampling calibration check, which is required to ensure 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 all sampling situations, the SSHO/TA will sample worker(s) who's task assignments involve the greatest risk of exposure. This "worst case" sampling strategy ensures that no workers on site will receive an exposure greater than those measured. During active integrated sampling, the requirements listed below will be followed:

1. Air sampling pumps will pre and post-calibrated IAW with Appendix A of this SOP.

2. 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.
3. The SSHO/TA will be responsible for completing the information required in the PIKA Personnel Air Sampling Data Sheet
4. 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 CSHM in the SSHP/SSMP.
5. Sampling and sample handling will be conducted IAW applicable NIOSH/OSHA/EPA sampling and analytical techniques.
6. After the samples that have been collected, all 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 CSHM 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 CSHM 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 CSHM 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 ensure continued operation 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 CSHM, 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 SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;

3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist.

10.0 ATTACHMENTS

Appendix A..... Calibration Procedure for Air Sampling Pumps

APPENDIX A

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 CSHM 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. Pump, and 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 .

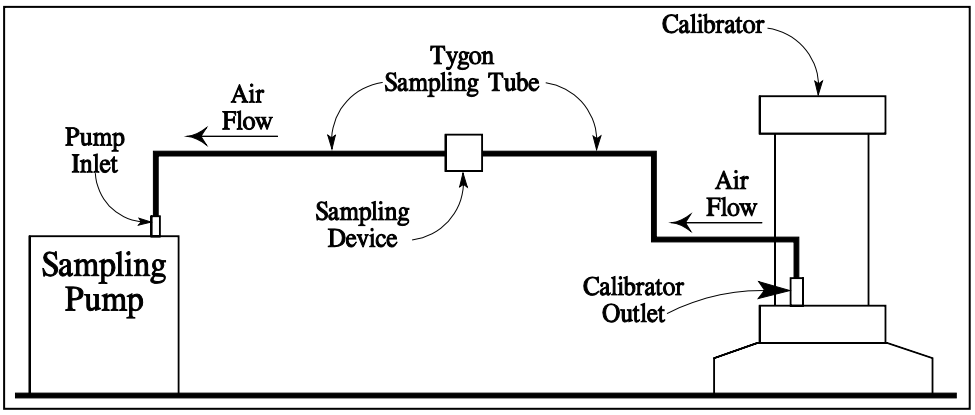
3.0 PROCEDURE

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 CSHM.

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 all 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

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the handling of drums or containers.

2.0 SCOPE

This SOP 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 SOP is not intended to contain all requirements needed to ensure regulatory compliance. Consult the documents listed in section 3.0 of this SOP for additional for compliance issues.

3.0 REGULATORY REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards and U.S. Army Corps of Engineers (USACE) requirements directly apply to the conduct of operations associated with the SOP. In the event other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed.

1. OSHA General Industry Standard 29 CFR Part 1910.120; and
2. USACE EM 385-1-1, Section 28.H.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated in plans, procedures and training for sites where this SOP is to be implemented.

4.2 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented for all drum and container handling operations. The SS will also ensure that relevant sections of this SOP are discussed in the tailgate safety briefings and that information related to its daily implementation is documented in the Site Operational Log.

4.3 TEAM LEADER

The Team Leader shall be responsible for the field implementation of this SOP and for implementing the safety and health requirements outlined in section 5.0 of this SOP. In the absence of a SS, the Team Leader shall be responsible for implementing the SS responsibilities outlined in paragraph 4.2.

4.4 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily tailgate safety briefings. The SSHO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in 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.

5.1 SAFETY HAZARDS AND OPERATIONAL CONTROL TECHNIQUES

This SOP 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 SOP also outlines the effective engineering controls, safe work practices, and personal protective equipment (PPE) to be used in drum/container handling. This SOP 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.

5.2 GENERAL REQUIREMENTS

The following generalized 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; and
9. The flow chart found in Figure 48-1 will be used as a guide to direct the course of drum/container handling, sampling, staging, bulking and shipment procedures outlined in this SOP.

5.3 LOCATION AND REMOVAL OF BURIED DRUMS/CONTAINERS

To ensure the safety and health of on site workers, the environment and the general public, extreme caution shall be used when buried drum/containers must be located and removed. 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 the Excavation and Trenching SOP; and
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 ensure conditions are safe for entry and to determine if the requirements of the Confined Space Entry SOP must be implemented.

5.4 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; and
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; and
3. The configuration of the drumhead and the drum material (see Tables 48-1 and 48-2).

Table 48-1. 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 48-2. 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.

5.5 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 ensure protection of 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 48-3) will be used, and the operation will be conducted in a containment vessel designed to minimize the effects of a pressurized release or explosion; and
8. Employees shall not stand upon or work from drums or containers.

5.6 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.

Table 48-3. 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.

If deemed necessary by the CIH, a Certified Health Physicist, or other person with sufficient education and experience to make such an assessment shall conduct the hazard assessment of radioactive waste drums/containers and exposure potential.

5.7 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; and
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.

5.8 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; and
4. Overpack drums, first aid kits and fire extinguishers shall be staged near the area where pressurized drums are inspected and stored.

5.9 HANDLING LABORATORY WASTE PACKS

In addition to the requirements of paragraph 5.4 of this SOP, 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; and
5. Whenever possible, handle lab packs initially using a grappler unit designed for explosive containment.

5.10 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; and
5. Samplers shall not stand on or lean over the drum/container while sampling.

5.11 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 SOP 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 48-2 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; and
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.

5.12 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.

5.13 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; and
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.

5.14 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. To ensure that tanks and vaults found on site are handled safely, the following shall be implemented:

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 the Confined Space Entry SOP whenever employees must enter a tank or vault; and
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.

5.15 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. To ensure that a spill will be contained and cleaned-up safely, the following shall apply:

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; and

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.

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;
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 the Confined Space Entry SOP; and
4. All provisions and requirements specified in other SOPs that apply to drum and container-handling operations (i.e., excavation and trenching, heavy equipment operation, etc.) shall be followed.

7.0 AUDIT CRITERIA

The following items related to drum and container-handling operations will be audited to ensure compliance with this SOP:

1. The Daily Operational and Safety Logs;
2. The Documentation of Training form for the initial site hazard training;
3. The Documentation of Training forms for the Daily Tailgate Safety Briefings; and
4. The Daily Safety Inspection Checklist.

8.0 ATTACHMENTS

No attachments are associated with this SOP.

FIGURE 48-1. DRUM AND CONTAINER HANDLING FLOW CHART

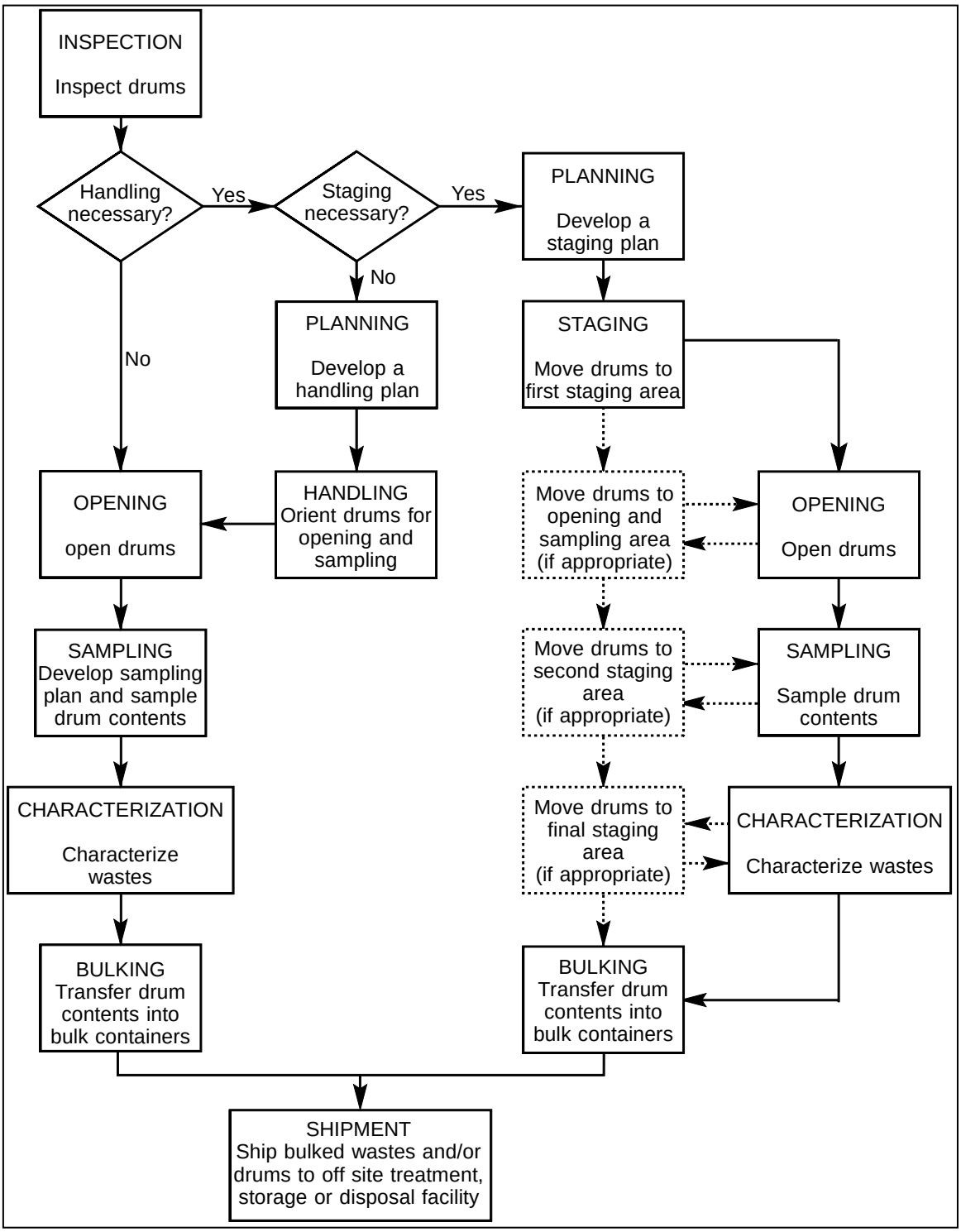
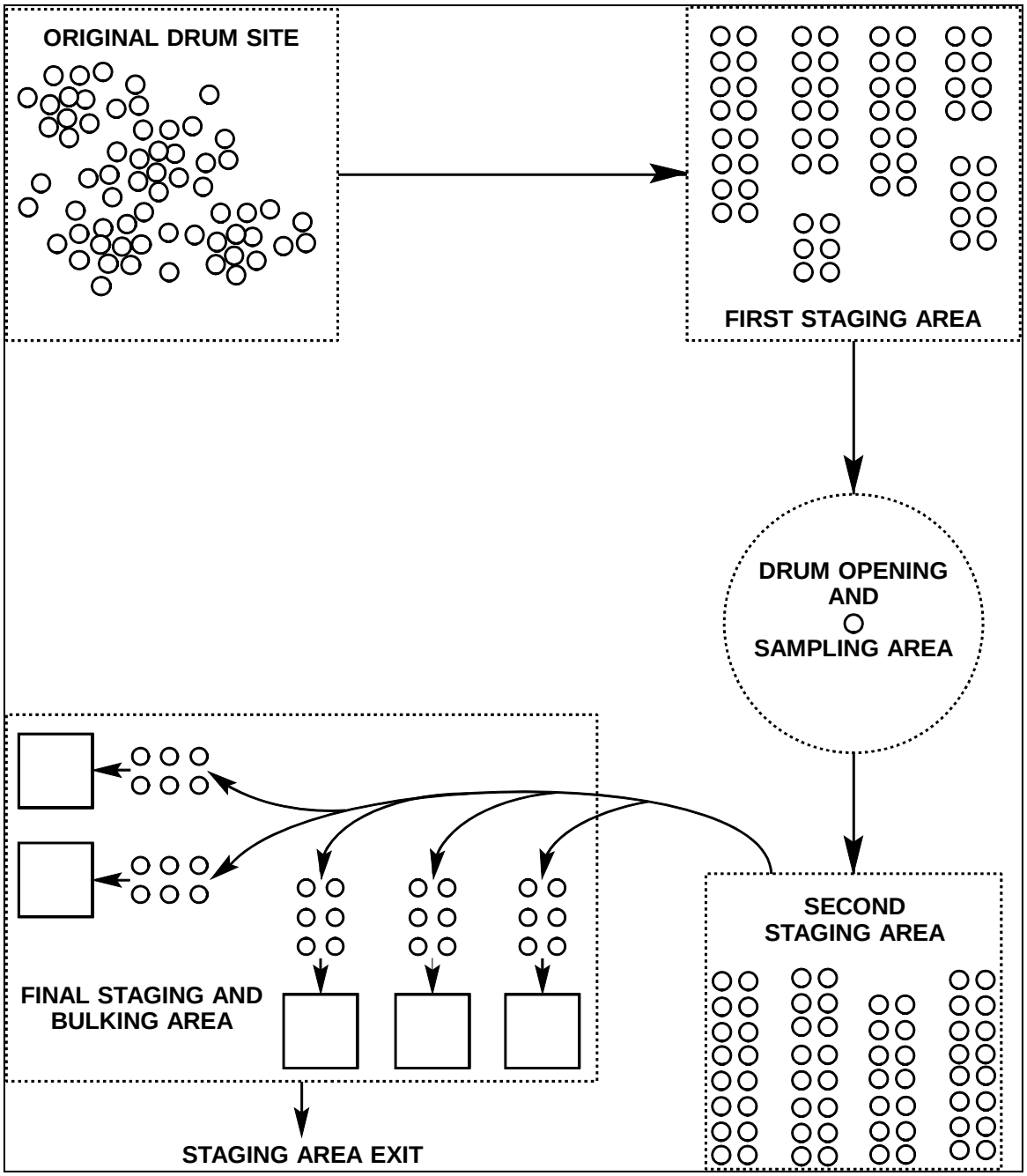


FIGURE 48-2. EXAMPLE SITE STAGING AREA MAP



1.0 PURPOSE

PIKA Engineers, Inc. (PIKA) recognizes that ensuring project safety requires a coordinated team effort in which each member of the team plays an integral part. For each project site, this coordinated team effort is directed and organized by the Site Safety and Health Officer (SSHO) who has the on-site responsibility for maintaining a safe and healthful work environment. Therefore, it is the purpose of and this program to outline the procedures and requirements related to the position of the SSHO. This SOP will be used in conjunction with the PIKA Corporate Safety and Health Program (CSHP) 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 program is applicable to all PIKA projects where PIKA personnel are assigned to the role of SSHO. This shall include both known hazardous waste sites and those non-hazardous waste sites where a SSHO is assigned to ensure the safety and health of on-site personnel. The procedures in this program will be strictly adhered to unless otherwise amended within site-specific project plans. This purpose of this attachment is to supplement the PIKA CSHP, and act as a working tool toward the implementation of each site-specific Site Safety and Health Plan (SSHP).

3.0 REFERENCES

The following Occupational Safety and Health Administration (OSHA) standard directly applies to the conduct of operations associated with the SOP. Additionally, this SOP has been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- OSHA Standard 29 CFR 1910.120
- Engineering Pamphlet (EP) 1110-1-18, *Ordnance and Explosives Response*
- EP 385-1-95a, Basic *Safety Concepts and Considerations for Ordnance and Explosives Operations* (latest edition).

4.0 RESPONSIBILITIES

4.1 OCCUPATIONAL SAFETY AND HEALTH MANAGER

The PIKA Corporate Safety and Health Manager (CSHM) is responsible for the continued development and implementation of this SOP and the PIKA CSHP. To effectively implement this SSHO SOP, the CSHM will take an active role in providing consultation, guidance, and training to those personnel assigned to the role of SSHO. To this end, the CSHM will:

1. Provide approval of those personnel selected for the SSHO position by the PIKA Project Managers assigned to PIKA projects.
2. Ensure that those personnel assigned to the role of SSHO meet the requirements specified by 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 CSHP to ensure their continued integrity and their compliance with applicable Federal, state and local regulations.
4. Consult with each SSHO to ensure that all site-specific safety and health issues are addressed and resolved.
5. Provide technical assistance and expertise to the SSHO regarding the implementation of 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 ensure their 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 SOP, and shall also ensure that this SOP is incorporated into site specific plans, procedures and training for those sites where this SOP will be applied.

4.3 SITE SUPERVISOR

The Site Supervisor (SS) will ensure that this SOP is implemented 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 ensure that all feasible controls are utilized to reduce the risk of personnel exposure to project hazards, and where possible, eliminate the potential for an accident.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO has the overall responsibility for the safety and health of all PIKA, subcontractor, government, and visitor personnel while on site. In this role, the SSHO must ensure that the requirements of the SSHP are implemented by all site personnel for the duration of site activities. The SSHO will also ensure that all personnel are properly trained, qualified, equipped, and physically protected from the site and operational hazards to the greatest extent feasible.

For all matters related to the implementation of the SSHP, the SSHO will answer directly to the CSHM. However, during daily operations, the SSHO will report administratively to the on-site PIKA Site Supervisor (SS). For on-site management of PIKA's safety and health program, the SSHO will:

1. Initiate and authorize a "Stop Work" order for any imminent safety or health 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. Investigate injuries, illnesses, accidents, incidents, and near misses;
8. Conduct visitor orientation, daily safety inspections, and weekly safety audits;
9. Ensure that all safety and health related forms are initiated and competed properly to ensure the capture of all relevant safety and health data;
10. Immediately inform the CSHM when a SOW change occurs that effects the tasks addressed in the SSHP;
11. 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;
12. Ensure that no task is performed until all safety and health provisions required by this SOP and the SSHP are implemented (i.e., CTHA is completed, personnel training is conducted, etc.); and
13. Ensure field implementation of the PIKA CSHP.

5.0 SSHO MOBILIZATION AND SITE SET-UP PROCEDURES

The SSHO will become completely familiar with the PIKA CSHP and the site-specific Work Plan (WP), which includes the SSHP and PIKA Standard Operating Procedures (SOPs). 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:

1. Coordinate with all applicable local 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 assist in completing the Certification of Task Hazard Assessment form.
4. Establish medical evacuation routes and personnel assembly points.
5. Inventory first aid, equipment, personal protective equipment (PPE), fire extinguishers, etc.
6. Designate the number, type, and location of toilet facilities.
7. Obtain any local certificates required.
8. Prepare evacuation maps and confirm contact lists 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 – 10 listed above during the first day's operations. 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 SSHO's arrival on site. However, this does not relieve the SSHO of the responsibility of ensuring that all of the steps listed above have been accomplished. It is imperative that the SSHO do everything possible to ensure safe, uninterrupted site operation and that a good rapport is established with all applicable local authorities.

6.0 TRAINING REQUIREMENTS AND PROCEDURES

6.1 CONDUCT AND DOCUMENT TRAINING

All 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 ensure that the data specified in the following paragraphs are presented to all effected workers. Unless otherwise specified in this section or the SSHP, all training will be documented using the PIKA Documentation of Training Log. 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 TRAINING

This training shall be used to review important topics outlined in the SSHP and to inform site personnel of the hazards and control techniques associated with on-site operations. To ensure coverage of all topics, the outline specified in Table 49-1 will be utilized for this training.

6.3 HAZARD INFORMATION TRAINING

Hazard information training shall be presented utilizing the PIKA Hazard Information Program, which meets the requirements specified in 29 CFR 1910.120(I). This training shall be presented to all personnel who will be involved in the conduct of on-site

operations. The training outline in Table 49-1 will also be used for this training, which will cover:

- A description of the chemical contaminants expected on site, including a description of the physical properties, symptoms of exposure, exposure limits, potential fire or explosion hazards and routes of exposure for each contaminant;
- The physical hazards associated with conducting site operations, including temperature extremes, heavy equipment and hand tool hazards, electrical hazards, high noise operations, and any other applicable general safety and health hazards;

TABLE 49-1: 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. UXO Safety !K. Safety Precautions for Suspected Fuzes and OE Items On Site, as Well as Disposal Requirements *N. Contingency and Emergency Response Plan *1. Evacuation *2. Potential/Actual Fire/Explosion Hazards *3. Personnel Injury *4. Adverse Weather Conditions *5. Chemical Spills (when applicable)
Methods and Procedures	*A. Marking Plots/Lanes *B. Vegetation grubbing (if applicable) *C. OE Detection Identifications and Markings !1. General !2. Sweep Lanes !3. Surface/Subsurface Anomaly Detection Techniques *E. Surface Investigation and Clearance of UXO/OE !D. UXO/OE Marking Procedures !F. Subsurface Investigation and Clearance of UXO/OE !G. UXO/OE Disposal and Collection Site !H. Safety and Health Issues of UXO/OE Disposal !1. UXO/OE Disposal and Collection Site !2. UXO Disposal Procedures (Range Operations) !3. Inert OE Disposal Procedures *I. Safe Equipment Use !1. UXO Detection *2. Mechanical/Hand Tools *3. Heavy *4. Vehicles

* Training presented to all on-site personnel.

! Training presented to UXO-qualified personnel only.

- The biological hazards associated with the site, to include poisonous/hazardous plants, animals and insects, and the potential for contacting medical/biological wastes; and
- Recognition of UXO/OE safety-related issues that could be present on site.

6.4 EQUIPMENT TRAINING

Equipment operation training will also be conducted for site personnel who will be responsible for the operation of monitoring instruments, earth moving equipment, power tools or hand tools. This training 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.

6.5 PERSONAL PROTECTIVE EQUIPMENT TRAINING

As specified by 29 CFR 1910.132, all 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, all affected personnel shall demonstrate an understanding of the training and their ability to properly use the assigned PPE. PPE training shall 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.

6.6 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 all 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. 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.

6.6.1 General Information Provided

To ensure site personnel are knowledgeable 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.

6.6.2 Product-specific Information Provided

To ensure that site personnel are knowledgeable of the chemical and physical hazards associated with hazardous substances used on site, all 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.

6.6.3 Documentation of Hazard Communication Training

HAZCOM training shall be documented by the SSHO using the PIKA HAZCOM Training Form. This documentation shall be maintained on site for the duration of the project, and later incorporated into the employee=s personal training file.

6.7 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 all 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.

6.8 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 all 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 ensure that all personnel sign the PIKA Three-day On-site Training Log.

6.9 DAILY AND WEEKLY SAFETY BRIEFINGS

6.9.1 Daily Safety Briefing

It is essential that the SSHO be involved in the Daily Safety Brief given each day prior to commencing work. This briefing must be pertinent and informative, and documented using the PIKA Documentation of Training Form. 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.

6.9.2 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. All site personnel will be required to attend the training and the SSHO will document this training in the PIKA Documentation of Training Form. The training will be

presented by the SSHO, or a designated representative, and will be used to cover topics specified by either the CSHM or a topic relevant to site-specific hazards such as chemicals, ordnance, heat stress, etc. The documentation of each WSB to include the topic covered and the names/signatures of the personnel attending.

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. An example of a typical

The SSHO must understand that the Daily Safety Log is a 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 ensure there is closure for each significant event logged.

7.2 TRAINING LOG

The SSHO is responsible for ensuring that training conducted on site is recorded daily, and that the PIKA Documentation of Training Form is properly completed. In the Depending upon the number of personnel on site, the SSHO 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 Documentation of Training Form will be completed and maintained on site with the other site records.

7.3 VISITOR LOG

A visitor record will be kept at the entrance to all 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 Visitor Log 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. Further procedures for site visitors are outlined in Section 22 of the CSHP.

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 and will ensure that the results are expressed to the SS. Copies of all 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 CSHM for review. Additionally, any daily checklist with deficiencies noted will also be forwarded to the CSHM. Once a deficiency has been corrected, the SSHO 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.

7.5 VEHICLE INSPECTION LOG

The SSHO will ensure that the PIKA Weekly Vehicle Inspection Checklist is completed on a weekly basis for each site vehicle, and on a per-day basis for any vehicle used to transport explosive. Copies of the inspection logs will be maintained on-site and categorized by vehicle. The CSHM 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 CSHM 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 ensuring all appropriate forms are completed and submitted in a timely fashion. The PIKA Accident/Injury/Illness/Near Miss Report 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 $50.00.
3. A near miss where personnel were nearly injured or property was nearly damaged.

A copy of this report will be faxed to the CSHM within 24-hours of the incident occurrence with the original maintained on site. If required by the Client=s SOW, the CSHM will either complete the Clients accident forms or forward a copy of the PIKA form to the Client=s Representative. The CSHM 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 CSHM. For property accidents involving site vehicles, a copy of the police report and repair estimates will also be forwarded to the CSHM 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 need not be completed. To complete the Eng 3394 form, follow the instructions provided, and send it to the CSHM prior to submission to the USACE. Once the form has been approved, it should be signed by the SS, submitted to the CSHM for signature, and forwarded by the CSHM to the USACE. Prior to completion of the Eng Form 3394, verbal will be given to the USACE on-site representative and the CSHM within 24-hours of the incident occurrence. A preliminary copy of the Eng 3394 form will be forwarded to the CSHM within three working days, with the final version presented to the CSHM within 10 working days.

7.7 CERTIFICATE OF TASK 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 contractors 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 affect the anticipated degree or nature of hazards. If any task is added or changes, the SSHO will immediately notify the CSHM of the change and complete a new Certification of Task Hazard Assessment (CTHA) form outlining the hazards. The CSHM will then finalize the CTHA 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 CSHM and all 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/Exit Log is maintained. This log is required at all 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 ensure that all personnel working in the EZ are logged in and out. This will be required to provide an 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 Personal Air Sampling Data Sheet. This log is required to record all 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 CSHM 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 CSHM who will ensure that the form is added to 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. This log is required at all hazardous waste 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 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 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 Site-Specific Chemical Inventory Log. 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.

7.13 HAZARD COMMUNICATION TRAINING FORM

The SSHO will be responsible for ensuring that the PIKA Documentation of Hazard Communication Training Log is completed whenever site personnel receive hazard communication training on site. This form contains a section for general site information, training elements to be covered, the products/substances that were reviewed, and a signature block for those attending the training. The SSHO will complete all applicable information in the site and product/chemical information sections and will initial the topics covered.

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 CTHA forms in the SSHP or APP will be used by the SSHO to ensure 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 SOP will be maintained in site records and subject to audit:

1. The Daily Operational and Safety Logs;
2. The Safety Meeting Attendance Log for the initial site hazard training;
3. The Safety Meeting Attendance Log for the Daily Safety Briefing; and
4. The Daily Safety Inspection Checklist.

10.0 ATTACHMENTS

No attachments are associated with this SOP.

ATTACHMENT 3

PIKA SSHP ES&H FORMS

PIKA INTERNATIONAL, INC.

WORK PLAN REVIEW FORM

All site personnel shall sign this form after having read the Work Plan (WP) and will do so prior to being allowed to perform operations on site involving known or potential exposures to safety and health hazards

EMPLOYEE STATEMENT

My signature below indicates that I have read the WP and have received answers to any questions which I have related to the WP. My Signature further indicates my willingness to comply with the provisions and requirements of the WP.

Site/Project:			
Date	Organization	Printed Name	Signature

PIKA

PIKA 3-DAY ON-SITE TRAINING & SITE HAZARD INFORMATION TRAINING LOG

Site Name & Location: Ravenna Army Ammunition Plant, Ravenna, OH	
Contract No.:	**Task Order Number:**
Site Supervisor:	**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 Started	Date Completed

PIKA INTERNATIONAL, INC.

Visitors Sign-In Log

PROJECT LOCATION: _____

PROJECT SITE: _____ PROJECT NO: _____

Date	Name	Representing	Equipment and PPE Level	Time IN	Time Out

Comments:_____

_____

_____

_____

_____

_____

PIKA

PIKA SAFETY TRAINING ATTENDANCE LOG

Date:	Instructor(s):	Time:	Log No.:
Site Name & Location: Ravenna Army Ammunition Plant, Ravenna, OH			
Contract No.:	**Task Order Number:**		
Site Supervisor or SUXOS:	**SSHO:**		

Training Provided: ☐ Initial Site Hazard Training ☐ Daily Safety Briefing ☒Other:_____
☐ Weekly Safety Training ☐ Task/Hazard-specific Training

I. TRAINING TOPICS COVERED

	Planned Site Activities		Chemical Hazards		Respirator Use
	Physical Safety Hazards		Routes of Chemical Exposure		Decontamination Procedures
	Biological Hazards		Chemical Exposure Symptoms		Emergency Procedures
	Heat or Cold Stress		Level of PPE		First Aid Procedures
	Site Controls		Types of PPE		Buddy Team Procedures

Other Topics:_____

II. TRAINING COURSE ATTENDEES

Name (printed)	Signature	Organization

III. 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

PIKA

HEAVY EQUIPMENT INSPECTION CHECKLIST

Contract No.:	**Date:**	**Time:**	**Log Number:**
Site Name & Location: Ravenna Army Ammunition Plant, Ravenna, OH.			
SUXOS:		**SSHO:**	
Odometer Reading:	**Hour Meter Reading:**		**Fuel Level:**

Make/Description: _____ **Model:** _____ **Serial No.:** _____

Place a ✓ mark in the "In Order" column to indicate that the item is present and in working condition. If absent or deficient describe the discrepancy and the corrective action taken in the "Discrepancy/Comments" box. If item does not apply to equipment being inspected, enter "NA". All listed items must have a response.

Item	In Order	Discrepancies/Comments
Service Brakes		
Emergency Brakes		
Parking Brake		
Brake Lights		
Back-up Alarms		
Horn		
Tires		
Spare Tire and Tire Changing Equip.		
Steering		
Seat Belt		
Operating Control		
First Aid Kit, Burn Blanket, Eye Wash		
Emergency Numbers/Hospital Map		
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		
ROPS		
Falling Object Protection System		
Other		
Other		
Other		

Inspection conducted by: _____ _____
Name Printed Signature

Deficiencies corrected by: _____ Date: _____

PIKA

PIKA VEHICLE INSPECTION CHECKLIST

Site Name / Location: _____

Site Supervisor: _____ **Vehicle:** _____
(MAKE AND LICENSE PLATE #)

Date Inspected: _____ **Mileage:** _____ **Owner:** _____
(RENTAL, 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		
Blood borne 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. All forms with failures are to have the deficiencies noted and copy of 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

PIKA

ACCIDENT/INJURY/NEAR-MISS REPORTING FORM

SECTION 1 - GENERAL INFORMATION

Name:	SSN:		
Job Title:	D.O.B.:	Sex:	Age:
Site Name:	Safety Officer:		
Date of Report:	Date of Incident:	Time of Incident:	
Task/Operation Being Conducted:			
PPE Worn:			

CONDITIONS AT TIME OF INCIDENT

Temperature: _____ Humidity: _____ Cloud Cover: _____
Wind Speed: _____ Direction: _____ Precipitation: _____ Other: _____

Type of Incident: ☐ Personal Injury ☐ Personal Illness ☐ Chemical Exposure
☐ Motor Vehicle ☐ 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 2 - 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 ☐ 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): _____

PIKA

ACCIDENT/INJURY/NEAR-MISS REPORTING FORM

SECTION 3 - MOTOR VEHICLE ACCIDENT

Type of Vehicle/Equipment	Type of Collision	Seat Belt Use
☐ Automobile ☐ Van/Truck ☐ Bush Hog ☐ 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

Accident Description (Use additional paper if needed):

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 SHP or a SSHP?

☐ Yes Reference: _____

☐ No Explain: _____

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: _____

SSO Signature: _____ Date: _____

Corrective Actions Completed By: _____ Date: _____

PIKA Corp. Review By: _____ Date: _____

SAFETY OBSERVER REPORT

Day:_____

PIKA Project #:
Contractor: PIKA International Inc., 12919 Southwest Freeway, Suite #190, Stafford, TX 77477
Location: Ravenna Army Ammunition Plant, Ravenna, OH 44266

SAFETY OBSERVER: _____

Slips, trips, falls:_____

Struck by, against:_____

Exposure to Contaminants:_____

Electric Shock:
_____

Burns (Chemical/Heat):
_____

Unsafe Acts/Conditions:
_____

Remarks: _____

REVIEWED BY SSHO:_____

PIKA

PIKA International, Inc. Task Order and Safety Meeting

Contract Number	Project Title	Location Ravenna Army Ammunition Plant	Date

	NAME	Company	Signature
1)			
2)			
3)			
4)			
5)			
6)			
7)			
8)			
9)			
10)			
11)			
12)			
13)			
14)			
15)			
16)			
17)			
18)			
19)			
20)			

PIKA

DAILY INSPECTION AND WEEKLY AUDIT LOG

GENERAL SITE INFORMATION			
CONTRACT NO.:	**DATE:**	**TIME:**	**LOG NO.:**
SITE NAME AND LOCATION: Ravenna Army Ammunition Plant, Ravenna, OH.			
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.

PIKA

SITE SPECIFIC CHEMICAL INVENTORY FORM

Site Name/Location:	**Contract No.:**	**Delivery Order No.:**

Date	Product Name	Supplier's Name and Address	Hazardous Chemicals	Training Given	MSDS On-site

PIKA INTERNATIONAL, INC.

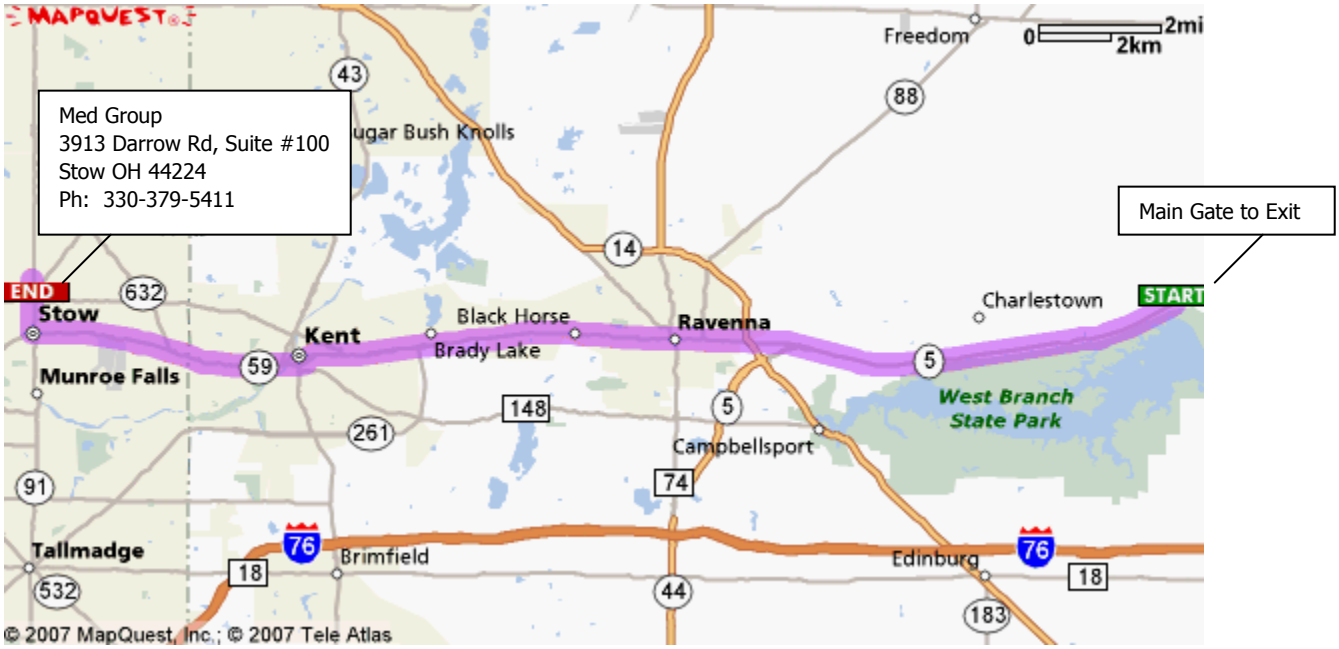
EMERGENCY TELEPHONE NUMBERS

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	330-379-5411
Emergency Hospital Care	Robinson Memorial Hospital 6847 N Chestnut Street Ravenna, OH 44266	330-297-0811
Police	Portage County Sheriff Office	330-296-5100 / 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
Jeffrey Gollon	TACOM Contract Specialist	309-782-7374
William O'Donell	BRAC	703-601-1570
Mark Patterson	RVAAP Acting Facility Manager	330-358-7311
Brian Stockwell	PIKA Project Manager	Office 330-385-2920 Cellular 330-352-6955
Terry Kasnavia	PIKA President	Cellular 281-382-6732
Drew Bryson, CIH	PIKA Safety and Health Mgr.	Office 281-546-4862 Cellular 865-482-1292
Mel Lau	PIKA UXOSO/SSHO	Cellular 330-352-5305
Lew Kovarik	PIKA SUXOS/SS	Cellular 330-352-9887

CLINIC MAP AND DIRECTIONS: Site personnel requiring non-emergency first aid treatment, as deemed necessary by the SSHO will be taken to the medical facility described below.
Directions to Med Group
Summary: 19.62 miles (36 minutes)



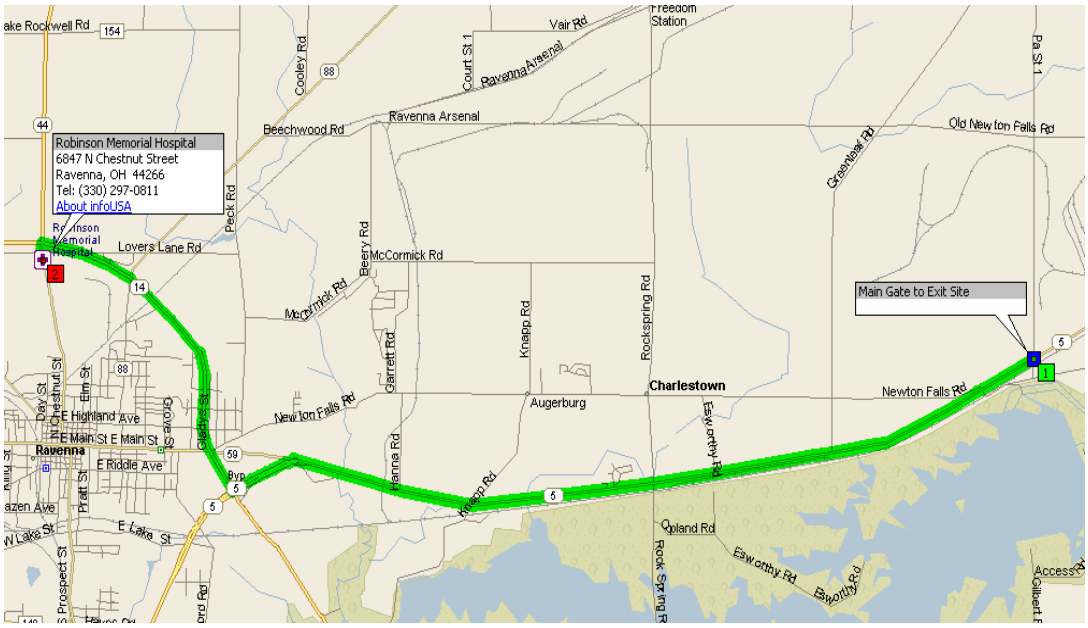
Instruction	For
Depart Main Gate to Exit Site on SR-5 [Ravenna Warren Rd] (West)	6.3 mi
Stay Straight to go onto OH-59	12.4 mi
Turn right onto Darrow Rd / OH-91	0.8 mi
Arrive at Med Group: 3913 Darrow Rd #100, Stow, OH 44244, Tel: (330) 688-7900	

PIKA INTERNATIONAL, INC.

HOSPITAL MAP AND DIRECTIONS: Site personnel requiring care beyond first aid shall be transported by ambulance or other means to the medical facility described below.

Directions to the Robinson Memorial Hospital
Summary: 9.9 miles (16 minutes)

Instruction	For
Depart Main Gate and turn right (west) on SR-5 [Ravenna Warren Rd] at the SR-5 bypass, merge left and continue on SR-5	7.0 mi
At SR-14, turn RIGHT (North) onto SR-14 and continue to Chestnut St	2.7 mi
Turn LEFT (South) onto (N) Chestnut St	0.1 mi
Arrive Robinson Memorial Hospital [6847 N Chestnut Street, Ravenna, OH 44266, Tel: (330) 297-0811]	



COMMENT RESPONSE TABLE

DOCUMENT PREPARERS: PIKA and e^2M

DOCUMENT TITLES: 1) Explosive Site Plan (ESP), Operation and Maintenance of Sand Creek Barrier System; 2) Draft Revised Operations and Maintenance Plan (O+M), Sand Creek Barrier System; and 3) Site Safety and Health Plan (SSHP)

PROJECT: Time Critical Response Action at the Rocket Ridge Area of Open Demolition Area #2.

DOCUMENT REVIEWER: **Eileen T. Mohr, Ohio EPA, NEDO, DERR**

DATE TRANSMITTED: July 2, 2008

CMT. #	DOCUMENT/ PAGE #/	REVIEWER COMMENT	REVIEWER RECOMMENDATION	PREPARER RESPONSE
			ESP, O&M, and SSHP	
1	General – All	Future documents.	Please ensure that draft documents are clearly stamped "draft." No changes needed on these documents.	Comment noted
2	General – All	Future documents.	Please ensure that draft documents have line numbers. No changes needed to these documents.	Comment noted
3	General – All	Explanation needed and potential change.	Although I know that there are 3- 500 lb bombs in Rocket Ridge, it is unclear as to why this munition was selected for determining the MGFD, etc.. It is unlikely that any of the larger munitions would migrate towards the barrier system; typically it would be the smaller munitions. Please clarify and change if needed. (This would include text, maps and calculations on all three documents).	Army Corps and DDESB requirements state that the MGFD be based upon the largest known item at the site. This is also an added safety precaution and will not negatively impact any other operations.
			ESP	
4	ESP – pg 2, item 4e	Tense correction needed.	Change tenses in the first 2 sentences in this item to match. (One is currently past tense, one is future tense.)	Tense correction has been made. .., the Army will construct a barrier system.
5	ESP – pg 2, item 7a	Text change. (Because we don't know all the munitions in Rocket Ridge).	Change text to read: "…., or is expected to be on-site includes: 75 millimeter…"	The text has been revised: "The MEC that has been identified or is anticipated to be present at Rocket Ridge includes:.."
6	ESP – App A, fig 1	Legend correction.	What is the "proposed area" denoted in the legend. Remove if necessary.	The Legend denotation was corrected to Sand Creek Barrier System
7	ESP – App A, fig 3	Map changes requested.	a. remove "crop" ☺ circles from the map.	The map has been revised as follows: a. The circles were removed

COMMENT RESPONSE TABLE

DOCUMENT PREPARERS: PIKA and e^2M

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PROJECT: Time Critical Response Action at the Rocket Ridge Area of Open Demolition Area #2.

DOCUMENT REVIEWER: **Eileen T. Mohr, Ohio EPA, NEDO, DERR**

DATE TRANSMITTED: July 2, 2008

CMT. #	DOCUMENT/ PAGE #/	REVIEWER COMMENT	REVIEWER RECOMMENDATION	PREPARER RESPONSE
			b. several Slagle Roads… confirm or change. c. add igloos to the legend. d. what is the "proposed area" denoted in the legend? Remove if necessary. e. the amount of added detail to this map is not needed. For example: buildings at LL9 and 11 are gone, most of the Wet Storage igloos are gone, etc.. Update to reflect current conditions. f. define PTRD somewhere. Add an acronym list to the front of the document? g. label Rocket Ridge.	b. The Slagle Road denotation has been changed. c. Igloos were added to the legend. d. The "Proposed Area" denotation has been removed. e. The map has been updated to reflect current conditions. f. PTRD has been defined on map. Acronym list was added. g. Rocket Ridge has been labeled.
8	ESP – App A, fig 4	Map changes requested.	a. remove "crop" ☺ circles from the map. b. add igloos to the legend. c. the amount of added detail to this map is not needed. For example: buildings at LL9 and 11 are gone, most of the Wet Storage igloos are gone, etc.. Update to reflect current conditions. d. add igloos to the legend.	The map has been revised as follows: a. The circles were removed. b. Igloos were added to the legend. c. The map has been updated to reflect current conditions. d. Igloos were added to the legend.
Revised O&M				
9	O+M – pg 2, sec 3.2	Text change.	Pam EP 75-1-2… Munitions and Explosives…	The text on page 2 has been revised to read as noted.
10	O+M – pg 5, sec 3.5	Items C+D… question.	Both items reference contract option items to be exercised. How long will exercising a contract option for MEC and MD management take? We do not want any material stored indefinitely.	Either contract option will be exercised within a week.

COMMENT RESPONSE TABLE

DOCUMENT PREPARERS: PIKA and e^2M

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PROJECT: Time Critical Response Action at the Rocket Ridge Area of Open Demolition Area #2.

DOCUMENT REVIEWER: **Eileen T. Mohr, Ohio EPA, NEDO, DERR**

DATE TRANSMITTED: July 2, 2008

CMT. #	DOCUMENT/ PAGE #/	REVIEWER COMMENT	REVIEWER RECOMMENDATION	PREPARER RESPONSE
11	O+M – pg 6, sec 3.6.4	Clarification requested.	The UXO team leader has the final … what? (There is a word missing in the sentence.)	The team leader has "final on-site authority on MEC procedures and safety issues." Please re-read sentence with this clarification.
12	O+M – pg 9, sec 3.7.3	Recommendation.	Consider have key back-up equipment (ex. Schonstedt) on site to minimize lost time in obtaining a replacement	The text has been revised as noted. "A back-up unit is maintained on-site during field operations."
13	O+M – pg 11, sec 3.12.6	Revision requested.	The text references Appendix XX. Please insert the applicable #.	The correct reference is "Attachment 1". The text has been revised accordingly.
14	O+M – pg 12, sec 3.12.7	Text change. (Because we don't know all the munitions in Rocket Ridge).	Change text to read: "…., or is expected to be on-site includes: 75 millimeter…"	The text on page 12 has been revised as noted.
15	O+M – pg 12, table 3-3	Clarification requested.	The text in the 2nd bullet appears to be contradictory. The first sentence indicates that artifacts and/or remains should be collected or secured. The second sentence indicates that the human remains are not to be disturbed.	The text was provided by the RTLS Cultural Resources Office. The first sentence indicates that only appropriate RTLS personnel may collect artifacts or human remains, if found at the site. The second sentence directs the Contractor to not disturb any artifacts or human remains.
16	O+M – pg 28, sec 5.2.8	Revision requested.	Change text to read: "…onsite or offsite…"	The text in section 5.2.8 on page 28 has been revised as noted.
17	O+M – Attach 2, pg 200-2	Section 7 lists the attachments.	ESHF-206, 207, and 208 are not included. They also are not applicable to this project. Either remove from the attachment list, or provide.	ESHF-206, 207, and 208 have been removed from the attachment list.
			SSHP	
18	SSHP – GENERAL	Although Ohio EPA does not have regulatory authority over health and safety plans, the Agency has reviewed the SSHP.	Comments are not required to be addressed.	Comment noted.
19	SSHP – pgs 4 and 5	This section lists all of the RVAAP MMRP sites.	Instead of the general description, there should be a description specific to ODA2, Rocket Ridge, and the migration	The following text has been inserted: Rocket Ridge is located at Demolition Area #2 MRS.

COMMENT RESPONSE TABLE

DOCUMENT PREPARERS: PIKA and e^2M

DOCUMENT TITLES: 1) Explosive Site Plan (ESP), Operation and Maintenance of Sand Creek Barrier System; 2) Draft Revised Operations and Maintenance Plan (O+M), Sand Creek Barrier System; and 3) Site Safety and Health Plan (SSHP)

PROJECT: Time Critical Response Action at the Rocket Ridge Area of Open Demolition Area #2.

DOCUMENT REVIEWER: **Eileen T. Mohr, Ohio EPA, NEDO, DERR**

DATE TRANSMITTED: July 2, 2008

CMT. #	DOCUMENT/ PAGE #/	REVIEWER COMMENT	REVIEWER RECOMMENDATION	PREPARER RESPONSE
			downstream issue.	The following is a description of Rocket Ridge: "Rocket Ridge is a steep embankment approximately 500 feet long and 25 feet high located adjacent to Sand Creek within ODA2, approximately 2,700 feet upstream of the George Road Bridge. ODA2 was used for munitions demilitarization, including detonation of large caliber munitions and off-specification bulk explosives that could not be deactivated or demilitarized by any other means. The Rocket Ridge slope was used for the disposal of demilitarized munitions, although not all munitions appear to have been completely demilitarized. Munitions-related items that could be identified include 75-millimeter (mm) and 105-mm rounds, booster cups, three 500-pound bombs, white phosphorus rifle grenades, fuzes, and burster tubes. It appears that the munitions were transported from the demolition site to Rocket Ridge and dumped at the top of the slope. Sand Creek flows in an eastward direction along the northern boundary of the Rocket Ridge Area of ODA2, at the toe of the slope. Due to the steep slope of the disposal area and the stream bank erosion resulting from high water events, some of the munitions materials have reached Sand Creek."
20	SSHP – pg 8, sec 2.5.2	Revise as necessary.	There appears to be duplicative language in the 1st sentence of this section.	For clarification the sentence has been changed to read as follows: A hazardous substance is defined as "*any substance*, *as defined as a hazardous*

COMMENT RESPONSE TABLE

DOCUMENT PREPARERS: PIKA and e^2M

DOCUMENT TITLES: 1) Explosive Site Plan (ESP), Operation and Maintenance of Sand Creek Barrier System; 2) Draft Revised Operations and Maintenance Plan (O+M), Sand Creek Barrier System; and 3) Site Safety and Health Plan (SSHP)

PROJECT: Time Critical Response Action at the Rocket Ridge Area of Open Demolition Area #2.

DOCUMENT REVIEWER: **Eileen T. Mohr, Ohio EPA, NEDO, DERR**

DATE TRANSMITTED: July 2, 2008

CMT. #	DOCUMENT/ PAGE #/	REVIEWER COMMENT	REVIEWER RECOMMENDATION	PREPARER RESPONSE
				substance under 29 CFR 1910.120, 1926.65, or 40 CFR Part 302, or any chemical determined to be a hazard as specified in 29 CFR 1910.1200 or 1926.59 to include a chemical (as a gas , liquid , vapor, mist, dust or fume) which has been identified as causing adverse health effects in exposed humans."
21	SSHP – pg 26, sec 7.5.1	Clarification.	What clinic?	The PIKA designated occupational health clinic for work at the RVAAP: MEDGroup – 3913 Darrow Road, Suite 100, Stow Ohio 44224. This information will be incorporated into the noted text for clarification.
22	SSHP- pg 28, sec 8.4	Clarification.	The text references a 1 ft MEC removal. Please clarify. This should be a surface removal (unless covered by sediment/debris).	This language is a carry-over from a previous project. The text will be corrected to read "Integrated breathing zone (BZ) sampling will not be required during the performance of the O&M of the Sand Creek Barrier System being performed by PIKA personnel."
23	SSHP- pg 31, secs 9.1.5 and 9.2.2	Recommendation.	In future SSHPs, please detail prevention, signs and symptoms, and treatment for levels of heat and cold stress. It is unlikely that workers will flip back to the specific SOPs. Consider having them posted in a conspicuous place.	Comment noted.
24	SSHP – pg 42, sec 12.2	Clarification.	Is the intent to have portable toilets or just use the field office facilities?	Text in section 12.2 will be corrected to read as follows: During the O&M activities, personnel will utilize the toilet facilities provided in the PIKA field office at Building 1038. Antibacterial hand cleaning solution will be available within the restroom."

COMMENT RESPONSE TABLE

DOCUMENT PREPARERS: PIKA and e^2M

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PROJECT: Time Critical Response Action at the Rocket Ridge Area of Open Demolition Area #2.

DOCUMENT REVIEWER: **Eileen T. Mohr, Ohio EPA, NEDO, DERR**

DATE TRANSMITTED: July 2, 2008

CMT. #	DOCUMENT/ PAGE #/	REVIEWER COMMENT	REVIEWER RECOMMENDATION	PREPARER RESPONSE
25	SSHP – pg 44, table 14-1	Clarification.	Will there be a field trailer or will the PIKA field office just be used given the close proximity to the site?	Personnel will use the PIKA field office in Building 1038. Table 14-1 will be revised accordingly.
26	SSHP – pg 47, top of page	Revision.	All contacts for emergency services go through Post #1.	The following text was inserted: The off-site emergency resources presented in **Table 15-1** will be contacted by the EC in the event of an emergency. Table 15-1: 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"**
27	SSHP – pg 47, table 15-1	Addition requested.	Add Post #1 contact information.	Please refer to response #26
28	SSHP – pg 48, sec 15.9.1	Clarification.	In the event that emergency services need to be contacted, communications go through Post 1.	The following text was inserted: Post 1 will be contacted to summon off-site emergency services as needed for treatment of injuries or exposure.
29	SSHP – pg 48, sec 15.9.2	Clarification.	In the event that emergency services need to be contacted, communications go through Post 1.	The following text was inserted: Post 1 will be contacted to summon off-site emergency services as needed for treatment of

COMMENT RESPONSE TABLE

DOCUMENT PREPARERS: PIKA and e^2M

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PROJECT: Time Critical Response Action at the Rocket Ridge Area of Open Demolition Area #2.

DOCUMENT REVIEWER: **Eileen T. Mohr, Ohio EPA, NEDO, DERR**

DATE TRANSMITTED: July 2, 2008

CMT. #	DOCUMENT/ PAGE #/	REVIEWER COMMENT	REVIEWER RECOMMENDATION	PREPARER RESPONSE
				injuries or exposure.
30	SSHP – pg 52, sec 15.12.3, 2nd last line before bullets	Text change.	Change to read: "…and transportation will be summoned. The first aid…"	The text has been revised to read: "… and transportation will be summoned. The first aid…"
31	SSHP – pg 52, sec 15.12.3	Clarification.	In the event that emergency services need to be contacted, communications go through Post 1.	The following text was inserted: Post 1 will be contacted to summon off-site emergency services as needed for treatment of injuries or exposure.
32	SSHP – pg 53, sec 15.12.4	Clarification.	In the event that emergency services need to be contacted, communications go through Post 1.	The text has been revised to read: If immediate transportation to a medical facility is required Post 1 will be contacted to summon off-site emergency services.
33	SSHP – pg 53, sec 15.12.4	Recommendation.	Unless an injury is really minor, consider calling a squad for transport.	Comment noted.
34	SSHP- pg 54, sec 15.15	Clarification.	Not all ambulance service in the area is ALS, most is BLS. Unless an injury is really minor, consider calling a squad for transport.	Comment noted.
35	SSHP – pg 56, sec 15.17.1	Clarification.	Is it anticipated that there will be subsurface investigation of anomalies during this project?	This was an incorrect project citation. The text will be corrected to read: "During site operations that involve O&M of the Sand Creek Barrier,…"
36	SSHP – attach 1 CAHAs throughout.	Change in future documents.	Sever should be severe.	The comment has been incorporated into the document.

COMMENT RESPONSE TABLE

DOCUMENT PREPARERS: PIKA and e^2M

DOCUMENT TITLES: 1) Explosive Site Plan (ESP), Operation and Maintenance of Sand Creek Barrier System; 2) Draft Revised Operations and Maintenance Plan (O+M), Sand Creek Barrier System; and 3) Site Safety and Health Plan (SSHP)

PROJECT: Time Critical Response Action at the Rocket Ridge Area of Open Demolition Area #2.

DOCUMENT REVIEWER: **Eileen T. Mohr, Ohio EPA, NEDO, DERR**

DATE TRANSMITTED: July 2, 2008

CMT. #	DOCUMENT/ PAGE #/	REVIEWER COMMENT	REVIEWER RECOMMENDATION	PREPARER RESPONSE
37	SSHP – attach 1 CAHAs throughout.	Clarification.	In slips, trips and falls, reference the water hazards in here.	The following text was inserted: "In and around the creek areas, algae, moss, rocks, and rushing water can cause slippery, uneven and unstable walking surfaces. Personnel will remain alert to the potential for slip, trips and falls when working around the water."
38	SSHP – attach 2	Question.	CD of SOPs not included with the document.	The CD was inadvertently omitted. A CD of the SOPS will be provided in the next iteration.
39	SSHP – attach 3, veh.insp. list	Change in future documents.	Item #3 – change to Eyewash Kits.	The text in attachment 3 has been changed as noted.

RESPONSES TO REVIEW COMMENTS

DOCUMENT PREPARER: PIKA and e^2M

DOCUMENT TITLES: 1) Explosive Site Plan (ESP), Operation and Maintenance of Sand Creek Barrier System; 2) Draft Revised Operations and Maintenance Plan (O+M), Sand Creek Barrier System; and 3) Site Safety and Health Plan (SSHP)

PROJECT: Time Critical Response Action at the Rocket Ridge Area of Open Demolition Area #2.

DOCUMENT REVIEWER: **Katie Elgin, OHARNG, Ravenna Training And Logistics Site**

DATE TRANSMITTED: 27 June 2008

CMT. #	SECTION, PARA, PAGE	REVIEWER COMMENT	REVIEWER RECOMMENDATION	PREPARER RESPONSE
		ESP		
1	Pg 1, 1a	"Operation and Maintenance of Sand Creek Barrier System, Rocket Ridge Area of ODA2..." Since you are describing the name of the site and referencing the location, I recommend inserting "2,700 feet east of the" before "Rocket Ridge". This is how the site was described in the other documents.		The comment was incorporated into the document.
2	Pg 1, 3a	"To prevent the downstream movement of munitions and explosives of Concern (MEC) and Munitions Debris (MD) within Sand Creek" Change to "To prevent the potential downstream movement of Munitions and Explosives of Concern (MEC) and Munitions Debris (MD) from Rocket Ridge within Sand Creek"		The comment was incorporated into the document.
3	Pg 2, 4d	"On 18 June 2007, a rifle grenade containing white phosphorous exploded on the slope of Rocket Ridge. A survey conducted on 5-6 November 2007 upstream of the George Rod bridge identified a piece of munitions debris approximately 1200 feet downstream of Rocket Ridge…" There needs to be a statement in here of how the white phosphorous grenade explosion relates to the November survey and subsequent Sand Creek barrier. Suggestion: Insert the following line after the first sentence: "This event triggered the need for a response action at Rocket Ridge. Therefore, a survey was conducted on…"		The noted text has been revised to read as follows: "This event triggered the need for a response action at Rocket Ridge. Therefore, a survey…"
4	General	Recommend inserting an acronym table in this document since this is a stand-alone document and there are many undefined acronyms.		An acronym table was inserted into the document.
5	Pg 2, 7a	"The MEC that has been discovered, or is expected to be on site is…" Here we are talking about Rocket Ridge and not the Sand Creek barrier area. Therefore, I would change the sentence to the following: "The MEC that has been identified or is anticipated to be present at Rocket Ridge is…"		The text suggested by the commenter was inserted into the document.
6	Pg 2, 7a	Define MGFD and MSD in the text as this is the first references.		The comment was incorporated into the document.

RESPONSES TO REVIEW COMMENTS

DOCUMENT PREPARER: PIKA and e^{2}M

DOCUMENT TITLES: 1) Explosive Site Plan (ESP), Operation and Maintenance of Sand Creek Barrier System; 2) Draft Revised Operations and Maintenance Plan (O+M), Sand Creek Barrier System; and 3) Site Safety and Health Plan (SSHP)

PROJECT: Time Critical Response Action at the Rocket Ridge Area of Open Demolition Area #2.

DOCUMENT REVIEWER: **Katie Elgin, OHARNG, Ravenna Training And Logistics Site**

DATE TRANSMITTED: 27 June 2008

CMT. #	SECTION, PARA, PAGE	REVIEWER COMMENT	REVIEWER RECOMMENDATION	PREPARER RESPONSE
7	Pg 2, 7a	"The MGFD identified is the 500 lb Bomb M64A1. During the course of this investigative action, if MEC with a greater fragmentation distance is encountered…" This is not an "investigative action". Recommend deleting the word "investigative".		The comment was incorporated into the document.
8	Pg 3, item c	Even though there are no public roadways, there are facility/personnel roadways that would need to be closed. Mention these facility roads and that any areas to be closed or evacuated will be coordinated with the OHARNG.		The following text was added at the end of item c: "However, the MSDs may include facility roads. Any facility roads and areas to be closed or evacuated will be coordinated with OHARNG."
9	Pg 3, item d	OD-2 should be changed to ODA2 to be consistent.		The comment was incorporated into the document.
10	Pg 4, item b	Define NEW in the text as this is the first reference.		The comment was incorporated into the document.
11	Pg 4, item c	"Access to the ODA2 area is controlled through RVAAP Post 1 Security." Also add in that it is controlled through an onsite locked gate.		The noted text has been revised to read as follows: Access to the ODA2 area is controlled through RVAAP Post 1 Security… "and an onsite locked gate."
12	Pg 4, item d	Define ESQD as this is the first reference.		The comment was incorporated into the document.
13	Appendix A, Figure 3 and 4	Recommend deleting the small black circles as they are distracting and not needed.		The comment was incorporated into the document.
Revised O&M				
1	Pg 2, 1st paragraph	"… have been subsequently licensed to the OHARNG for use as a military training site." After "site", insert ", the Ravenna Training and Logistics Site (RTLS)."		The comment was incorporated into the document.

RESPONSES TO REVIEW COMMENTS

DOCUMENT PREPARER: PIKA and e^{2}M

DOCUMENT TITLES: 1) Explosive Site Plan (ESP), Operation and Maintenance of Sand Creek Barrier System; 2) Draft Revised Operations and Maintenance Plan (O+M), Sand Creek Barrier System; and 3) Site Safety and Health Plan (SSHP)

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CMT. #	SECTION, PARA, PAGE	REVIEWER COMMENT	REVIEWER RECOMMENDATION	PREPARER RESPONSE
2	Pg 2, last full paragraph	This paragraph seems lost in that it does not describe how it relates to the installation of the barrier. You need to insert a line at the end of the paragraph indicating that the white phosphorous grenade event triggered the need for a response action at Rocket Ridge with the MEC barrier being the first step or interim measure in the response action.		He following new text has been incorporated into the last paragraph on page 2: "The rifle grenade event triggered the need for a response action at Rocket Ridge with the MEC barrier being the first step or interim measure in the response action."
3	Pg 4, Section 3.3, 1st paragraph	""Once the site is secured, PIKA personnel will continue to secure the site until relieved by military EOD. Confirmation of CWM will require a halt in specific Area of Concern (AOC) operations." Recommend deleting "Area of Concern (AOC)" since the MEC barrier is not located on an AOC.		The comment was incorporated into the document.
4	Pg 10, Section 3.10	In this section (Project Notifications), it may be a good idea to identify a subsection for the notification/ coordination with the OHARNG. Prior to any field visit, the contractor will need to notify and coordinate with the range control and MAJ Meade to make sure there is no firing on the MK19 range and to coordinate what time the George Road gate will need to be opened. This is a pretty important notification/ coordination that should also be mentioned in this section so it is nor overlooked.		The following new paragraph was inserted: "3.10.3 Notification and Coordination with OHARNG Prior to any field visit, e^{2}M or PIKA will notify and coordinate with the range control and MAJ Meade to ensure there is no firing on the MK19 range and to coordinate what time the George Road gate will need to be opened."
5	Pg 10, Section 3.10.2	MAJ Meade's listed phone number is incorrect. Change 6790 to 6560.		The comment was incorporated into the document.
6	Pg 11, Section 3.12.5	Here it mentions that the approved MEC storage area is at Igloo 1502. All other documents and sections reference the approved storage area as Igloo 1501. Please check and change the Igloo number if needed.		Storage Igloo 1501 is the correct citation. As such the text has been revised to read as follows: "Collection points are those areas used to temporarily accumulate MEC within an area pending transportation to the

RESPONSES TO REVIEW COMMENTS

DOCUMENT PREPARER: PIKA and e^2M

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CMT. #	SECTION, PARA, PAGE	REVIEWER COMMENT	REVIEWER RECOMMENDATION	PREPARER RESPONSE
				approved storage location at Igloo 1501 or ODA2."
7	Pg 13, Section 3.13, 1st bullet	Please add in the following at the end of the text for this bullet "The O&M visit must not interfere with activities on the MK19 range."		The comment was incorporated into the document.
		SSHP		
1	Section 15.17 Spills	Somewhere in this section it needs to reference that if there is a spill on OHARNG property, the notification and spill cleanup must be in compliance with the RTLS Integrated Contingency Plan. The OHARNG must be notified according to our First Responder Notification Form.		The following text was inserted: "In the event of a spill, the PIKA SUXOS will notify the OHARNG of the nature and extent of the spill. Both notification and spill clean-up will be conducted in accordance with the RTLS Integrated Contingency Plan using the OHARNG First Responder Notification Form."