

Warehouse Staff Safety Guide

STANDARDS TO PROMOTE A SAFE WORK ENVIRONMENT



NOVEMBER 2014

Founded in 1961, Project Concern International (PCI) is an international non-profit organization dedicated to preventing disease, improving community health and promoting sustainable development worldwide. Motivated by our concern for the world's most vulnerable children, families and communities, PCI envisions a world where abundant resources are shared, communities are able to provide for the health and well-being of their members, and children and families can achieve lives of hope, good health and self-sufficiency. PCI is headquartered in San Diego, California, with US offices in Washington, DC and Seattle, WA. PCI currently operates in 16 countries in Asia, Africa and the Americas. Intervention focus areas include: food and livelihood security; health and nutrition; water and sanitation; and humanitarian assistance and disaster risk management. Cross-cutting areas of focus include community mobilization; gender equity; social and behavioral change; local capacity strengthening; and sustainable impact.

Published in 2014 by:

Project Concern International
5151 Murphy Canyon Road, Suite 320
San Diego, CA 92123
USA

An electronic version of this document and corresponding posters can be found at the following link:
www.fsnnetwork.org/warehouse-staff-safety-guide

Author:

CFA Services - Brian Holmes (Consultant)

Contributors:

Rebecca Freeman, Christina Gagliardi, Cindy Pfizenmaier, Peg Ross, and Jerome Sigamani (PCI); Maria Tupac (ACDI/VOCA); Hassan Ben Baha (Catholic Relief Services); Matt Smith (Land O' Lakes); Ron Shaw and Khawaja Adeeb (Save the Children); Birendra Kumar De (TOPS); and Erika Clesceri (USAID/DCHA), Jim Hinton & Hernan Thaine (Consultants).

Design, Layout and Posters:

Eric Watanabe (Consultant)

Editor:

Amy Pedotto (Consultant)

Contact information:

Christina Gagliardi
Sr. Technical Advisor, Commodity Management
Project Concern International
Email:cgagliardi@pciglobal.org.

This document was produced by PCI with a grant from the Technical and Operational Performance Support (TOPS) Program, made possible with financial support from the U.S. Agency for International Development (USAID) Office of Food for Peace (FFP). The views expressed in this document do not necessarily reflect the views of TOPS, USAID, or the United States Government. TOPS is funded by USAID/FFP to strengthen skills in implementing organizations and promote excellence in food security and nutrition programming for vulnerable households in FFP Title II countries.

ACKNOWLEDGEMENTS

We wish to acknowledge the U.S. Agency for International Development (USAID) and the Technical and Operational Performance Support (TOPS) Program for Capacity Building in Best Practices, Assessment and Documentation of Promising Practices for their generous financial support toward the development of this guide. We also wish to acknowledge the Warehouse Staff Safety Working Group members of the TOPS Commodity Management Task Force who worked together with PCI to develop the first draft of the **Warehouse Staff Safety Guide** and provided critical input on subsequent drafts. Thank you to each of the consultants that were hired to assist with the development of this guide including: Brian Holmes of CFA Services, Eric Watanabe (graphic designer), Amy Pedotto (editor), each of these individuals went above and beyond. A special thank you to each of the country programs who conducted detailed reviews of the guide and posters with their commodity management staff including: CARE in Bangladesh, CRS in Burkina Faso, Ethiopia, Malawi and South Sudan; PCI in Guatemala and Nicaragua; and Save the Children in Bangladesh. The feedback received from the field reviews was invaluable and contributed to the development of the final documents. And finally we would like to thank Erika Clesceri, Bureau Environmental Officer, USAID/DCHA, for her review and critical inputs to the fumigation sections of the guide and posters.

The number of people and organizations involved in the development and review of the guide was significant, and is an indicator of the importance all organizations have on improving warehouse staff safety. It is our hope that this guide and related tools will assist organizations to improve warehouse safety and reduce risk of injury and illness.

Christina Gagliardi
Sr. Technical Advisor, Commodity Management
Project Concern International
November, 2014

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LIST OF ACRONYMS

APW	Air pressurized water
CRS	Catholic Relief Services
EPA	Environmental Protection Agency
FFP	Food For Peace
FMP	Fumigation Management Plan
MSDS	Material Safety Data Sheets
NFI	Non-food item
NGO	Non-governmental organization
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PCI	Project Concern International
PEA	Programmatic Environmental Assessment
PERSUAP	Pesticide Evaluation Report and Safer Use Action Plan
PNA	Participant needs assessment
PPE	Personal protection equipment
PVO	Private voluntary organization
TOPS	Technical & Operational Performance Support Program
TLV	Threshold limit value
USAID	United States Agency for International Development
SCBA	Self-contained breathing apparatus



CHAPTER 1: INTRODUCTION AND PURPOSE

In 2013, approximately 1.1 million metric tons of U.S. Title II food aid was delivered to 46 countries to minimize hunger around the world (USAID, 2014). Private voluntary organizations (PVOs) play an important role in distributing food commodities for development assistance and during emergencies. PVO staff is responsible for receiving, storing, transporting and distributing large quantities of commodities to the communities they serve. Other guides focus on how to protect food commodities throughout the distribution process. The purpose of this **Warehouse Staff Safety Guide** is to provide PVOs with information, recommendations and materials to train their staff and promote safety in the warehouses where food commodities are stored.

Warehouses are staffed by full-time, part-time and temporary workers and often operate under challenging conditions. In most cases, national legislation and international standards govern workplace health and safety. The implementation and oversight of legislation and standards rests with the PVO, which must ensure that staff is well trained to promote a safe work environment. The PVO must be able to demonstrate to regulators (local authorities or donors) that it has trained and equipped staff to prevent hazardous incidents.

The need for this guide was identified by the TOPS Commodity Management Task Force. A working group developed the first draft of the guide but given the amount of time and expertise required to further develop and finalize the guide, it was determined that outside support was required. PCI submitted a proposal to TOPS for funding to hire a consultant, editor and graphic designer to further develop the guide, as well as to develop the various posters and tools associated with the document. Working group members reviewed and provided feedback on the various drafts developed by the consultant and later the guide and tools were reviewed at the field level by various organizations including: CARE, CRS, PCI and Save the Children. USAID/DCHA Environmental Bureau also reviewed and provided guidance on the sections related to fumigation. The feedback and insight received by field staff contributed greatly to the preparation of this guide, and accompanying tools and posters. Technical guidelines are based on U.S. federal regulations and occupational health and safety guidelines (OSHA, n.d.) (Federal Compliance Systems Inc , 2013).

Reducing health and safety hazards is everyone's responsibility and concern. All organizations and their staff should be made aware of safety standards and practices to reduce risk of injury and illness. Staff should be encouraged to report any unsafe work practices or safety hazards encountered on the job without fear of reprisal. A key factor in achieving a safe workplace is strict compliance to health and safety guidelines by all parties.

SAFETY IS EVERYONE'S CONCERN!



CHAPTER 2: SAFE PRACTICES, COMPLIANCE AND ENFORCEMENT CODES

The primary responsibility of warehouse staff is to perform their duties in a safe manner to prevent injury to themselves and others. **Everyone working in the warehouse must become familiar with and follow workplace health and safety guidelines as a condition of their employment.**

Before beginning work or new assignments, the organization should review applicable and appropriate safety rules with each staff member. A staff member should be instructed **not** to begin a task if he or she has any questions about how it is to be done safely. The staff member and his or her supervisor should discuss the situation to determine the safest way to complete the job. A staff member should contact the Safety Committee Chairperson/Safety Coordinator if he or she still has questions or concerns after discussing the situation with a supervisor.

No staff member should ever be required to perform work that he or she believes is unsafe or likely to cause injury or a health risk to themselves or others. It is everyone's responsibility to enforce these rules to ensure safety!

The organization should make every reasonable effort to provide a safe and healthy workplace that is free from potential hazards. **The following principles should be followed:**

- 1) **All accidents are preventable.** The implementation of effective health and safety control policies and programs will prevent accidents.
- 2) **Accident prevention is good business.** It minimizes human suffering, promotes better working conditions for everyone, holds the organization in higher regard within the community and increases productivity.
- 3) **Staff is valued.** Management is responsible for providing the safest possible workplace for staff and is committed to allocating and providing the resources needed to promote and effectively implement these safety guidelines.
- 4) **Everyone is responsible.** Staff is responsible for following safe work practices and for preventing accidents and injuries.
- 5) **Communication is key.** Management will establish lines of communication to solicit feedback from staff where health and safety are concerned.
- 6) **Managers are role models.** The organization's management staff will serve as role models, demonstrating good attitudes and a strong commitment to health and safety in the workplace.
- 7) **Monitoring is part of everyday business.** Management must monitor company health, safety and working conditions to ensure that program objectives are achieved.
- 8) **Safety promotion is on-going.** Everyone must be committed to promote safety awareness and prevent accidents and injuries.
- 9) **Everyone must be committed to safety.** People working together can prevent accidents and keep each other healthy and safe in the workplace.

2.1: SAFETY COMMITTEE — ROLES AND RESPONSIBILITIES

The purpose of the Safety Committee is to promote workplace health and safety control policies through enhanced communication, education, and involvement of staff, contractors, visitors and the general public.

MEMBERSHIP

The Safety Committee should be comprised of the Commodity Manager, Security Officer, Warehouse Manager, Logistics Officer and Commodity Tracking System Officer. The committee should have a designated chairperson responsible for managing the committee's activities. At the Program Manager's discretion, a regularly hired laborer could also participate in the committee. The Program Manager and the country and human resources directors should have standing invitations to attend committee meetings.

OBJECTIVES

Committee objectives should be to:

- 1) Assess warehouse health and safety systems, processes, operations and resources.
- 2) Review reports and information relevant to matters of safety and make recommendations, as it deems appropriate.
- 3) Conduct unscheduled checks to ensure compliance with warehouse health and safety protocols.
- 4) Take appropriate action in response to any request by the Program Manager or Senior Management Team concerning a safety or health-related matter.
- 5) Review and monitor implementation of the health and safety plan.
- 6) Celebrate safety achievements, for example a month or year that is accident or incident free.

MEETINGS

Quarterly committee meetings are recommended, however, they may be required more frequently depending on circumstances and the location. Committee members should choose meeting dates based upon their schedules. All safety committee meetings and trainings should be conducted during working hours.

Prior to Safety Committee meetings

The committee chairperson should:

- Send out a meeting agenda and minutes from the previous meeting
- Remind staff to submit any comments or concerns about safety issues prior to the meeting.

Possible agenda items for a Safety Committee meeting include:

- Safety incidents
 - Discuss outstanding safety issues
 - Review new safety issues
 - Identify and discuss safety incident trends
- Safety training/activities
 - Review recently implemented safety training/activities
 - Discuss/plan for upcoming safety training/activities
- Safety inspections
 - Use [Appendix 1: Warehouse Safety Inspection Checklist](#) to conduct warehouse

- o safety inspections
- o Assign any follow up tasks to issues identified during the inspection
- 'Safety topic of the quarter/month'
 - o Have someone present information about a relevant safety topic
 - o Highlight safety issues or innovative safety practices from other warehouses
- 'Safe Staff Member'
 - o The committee can regularly recognize a staff member for their exceptional safety practices

After the Safety Committee meeting

The committee chairperson should distribute meeting minutes and ensuring that tasks assigned during the meeting are completed.

The committee should review its terms of reference and its performance annually.

RECORDKEEPING

Thorough records of committee actions and meetings should be kept and filed in the warehouse and office; copies should be shared with the Program Manager.

COMMUNICATION

All written communication between the organization and the committee should be maintained and readily available for inspection. Organizational leadership should issue a timely written response to all questions and recommendations from the safety committee.

MEETING MINUTES

Meeting minutes should include the agenda, lists of present and absent committee members, key points discussed during the meeting and decisions made. Draft minutes should be circulated promptly to all committee members for comments and edits and then shared with designated organizational leadership.

2.2: COMMUNICATION

Management and staff must effectively communicate regarding safety-related issues. The following communication guidelines are recommended to ensure involvement and commitment to safety issues by management and staff.

- Hold periodic safety meetings with staff that encourage participation and open, two-way communication.
- Provide new staff with safety training as well as a copy of the ***Warehouse Staff Safety Guide***.
- Develop a phone tree for warehouse staff so that management can contact them in event of emergency.
- Provide regular refresher trainings once per year for existing employees.
- Post up-to-date information about safety issues, accidents and general safety suggestions on bulletin boards.
- Keep a white or chalkboard near the warehouse entrance where a list of on-site personnel and visitors can be written on a daily basis. This will assist in accounting for people in case of an emergency.
- Distribute written communication to staff from the Warehouse Manager, including memos, postings and newsletters.

- Encourage staff to inform the organization immediately of changes in the safety of the environment.
- Ask staff to bring their safety concerns to the attention of management. Staff raising safety issues or concerns should not fear retribution as a result of their action.
- Respond in writing to all staff-initiated, safety-related suggestions and refer unresolved issues to the Program Manager or safety committee members.
- Involve staff in future developments and safety activities, by requesting their comments and suggestions.
- Establish an anonymous feedback system for warehouse staff that wish to provide information about workplace hazards without identifying themselves.

2.3: TOOLS AND EQUIPMENT

Tools and equipment are key components for successful warehouse operations. The following recommendations should be followed to ensure their effective storage and handling, and the safety and wellbeing of staff. [Appendix 2: Warehouse Tools and Equipment](#) provides a checklist for reviewing tools and equipment available in a warehouse.

✓ Personal Protective Equipment

Personal protective equipment such as **helmets, gloves, respirators, back support belts and protective footwear should be budgeted into program costs** and available to all staff members. Organizations should ensure that all staff working in the warehouse have access to these items and use them when working in the warehouse. The use of each item will depend on the activities the staff member is engaged in. For example, someone working on the top of high stacks or working within the vicinity of high stacks should use a helmet that is secured under the chin, someone working with wooden pallets or reconstituting material like needles etc. should have gloves. Back support belts should be worn when lifting heavy bags. **All staff regardless of the activities they are completing in the warehouse should wear close toed shoes to protect their feet.**

✓ Platform Weighing Scale

Platform weighing scales should be used for heavy items that are difficult to lift off the ground or that may cause injury if they fall from a hanging scale.

✓ First-Aid Kit

A comprehensive first-aid kit must be available. Warehouse staff should be trained in first aid in case of an emergency. Refer to Chapter 5 for a suggested list of items for stocking a first-aid kit.

The first-aid kit should be:

- In a visible and accessible location.
- Placed in a dry place, out of direct sunlight.
- Stocked with generic medicines for first-aid use in case of an accident.
- Inspected quarterly to ensure that medicines are not out of date.
- Restocked immediately when medicines are used or expired.



A first-aid kit inspection log should be used to register inspections and to detail when items have been resupplied. The inspection log should be reviewed when conducting month-end commodity inventory counts. Refer to [Appendix 3: First-Aid Kit Inspection Log](#) for a sample inspection log.

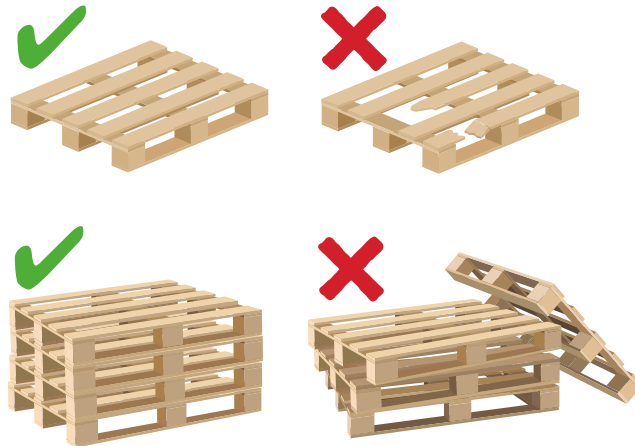
✓ Clean Water

Clean water should be available for use in first response to pesticide exposure (to skin, eyes, etc.) or fumigant intoxication.

✓ Pallets or Dunnage

Pallets and dunnage, material used to keep stored items in place, provide a base for items to prevent direct contact with the ground. All items must be stacked on either pallets or dunnage to protect commodities and for lifting heavy items by a forklift (if available). The following are recommendations regarding pallets:

- Use pallets that are small enough to be easily moved around the warehouse. The standard size is 1.2 meters x 1.1 meters, and approximately 10 to 15 centimeters tall.
- Use pallets made of wood or plastic and strong enough to accommodate the maximum weight of items to be placed on them.
- Stack pallets not in use out of the way so they are not a trip hazard.
- Stock the warehouse with tools such as a hammer, nails and a saw for repairing broken pallets.
- Ensure pallets do not have any protruding nails or sharp edges.
- In an emergency situation where no pallets are available, make every effort possible to prevent placing items directly on the ground by using dunnage.



✓ Flashlights (Torches)

In the event of a power failure, staff and the night watchmen will need flashlights to work in the dark and avoid injuries caused by tripping, slipping or falling in the darkness.

- Every warehouse should have at least two large flashlights.
- The security officer must have a flashlight when on duty at night. Spare batteries should be available at the warehouse.
- The Warehouse Manager should examine the reliability of the flashlight at least once a week. Replace the flashlights if they are out of order.



✓ Reconstitution Materials

Reconstitution materials are used to repair bags or containers to prevent damage or cross infestation of other items. Loose commodities can be a slip risk and attract vermin that in turn attract snakes.

Reconstitution tools and materials should be budgeted for during the program design phase and placed in a permanent location and registered in the warehouse inventory logbook. If extensive reconstitution of materials is required the following might be needed: a stitching machine, a funnel, a sieve, stitching twine and plastic jerry cans.

✓ Crowbar

A crowbar is needed for opening wooden cases without causing injuries to warehouse staff.

The crowbar is used in a pulling motion towards the body and should be held with both hands. The area around the crowbar should be clear to prevent injuries caused by nails or splinters that may come loose while the case is opened. When not in use, the crowbar should be laid flat on the floor and stored with all other tools.

✓ Cleaning Materials

Warehouse walls, floors and stacks should be dusted and cleaned on a daily basis for a safe and clean working environment. Dusty warehouses can cause breathing problems for staff.

- All warehouses should be equipped with cleaning materials and equipment, according to the size of the warehouse.
- Equipment may include brooms made from split coconut midribs and sugar palm fiber, small brushes for floors and cobwebs, wastebaskets, a shovel, handcarts and a wheelbarrow.
- Cleaning materials should be stored together, except for wastebaskets, which should be placed throughout the warehouse.
- The Warehouse Manager should prepare a cleaning plan and use a cleaning control sheet to monitor adherence to the cleaning schedule.

✓ Fire Extinguisher

Fire extinguishers in the warehouse are essential for small fires and first response.

- Equip warehouses with fire extinguishers.
- Number fire extinguishers and mount them on walls in visible and accessible locations, preferably next to doors.
- Train all staff how to use fire extinguishers.
- Ensure that each chemical fire extinguisher has a maintenance card containing a fire chemical refilling schedule.
- Install smoke alarms, depending on the size of the warehouse and the length of the operation. Please refer to local regulations for this information.

✓ Ladder

Ladders must be in good working condition, periodically inspected and correctly utilized by warehouse staff to prevent ladder-related injuries.

Ladders should be stored flat on the floor close to the wall to avoid them being knocked over or becoming a trip hazard.

✓ Back-up Generator

While it is standard operating procedure that no loading, offloading or inspecting is done in the warehouse without adequate natural light, there are exceptions when artificial lighting is required. Examples include 24-hour operations or warehouses that lack enough natural lighting.

A back-up generator should be available to operate lighting in the event of local power failure so that normal operations can resume. The generator should be positioned outside the warehouse to prevent smoke and inhalation problems. Staff should be trained to start and refuel generators to avoid burn accidents and hazards caused by fuel spills.

RAT CONTROL

*Rat traps are an important tool in the prevention of rodent infestation. **Be sure to use rat traps in accordance with USAID pesticide procedures detailed in the USAID Environmental Compliance Regulations.***

Commonly used traps are:

✓ Glue Traps

Glue or sticky traps are squares of heavy paper or vinyl that have been coated with a non-poisonous sticky adhesive and substances attractive to rats. The traps are placed in typical pathways for rats. When the animal walks across the sticky surface it becomes fixed to the trap.

✓ Snap Traps

A snap trap is activated when food bait is removed or eaten by the rat, triggering the spring-loaded mechanism. To set up the trap, remove the small staple holding the locking bar to the wood base. Place bait inside the curl found at the end of the bait pedal. Pull back the bow and hold down with a thumb. Engage the curved portion-locking bar under the small, V-shaped lip on the bait pedal. The traps are placed perpendicular to the wall near signs of rodent activity. To catch rats, place unset traps out for a few days so they can become familiar with them.



Glue trap



Snap trap

2.4: COMMON INJURIES AND PREVENTATIVE SAFETY MEASURES

All staff must do their part to prevent accidents and injuries including:

- 1) Observing organizational safety rules.
- 2) Keeping work areas free of unsafe conditions.
- 3) Avoiding and eliminating unsafe practices.
- 4) Promptly reporting unsafe practices and conditions.
- 5) Reporting all accidents immediately.

The following chart describes common warehouse injuries and safety measures to prevent them:

COMMON INJURY	PREVENTATIVE SAFETY MEASURE
Trips, slips and falls	1) Do not place material such as boxes, empty grain sacks or trash in walkways and passageways.
	2) Keep floors cleanly swept.
	3) Clean up spills or leaks immediately by using a rag or mop and bucket.
	4) Do not block or obstruct stairwells, exits, or access to safety and emergency equipment such as fire extinguishers.
	5) Return tools to their storage places after use.
	6) Use caution signs or cones to barricade slippery areas such as freshly mopped floors.
	7) Obey all posted safety and danger signs.
Chemical-induced injuries (i.e., burns, headaches, eye injuries, ingestion, etc.)	1) Use personal protective clothing or equipment such as neoprene gloves, rubber boots, shoe covers, rubber aprons, and protective eyewear, when using chemicals labeled 'Flammable', 'Corrosive', 'Caustic' or 'Poisonous'.
	2) Do not open a warehouse prior to the recommended timeframe following fumigation.
	3) Safely dispose of fumigant packaging. (Refer to Chapter 3.6 for safe disposal procedures.)
	4) Do not use gasoline (petrol) for cleaning purposes.
Ergonomic injuries (i.e., injuries that happen from doing common movements incorrectly)	1) Take periodic rest breaks from repetitive or prolonged activities by standing up and stretching.
	2) Use a chair that is padded, stable and mobile; swivels; and allows operator movement. It is important to sit up straight in a chair.
	3) Adjust computer screens and keyboards so that they are directly in front of you. Use a table large enough to hold a keyboard, the computer screen and all necessary documents.
	4) Keep wrists and hands in a straight position while keystroking by keeping forearms parallel to the floor and elbows at your sides.

COMMON INJURY	PREVENTATIVE SAFETY MEASURE
<p>Injuries due to lifting heavy objects (i.e., back pain, slipped disk, shoulder and leg injuries)</p>	1) Plan how an item will be moved before starting the job. Remove obstructions from your chosen pathway first.
	2) Test the weight of a load before lifting by pushing the load along its resting surface.
	3) If the load is too heavy or bulky, use lifting and carrying aids such as hand trucks, dollies, pallet jacks and carts.
	4) If assistance is required to perform a lift, coordinate and communicate your movements with those of your co-worker.
	5) Position your feet 15 to 30 centimeters apart with one foot slightly in front of the other.
	6) Face the load.
	7) Bend at the knees, not at the back.
	8) Keep your back straight.
	9) Get a firm grip on the object with your hands and fingers. Use handles when present.
	10) Never lift anything if your hands are greasy or wet.
	11) Stack items on pallets/dunnage so that they lie flat and do not lean against each other. The stacks must be at least 1 meter apart.
	12) Wear protective gloves when lifting objects with sharp corners or jagged edges.
	13) Hold objects as close to your body as possible.
	14) Perform lifting movements smoothly and gradually; do not jerk the load.
	15) If you must change direction while lifting or carrying the load, pivot your feet and turn your entire body. Do not twist at the waist.
	16) Set objects down in the same manner as you picked them up, except in reverse.
	17) Do not lift an object from the floor to a level above your waist in one motion. Set the load down on a table or bench and then adjust your grip before lifting it higher.
	18) Slide materials to the end of the tailgate before attempting to lift them off a pick-up truck. Do not lift over the walls or tailgate of the truck bed.
<p>Ladder-related injuries</p>	1) Do not use ladders that have loose rungs, cracked or split side rails, or other visible damage. Ladders with rubber footpads are preferred.
	2) Keep ladder rungs clean and free of grease. Remove buildup of material such as dirt or mud.
	3) Do not place a ladder in a passageway or doorway without posting warning signs or cones that detour pedestrian traffic away from the ladder. Lock the doorway that you are blocking with the ladder. Post signs that will detour traffic away from your work.
	4) Allow only one person on the ladder at a time.
	5) Face the ladder when climbing up or down.
	6) Maintain a three-point contact by keeping both hands and one foot or both

Chapter 2: Safe Practices, Compliance and Enforcement Codes

	feet and one hand on the ladder at all times when climbing up or down.
	7) When performing work from a ladder, face the ladder and do not lean backward or sideways from the ladder.
	8) Do not stand on the top two rungs of any ladder.
	9) Do not stand on a ladder that wobbles, or that leans to the left or right.
	10) When using a ladder, extend the top of the ladder at least 3 feet above the edge of the top of the stack.
	11) Secure the ladder in place by having another worker hold it.
	12) Do not move a rolling ladder while someone is on it.
	13) Do not place ladders on barrels, boxes, loose bricks, pails, concrete blocks or other unstable bases.
	14) Do not carry items in your hands while climbing up or down a ladder.
	15) Do not try to "walk" a ladder by rocking it. Climb down the ladder and then move it.
	16) Do not use a ladder as a horizontal platform.
Injuries related to carts	1) Do not exceed the rated load capacity noted on the manufacturer's label on the cart.
	2) Ask a spotter to help guide carts around corners and through narrow aisles.
	3) Do not stand on a cart or float or use it as a work platform.
General storeroom/warehouse injuries	1) Wear your safety glasses when uncrating materials and driving nails.
	2) Do not use pallets that are cracked or split or have other visible damage.
	3) Stack heavy or bulky storage containers on middle and lower shelves of the storage shelf.
	4) Do not run on stairs or take more than one step of a staircase at a time.
	5) Do not jump from elevated places such as truck beds, platforms, stacks or ladders.
	6) Do not lift slippery or wet objects.
	7) Always use wooden or plastic pallets to stack commodities and leave 1 meter between stacks and walls to ensure adequate walking space between stacks.
	8) Always wear a helmet when unloading and loading commodities from a truck and when stacking commodities in a warehouse.
	9) Keep clear of commodity stacks in a warehouse.
	10) When standing or walking on stacks, always move slowly, paying close attention to where you place your feet.
	11) All visitors to the warehouse should be accompanied at all times.
Head injuries	1) Never stack 25 kg commodity bags higher than 20 layers.
	2) Never stack 50 kg commodity bags higher than 30-40 layers.
	3) Never stack boxes of oil higher than eight layers.
	4) Never walk under ladders or near areas where people are working on stacks above.
Vehicle Injuries	Refer to Appendix 4: Vehicle Movement Hazard for details

2.5: SAFE WAREHOUSE OPERATING PRACTICES

Safe warehouse management is essential to securely store and track items, and protect warehouse health and safety. A warehouse is a place where goods are received, stored and dispatched. This guide refers to warehouses that store items entrusted to organizations by donors. Items are stored for short periods of time, typically less than three months and almost never for more than twelve months.

The items entrusted to the organization can be worth millions of dollars, therefore the warehouse must be adequately secured, well managed and a safe environment for staff. Please see the following appendices for useful information:

- **Appendix 1: Warehouse Safety Inspection Checklist**
- **Appendix 5: Characteristics of an Ideal Warehouse**
- **Appendix 6: Warehouse Safety Posters**
- **Appendix 7: How to Build a Stack**

2.6: SAFETY INSPECTIONS

Warehouse safety inspections should focus on the items being stored and related work activities. A sample Warehouse Safety Inspection Checklist is included in [Appendix 1](#). It includes information on the condition of floors, stairs and ramps; cleanliness; stacking; general safety; fire equipment and exits; ladders; electrical installations; pallets and racks; and storage practices.

Inspections should be conducted on a monthly basis by senior management or the Warehouse Manager, or could be included as a responsibility of the Safety Committee. Corrective actions for noted non-compliant issues should be implemented immediately. A warehouse safety inspection report should be completed during every inspection and should be signed and filed in the warehouse.

CHAPTER 3: FUMIGATION PLANNING AND SAFETY

The purpose of this chapter is to provide staff with an understanding of the fumigation process and precautions that must be taken to ensure the safety of staff and surrounding communities. Trained professionals should be contracted to fumigate warehouses and to handle fumigants. Warehouse staff should not handle fumigants. However, staff supervising the fumigation process should be properly trained and equipped to supervise fumigation activities to ensure the applicator is following safety guidelines to prevent illness and injury.



Fumigation is a dangerous process. Staff may be poisoned or even killed if fumigants are used improperly. Preparing for fumigations correctly is an important step toward ensuring the safety of staff and communities surrounding the warehouse.

First aid for fumigation-related incidents can be found in [Chapter 5.3](#).

3.1: WHAT ARE FUMIGANTS?

Fumigants are pesticides in the form of gases that are slightly heavier than air and have the ability to spread to all areas of a sealed structure. All fumigants are toxic to humans and other warm-blooded animals, as well as to insects and other pests. They are classified by the United States Environmental Protection Agency (EPA) as Restricted Use Pesticides (2014) because they are highly toxic and can seep into the smallest of cracks and crevices or bagged commodities and are a popular solution to insect and rodent infestations in stored grain. However, because pesticides move quite easily throughout the grain mass, they also may seep from the bin or storage building. This seepage poses three major challenges for the fumigator as listed below:

- 1) Pests may not be killed if insufficient fumigant is used inside the structure, increasing the risk of pesticide resistance.
- 2) Fumigant that escapes the structure represents a loss of a fairly expensive pesticide.
- 3) The ability of a fumigant to move through the smallest of cracks and cement walls, also means that it may move along electrical conduits, pipes, augers, and other passageways into adjacent buildings where it may harm and quite easily kill animals and people if not handled safely.

Commonly used fumigants include:

- *Aluminum phosphide* (AIP). Aluminum phosphide fumigants include Phostoxin® and Fumitoxin. They are used for product fumigation and occasionally for rodent control. Some formulations of aluminum phosphide also contain ammonium carbonate (about 40%), which releases ammonia gas, carbon and carbon dioxide (Hayes & Laws, 1990). The carbon dioxide reduces the tendency of the phosphine to oxidize spontaneously and thus prevents explosions and fires.
- *Magnesium phosphide* (Mg₃P₂). Magnesium phosphide fumigants include Magnaphos. It is used for product fumigation and occasionally rodent control.
- *Zinc phosphide* (Zn₃P₂). Zinc phosphide fumigants include ZP Rodent Bait and Dexol Gopher Killer. Zinc phosphide is more stable chemically than aluminum phosphide; it forms phosphine gas only when ingested. Thus zinc phosphide is used for rodent control but not for product fumigations.

WARNING!
Fumigants are dangerous. Staff may be poisoned, injured, or killed if used incorrectly.

Phosphine is extremely dangerous. Warehouse staff should know the following about phosphine:

- It is highly flammable and explosive.
- It may ignite spontaneously on contact with air.
- The agent may be ignited by heat, sparks or flames.
- When phosphine burns, it produces a dense white cloud of a severe respiratory irritant (phosphorous pentoxide).
- Vapors may travel to the source of ignition and flash back.
- Run-off may create a fire hazard. (CDC, 2011)

See [Chapter 4](#) for information about how to respond to a phosphine-related fire.

3.2: SIGNS OF ILLNESS

Phosphine gas irritates mucous membranes especially those of the deep lungs and upper airways. Because phosphine gas releases highly acidic forms of phosphorus when it contacts deep lung tissues, it tends to cause pulmonary edema (fluid in the lungs). Once absorbed into the body, phosphine can damage cell membranes and enzymes important for respiration and metabolism.

Intermittent, low concentrations of phosphine gas (probably 0.08 to 0.3 ppm) have been associated with mild headaches. Higher intermittent concentrations (0.4 to 35 ppm) have been linked to the following symptoms:

- Diarrhea, nausea, abdominal pain and vomiting
- Stinging of the eyes
- Cough
- Abdominal discomfort
- Numbness of the feet
- Tightness of the chest, breathlessness, soreness or pain in the chest and palpitations
- Headache, dizziness and staggering
- Skin irritation or burns

Warehouse management and staff must know these signs of phosphine exposure. If detected during a fumigation event, provide first aid immediately and seek medical attention. See [Chapter 5.3](#) for first aid for fumigant-related incidents.

3.3: PREPARING FOR FUMIGATION

USAID sponsored the development of a Programmatic Environmental Assessment (PEA) guide for Phosphine Fumigation of Stored Agricultural Commodity (USAID GEMS, 2013). The PEA includes a Fumigation Management Plan (FMP) Template (USAID GEMS, 2014) that includes a step-by-step guide with training material on preparing an FMP. The USAID FMP template can be found in [Appendix 8](#) of this guide and can be viewed online at:

http://www.usaidgems.org/Documents/FumigationPEA/Phosphide_FumigMangmtPlan_August%202014.docx

According to the PEA, before a fumigation event begins an FMP must be finalized, printed and kept on site for two years.

The purpose of an FMP is to:

- Provide guidance to the fumigator regarding how to produce safe and efficient results.
- Allow the non-governmental organization (NGO) to better manage and oversee the efficacy and safety of fumigators' practices.
- Support fumigation compliance reporting required by the Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP).

The FMP covers the following:

1. Notification of people and staff in buildings within 100 meters of the warehouse to be fumigated. They should be provided with the names of responsible parties, contact information and emergency response plans. See the following appendices for sample forms:
 - [Appendix 9: Official Notice of Fumigation](#)
 - [Appendix 10: Fumigation Marking Poster](#)
 - [Appendix 11: Emergency Contact Information](#)
2. Preparation and sealing procedures for the commodities being fumigated including using gas proof sheets and tarps and securing them to the ground with tape or sand snakes.
3. Determination of dosages and downtime calculations as well as personal protective equipment (PPE) requirements.
4. Fumigation and application method. This includes the fumigation's spatial plan and conformity with key steps and decision criteria including monitoring safety and efficacy during fumigation, determining when fumigation is complete, ventilating warehouses post-fumigation and allowing people to re-enter warehouses once safe to do so.
5. Monitoring, including post monitoring accident and deviation reporting.

PVOs planning to fumigate should review local requirements and amend the FMP template to comply. Any substantive deviations need to be submitted to USAID via the PERSUAP for approval.

The Commodity Manager and fumigator must review the FMP thoroughly, filling in details and making adjustments based on past fumigation activities prior to future applications.

3.4: RECOMMENDATIONS FOR STAFF TO AVOID INJURY RELATED TO FUMIGATION

Warehouse staff who work with or near fumigants **must comply with the following recommendations for their safety:**

- Be familiar with the FMP in [Appendix 8](#).
- Observe warning signs and know which work areas have been fumigated. Do not enter them until they have been aired out and monitored to show that they are safe.
- Pay careful attention to handling procedures on fumigant labels as these fumigants may explode when they come into contact with air or water.
- Take part in air monitoring or training programs your management offers.
- Use protective clothing including:
 - ✓ Respirator (see [Section 3.5](#) below for recommendations)
 - ✓ Protective clothes (long sleeve shirt and pants or overalls)
 - ✓ Boots

- ✓ Safety glasses (with solid side shields or goggles to protect eyes if contact with phosphide pellets is likely)
 - ✓ Clean, dry cotton gloves (in the case of phosphine tablets) or elastomeric or plastic gloves (in the case of liquid insecticides)
 - ✓ Rubber boots to protect hands and feet from contact with phosphide pellets
 - ✓ Rubber hat or helmet to protect head and repel fumigant
- Clean clothing with hot water and detergent before the next use.
 - Practice good personal hygiene when moving around a fumigated area.
 - Do not eat, drink or use tobacco in areas where fumigants are used.
 - Wash your hands and face before you eat, drink or smoke.
 - If possible, shower and change into clean clothes after using or coming into contact with fumigants.

3.5: RECOMMENDATIONS FOR MANAGEMENT TO AVOID INJURY RELATED TO FUMIGATION

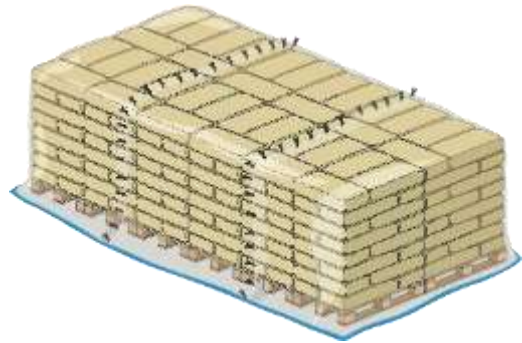
Management is responsible for the welfare of its staff within the warehouse and must:

- Ensure staff has access to the right equipment.
- Review the FMP with all staff affected ensuring that they understand its contents. If necessary, use a checklist that each staff signs indicating they have read the FMP.
- Inform staff that fumigants may cause fatal illness or injury.
- Tell staff which materials contain phosphide fumigants or are contaminated with them.
- Confirm in writing that all staff in and around the structure to be fumigated has been notified prior to application beginning.
- Establish an evacuation route and a meeting area for all staff in case of emergency.
- Ensure that phosphide fumigant residues and containers are accounted for and are safely disposed of by trained staff.
- Use extra caution with phosphide fumigants due to their explosive nature, particularly when it is in confined spaces or mixed with water.
- Display red ribbons to indicate fumigated areas.
- Decide when and where respirators should be used (see below for details).
- Provide the respiratory protection and PPE recommended.
- Provide training programs for warehouse staff to prevent exposure to fumigants.
- Know the many symptoms associated with phosphine gas exposure.
- Monitor air concentrations of phosphine gas and its exposure to staff. Post warning signs (see [Appendix 10: Fumigation Marking Poster](#)) that include the following information:
 - ✓ Danger
 - ✓ Date and time the fumigation begins and ends
 - ✓ Fumigant product name
 - ✓ Applicator's name, address and 24-hour phone number
 - ✓ Medical contact number
- Seek immediate medical attention for exposed staff with severe respiratory symptoms.
- Do not permit staff with symptoms such as dizziness and lightheadedness to drive or perform other complex tasks.

SHEETING AND SEALING A STACK

When sheeting a stack, only use gas-proof sheets and tarps and complete the following:

- Cover entire stack with gas-proof sheet with 1 meter of sheeting lying on the ground.
- If more than one sheet is used, join the sheets (with 1 meter overlap tightly rolled and then clipped or weighted).
- Use sand snakes or tape to secure sheet to the ground.



AERATION AND RE-ENTRY

The fumigator is responsible for indicating when a warehouse is safe after fumigation. The following should be verified before staff is permitted to re-enter the area:

- Aerate the area until the air borne concentration of phosphine gas is below 0.3 ppm.
- Monitor the area to make sure that phosphine gas released from the fumigated product does not raise concentrations above 0.3 ppm.
- Allow no one to re-enter a treated area without an approved respirator until monitoring is complete.

EFFICACY MONITORING



Gas monitoring must be done correctly to ensure the efficacy of the fumigation process and for the safety of people working in and around the warehouse. For more details on efficacy monitoring see the FMP in [Appendix 8](#).

It is highly recommended that the organization acquire its own phosphine gas monitoring equipment. The cost benefit of having this equipment is immense; especially in locations where it is highly unlikely the contractor would have this equipment.

RESPIRATOR USE

Cartridge or canister type respirators rated for protection/filtration of phosphine or air respirators with self-contained breathing apparatus (SCBA) **MUST** be used where staff may be exposed to phosphine. Respirators must have a full-face respirator mask. Canister respirators are preferred to cartridge respirators despite their greater cost.

Regardless of the expiration date or what the use log states on the canister, users should **never** be exposed to the phosphine gas odor.

Canisters should be checked regularly and if suspected of being faulty in any way they should be immediately substituted with another canister.

Respiratory protection standards are designed to establish minimum operating parameters that should be observed for a safe work environment when using respirators, these include the following:

- Cartridge or canister rated for protection/filtration of phosphine
- An evaluation of the staff member's ability to perform the work while wearing a respirator
- Regular training of staff in the correct use of respirators
- Periodic environmental monitoring
- Respirator fit testing
- Maintaining, inspecting, cleaning and storing respirators, and



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- Procedures to ensure adequate quality, quantity, and flow of breathing air for atmosphere-supplying respirators.

Management should evaluate the respiratory protection program regularly. The table below lists the recommended respiratory protection for staff exposed to phosphine gas.

CONDITION	MINIMUM RESPIRATORY PROTECTION
Phosphine gas concentration (ppm)	
0.3-3	Supplied-air respirator
7.5 or less	Supplied-air respirator operated in a continuous-flow mode
15 or less	Self-contained breathing apparatus with a full face piece, or Supplied-air respirator with a full face piece, or Air-purifying, full face piece respirator (gas masks) with a chin-style front- or back-mounted canister
50 or less	Supplied-air respirator equipped with a full face piece and operated in a pressure-demand mode, or self-contained breathing apparatus equipped with a full face piece and operated in a pressure-demand mode
Oxygen-limited atmospheres	Supplied-air respirator equipped with a full face piece and operated in a pressure-demand or other positive-pressure mode, or self-contained breathing apparatus equipped with a full face piece and operated in a pressure-demand or other positive-pressure mode

3.6: SAFE DISPOSAL OF FUMIGATION CONTAINERS

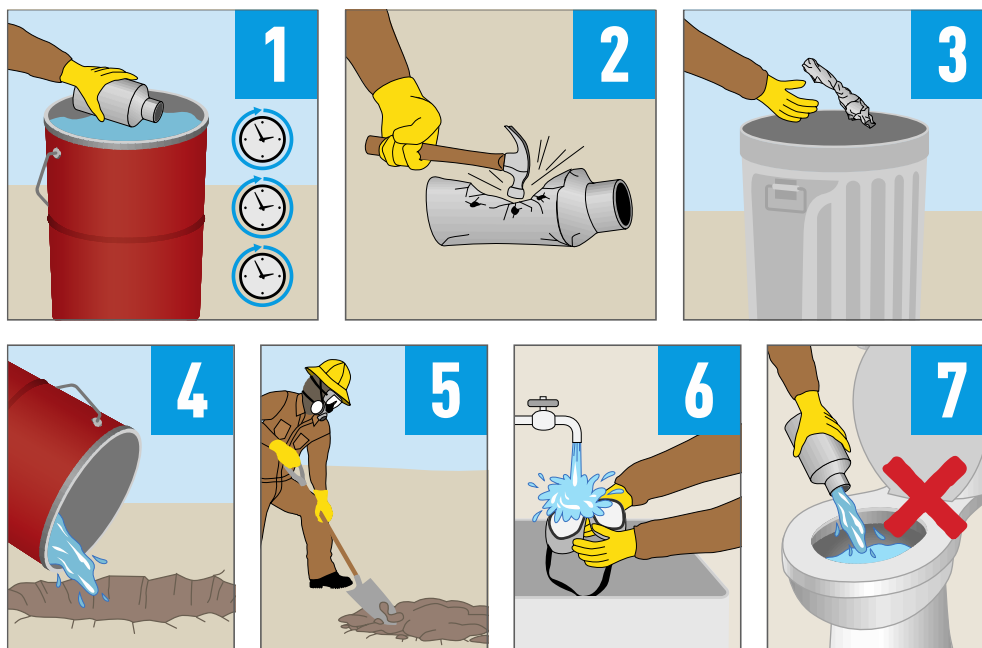
Disposal of fumigant residues and old packaging must be determined during the hazard assessment, which is part of the FMP process. Disposal instructions are normally provided on the fumigant's container label. Fumigation operators must comply with these requirements. In addition, the material safety data sheets (MSDS) that can be found online contain disposal information and must be available to each person involved in the fumigation and on file in the office.

Most packaging used in fumigation operations will require appropriate disposal either in a landfill, or where allowed by local bylaws, by burning after all residues are cleaned out. Metal containers such as aluminum/magnesium phosphide flasks must be rendered unusable before disposal by punching holes in them or crushing. Cardboard and paper packaging not contaminated with pesticide can be recycled or disposed of in a landfill. Cylinders are normally returned to the supplier for refilling.

DISPOSING OF FUMIGATION CONTAINERS

In most developing countries there are no designated areas for disposal of fumigation containers. Prior to completing the following steps ensure that all fumigants - pellets, liquids or dusters - are used up during the fumigation event.

1. Use a leak-proof drum, add deactivation solution or 2% solution of a low-sudsing detergent. Wearing a respirator, slowly pour in deactivated material or submerge containers and let stand for 36 hours.
2. Puncture all deactivated containers.
3. Dispose containers in landfill or a proper receptacle.
4. Dispose of deactivated mixture into a disposal pit.
5. Cover disposal pit with dirt.
6. Wash drum, equipment, clothing, gloves and hands thoroughly after disposal.
7. **WARNING-** Do not dispose of mixture in a toilet!!



3.7: USE OF PESTICIDE SPRAYS

Spraying pesticides to kill insects in an empty warehouse prior to receiving food requires the same level of safety precautions as fumigants. The following steps must be observed (extracted from the PEA FMP in [Appendix 8](#) (USAID GEMS, 2014):

- Submit a PERSUAP to USAID that requests specific pesticides.
- Give prior notice of the spraying to warehouse staff that is likely to be disrupted while the area is cleared for fumigation.
- Ensure the warehouse is totally clean to increase insecticide effectiveness.
- Repair all cracks, roof leaks and equipment prior to spraying.
- Calculate the area to be sprayed (usual recommended rate is two to five liters of water/100 square meters) and provide sufficient insecticide (recommended dosage rate 2% active ingredient in the solution or as recommended by the label). Ensure adequate availability of water and sprayers, protective clothing, and water and soap for washing.

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- Ensure that applicators wear protective clothing, including boots, long sleeve shirts, pants, disposable gloves, goggles, respirator and coveralls. In some cases, cartridge type respirators should be worn to protect against inhaling spray droplets. Check the fumigant's label for respiratory protection needed.
- Calibrate sprayer by adjusting volume of water needed to cover a known amount of floor area.
- Provide clear instructions to applicators as to the parts of the warehouse to be treated and an estimate of the area to be covered with one knapsack sprayer of pesticide.
- Give special instructions, for example, about applying heavier than normal dosages of spray to places where insects might be concentrated (i.e., cracks and crevices in walls and floors).
- Notify applicators about hazards such as electrical equipment, dimly lit areas and slippery floors.
- Mix pesticides in a well-ventilated area using disposable gloves and goggles. If a pest management service provider is used for spraying, pesticides should be mixed off-site before arriving on warehouse grounds.
- Spray an empty warehouse (floor, walls, roofs, etc.) and surrounding areas to kill insects before receipt of food commodities. The perimeter of the warehouse on the outside should be sprayed. Do not spray near waterways; spray at least 50 meters away from any body of water.
- Inspect all areas immediately after spraying to ensure they have been thoroughly treated. Any surplus spray should be applied to walls so that none is leftover. Diluted water-based sprays should not be retained in the sprayer for longer than one day because the insecticide may deteriorate rapidly.
- Wash and triple rinse sprayers thoroughly with clean water, collecting water used throughout the process. Dismantle and clean nozzles. Drain and dry spray tanks, hoses, and lances. Safely dispose of water used for washing and rinsing, preferably in an area designated for this waste where it will not affect non-target organisms. Crush empty insecticide containers and dispose of them in a secure pit/landfill where they will be covered.
- Wash hands, clothing and goggles worn during application in soap and warm water. Do not reuse gloves.
- Report the area of a warehouse sprayed and the type and quantity of pesticides used.

CONCLUSION

Serious illness, injury, and death may result from handling phosphide fumigants in the workplace. These risks are linked to the following:

- Inexperienced fumigation service providers without access to required safety and monitoring equipment.
- Incorrect handling during and after fumigant application.
- Failure to use gas-proof tarps.
- Failure to monitor air concentrations during and after application.
- Failure to use appropriate respiratory equipment during and after application.
- Incorrect disposal of unused fumigant products and containers.
- Incidental exposure from nearby fumigant application.

Fires and explosions due to the mishandling of fumigant products have particularly disastrous consequences. Staff is often unaware of the risks of working with or near phosphide fumigants. These risks can be greatly minimized by following the recommendations outlined above.



CHAPTER 4: FIRE PREVENTION AND EMERGENCY ACTION PLAN

Warehouse fire safety is essential to prevent or control fires quickly, effectively and safely. Good fire safety management ensures that in the event of a fire, all staff is able to evacuate to a safe place and the fire is contained as quickly as possible. Warehouse fire safety goes beyond mandatory compliance with fire codes and regulations.

Below are a few misconceptions about warehouse fire safety:

- The warehouse recently passed a fire inspection therefore it must be up to code.
- The warehouse is up to code therefore it must be safe.
- The warehouse was designed with a sprinkler system therefore it cannot burn down.
- The warehouse is full of non-combustible products that do not pose a fire hazard.

Fumigation, a common practice in warehouses storing food commodities, is a hazardous operation with the risk of fire or explosion. Phosphine, a common fumigant, is extremely flammable and explosive. The following fire prevention and response information should be reviewed prior to the fumigation of a warehouse so that staff is prepared in case of an emergency.

Training is a vital part of a fire protection and prevention program. Initial training should be provided at the beginning of employment and half-day refresher courses should be conducted annually. All warehouse staff including drivers, stevedores, warehouse staff, and managers must be trained in fire safety and response. Training should include an understanding of staff responsibilities as identified in the fire plan. It must also include instruction in the following:

- Fire prevention strategies
- Procedures for reporting fires and sounding alarms
- Evacuation plans
- Meaning and application of each type of fire and hazard symbol
- Type and use of appropriate fire-fighting equipment
- Fumigation oversight, safety and emergency response (refer to [Chapter 5](#) for more details)

See [Chapter 6: Warehouse Staff Safety Guide - Facilitator's Training Tool](#) for more information regarding training staff to prepare for and respond to a fire.

4.1: FIRE SAFETY CODES AND INSPECTIONS

Fire codes may vary from country to country depending on the skill and the education of fire department personnel. However, the purpose of all codes is universal: the achievement of a minimum level of acceptable safety.

Codes are used to determine building access, aisle widths, fire walls, smoke and heat removal systems, flue space requirements, and sprinkler density (including in-rack sprinklers). Fire inspections assess whether a building meets code and looks for hazards such as flammable debris, blocked exits and aisles, missing fire extinguishers, and damaged sprinkler systems.

A warehouse must have at least one correctly fitted and operational fire alarm that is maintained and tested at least every 6 months. Refer to national fire department equivalent standards for the number of fire alarms required for a particular warehouse.

The main causes of warehouse fires include the following:

- Arson
- Open flames
- Electrical-related causes
- Plant and equipment
- Heating equipment
- Lighting
- Smoking

FIRE PREVENTION

The safest way to deal with fire is to prevent it. The goal of fire prevention is to educate staff to take precautions to prevent potentially harmful fires and be educated about surviving them. It is a proactive method of reducing emergencies and the damage caused by them.

A fire needs three elements – heat, fuel and oxygen. A key strategy to prevent or contain fire is to remove one or more of these elements.

HEAT

Heat can be generated by work processes and is an essential part of some activities such as cooking. Heat must be controlled and kept away from fuel unless carefully controlled. Heat generated as a by-product of a process must be dealt with correctly.

HEAT SAFEGUARDS

To manage sources of heat:

- Ensure staff is aware of their responsibility to report dangers.
- Control sources of ignition.
- Have chimneys inspected and cleaned regularly.
- Identify different building uses, such as an office over a shop, and address them separately in terms of fire prevention.
- Ensure cooking food is always attended to.

SMOKING

To manage smoking on warehouse premises:

- ***Do not allow smoking in the warehouse.***
- Provide 'no smoking' signs at appropriate locations.
- Ensure outside smoking areas are away from flammable materials.
- Designate a place for cigarettes and matches to be disposed of safely and away from other combustible rubbish.

PORTABLE HEATERS

To manage portable heaters:

- Do not use them unnecessarily.
- Ensure they have emergency trip-off switches and thermostatic limiting controls.
- Turn them off if people leave the room or are going to sleep.
- Position them 1 meter away from anything that can burn.
- Do not use them to dry clothes.

ELECTRICAL SAFEGUARDS

Promote safety around electrical equipment by following these safeguards:

- All electrical equipment and installations must be designed, constructed, installed, maintained, protected, and used in a manner that prevents danger. Ensure a registered electrical worker or a person suitably qualified by experience carries out these tasks on fixed electrical wiring up to the socket outlet.
- Electrical contractors and staff are responsible for ensuring that the work they do is carried out according to relevant local standards.
- Ensure all warehouse staff are aware of the location of the main power switch and fuse box.
- Maintain sufficient pest control to avoid rodent damage to electric wiring and equipment.
- Check electrical equipment and remove anything found to be defective.
- Ensure electrical cords are in good condition.
- Plug appliances and lights into separate electrical outlets.
- Avoid using extension cords. If an outlet is required in an area where there is none, have one installed by a qualified electrician.
- Use extension cords safely – do not lay them under carpets or across walking areas.
- Use only one device per outlet.

ARSON

Arson is when fires are started deliberately and poses very significant risks to all workplaces. Arson most often occurs in areas with a known history of vandalism or fire setting. Typically, local youths light the fires outside a premise as an act of vandalism, using materials found nearby. Appropriate security measures, including the protection of stored materials and the efficient and prompt removal of rubbish, can therefore do much to alleviate this problem.

Advice should be sought from the local police or fire authority that will involve the other agencies as appropriate. Occasionally, staff or ex-staff commits arson attacks in the workplace. Management and other staff should be aware of this potential threat and be alert for early signs, such as a series of unexplained small fires.

Provide adequate security by:

- Using exterior and interior lighting, intrusion alarms, and a well-equipped guard service.
- Ensuring access openings are well secured.
- Preventing access by unauthorized persons.
- Keeping flammables safely stored and secured.

OXYGEN

Oxygen gas is used for:

- Welding, flame cutting and other similar processes.
- Helping people with breathing difficulties.
- Operating decompression and hyperbaric chambers as a medical treatment.
- Preserving and packaging food.
- Running steelworks and chemical plants.

Pure oxygen at high pressure from a cylinder can react violently with common materials such as oil and grease. Other materials may catch fire spontaneously. Nearly all materials including textiles, rubber and even metals will burn vigorously in oxygen.

With even a small increase in the oxygen level in the air it becomes easier to start a fire, which will then burn hotter and more fiercely than in normal air. It may be almost impossible to put the fire out. A leaking

valve or hose in a poorly ventilated room or confined space can quickly increase the oxygen concentration to a dangerous level.

The main causes of fires and explosions when using oxygen are:

- Oxygen enrichment from leaking equipment.
- Use of materials not compatible with oxygen.
- Use of oxygen in equipment not designed for oxygen service.
- Incorrect or careless operation of equipment.

OXYGEN SAFEGUARDS

Ensure staff is aware of their responsibility to report dangers. Oxygen should never be used to “sweeten” the air in a confined space.

When using oxygen:

- Follow safety advice from the supplier.
- Follow the safeguards on the container's safety data sheet.
- Keep the safety data sheet readily available.
- Be aware of the dangers of oxygen. If in doubt, ask.
- Prevent oxygen enrichment by ensuring that equipment is leak-tight and in good working order.
- Check that ventilation is adequate.
- Always use oxygen cylinders and equipment carefully and correctly.
- Always open oxygen cylinder valves slowly.
- Do not smoke where oxygen is being used.
- Never use replacement parts that have not been specifically approved for oxygen service.
- Never use oxygen equipment above the pressures certified by the manufacturer.
- Never use oil or grease to lubricate oxygen equipment.
- Never use oxygen in equipment that is not designed for oxygen service.

FUEL AND FLAMMABLE MATERIALS

Food and non-food items (NFIs), like fuel, which is a flammable material, should not be stored in the same location. If storing food and NFIs together is unavoidable, it is HIGHLY recommended that they be stored in separate rooms with safe and stable separations.

Workplaces in which large amounts of flammable materials are displayed, stored or used can present a greater hazard than those where the amount kept is small. Flammable materials burn readily in a normal atmosphere. Flammable materials include liquids (e.g. petrol), gasses (e.g. propane and butane) and solids (e.g. charcoal, paper). It is important to identify all flammable materials in your workplace and put adequate controls in place.

Great care is required in the storage, handling and use of flammable materials. Safety data sheets provide detailed advice.

LIGHTNING & SAFEGUARDS

Lightning can damage buildings either directly or indirectly by causing fire and explosions.

LIGHTNING SAFEGUARDS - OUTDOORS

Follow these safeguards outdoors when there is lightning:

- If you can hear thunder, you are within striking distance of lightning.

- There is no place outside that is safe during a thunderstorm therefore stay in the warehouse.
- Wait at least 30 minutes after the last thunder before leaving the warehouse.
- Stay away from windows and doors.
- If you feel your hair stand on end that means lightning is about to strike. Squat low to the ground on the balls of your feet.
- Place your hands over your ears and your head between your knees.
- Lightning strike victims carry no electrical charge; attend to them immediately. Check their breathing, heartbeat, and pulse. CPR may be needed. Seek medical care as soon as possible.

LIGHTNING SAFEGUARDS - INDOORS

Follow these safeguards indoors when there is lightning:

- Unplug appliances and other electrical items, like computers, and turn off air conditioners.
- Turn off those appliances that cannot be unplugged.
- Do not use corded phones, computers, and other electronic equipment that put you in direct contact with electricity or plumbing.
- Avoid washing your hands, bathing, doing laundry, or washing dishes.

4.2 FIRE-FIGHTING EQUIPMENT

FIRE EXTINGUISHERS

Fire extinguishers are the first line of defense when a fire breaks out. They should be distributed throughout the warehouse in accordance with national fire department equivalent standards. Warehouse managers must ensure that all fire extinguishers are maintained in serviceable condition. Staff are not to disable, tamper, relocate or use any portable fire extinguisher (or installed fire extinguisher system), other than for the purposes of fighting a fire. If a fire extinguisher is used for any reason, it must be reported to the Warehouse Manager immediately so that it can be replaced.

Warning!
**Using the wrong
type of extinguisher
could have
disasterous
consequences.**

FIRE EXTINGUISHER SEALS

Fire extinguishers must have seals to keep the safety pin in place. The seal is to be installed in such a manner that activation of the fire extinguisher will break the seal.

Fire extinguishers should only be used when:

- The fire is small and is not spreading. A fire can double in size quickly.
- The warehouse is equipped with a fire extinguisher appropriate for the source of the fire.
- Staff are properly trained in use of fire extinguishers. There is not enough time to read the instructions on how to use an extinguisher when a fire occurs.
- The fire extinguisher works. Inspect extinguishers once a month for dents, leaks or other signs of damage. Ensure the pressure is at the recommended level. On extinguishers equipped with a gauge, the needle should be in the green zone - not too high and not too low.

***Disclaimer:** It is highly recommended that only staff properly trained in basic fire-fighting techniques should fight a fire. Training should be done by a certified fire department or other agency qualified to do this.*

INSPECTION RECORD CARD

Fire extinguishers should have an inspection record card attached where monthly or periodic inspections can be recorded including the date of inspection and name of person carrying out the inspection.

MOUNTS

Fire extinguishers should be mounted on a wall in easily identifiable locations. The fire extinguisher should be attached in such a manner that it can be easily removed from the mount (e.g. not taped in place).










FIRE EXTINGUISHER CATEGORIES

Fire extinguishers are divided into four categories, based on different types of fires. Each fire extinguisher also has a numerical rating that serves as a guide for the amount of fire the extinguisher can handle; the greater the fire-fighting power, the higher the number.

The following is a quick guide to help choose the right type of extinguisher:

- **Class A** - use for ordinary combustibles materials such as paper, wood, cardboard and most plastics. The numerical rating on these types of extinguishers indicates the amount of water it holds and the amount of fire it can extinguish.
- **Class B** - use for fires involving flammable or combustible liquids such as gasoline, kerosene, grease and oil. The numerical rating for class B extinguishers indicates the approximate number of square feet of fire it can extinguish.
- **Class C** - use for fires involving electrical equipment, such as appliances, wiring, circuit breakers and outlets. Never use water to extinguish class C fires - the risk of electrical shock is far too great! Class C extinguishers do not have a numerical rating. The C classification means the extinguishing agent is non-conductive.
- **Class K** - commonly found in chemical laboratories. They are for fires that involve combustible metals, such as magnesium, titanium, potassium and sodium. These types of extinguishers also have no numerical rating, nor are they given a multi-purpose rating - they are designed for class D fires only.

Some fires may involve a combination of these classifications. Your fire extinguishers should have ABC ratings on them. Any of these extinguishers may be needed to fight a fire in a food aid warehouse depending on the source of the fire.

		Types of Fire Extinguishers				
Symbols found on fire extinguishers indicating types of fires						
		Water	Foam Spray	ABC Powder	CO ²	Wet Chemical
wood, paper, textiles		✓	✓	✓	✗	✓
flammable liquids		✗	✓	✓	✓	✗
flammable gases		✗	✗	✓	✗	✗
electrical contact		✗	✗	✓	✓	✗
cooking oils, fats, grease		✗	✗	✗	✗	✓

WATER EXTINGUISHERS

Water extinguishers or air pressurized water (APW) extinguishers are suitable for class A fires only. **Never use a water extinguisher on grease, electrical or class D fires** - the flames will spread and make the fire bigger. Water extinguishers are filled with water and pressurized with oxygen. Water extinguishers can be very dangerous in the wrong type of situation! Only fight the fire if you are certain it contains ordinary combustible materials only.

USING A FIRE EXTINGUISHER

To safely fight a fire:

- 1) Always stand with an exit at your back.
- 2) Stand several feet away from the fire, moving closer once the fire starts to diminish.
- 3) Use a sweeping motion and aim at the base of the fire.
- 4) Aim the extinguisher directly at the fuel, not at the flames.
- 5) If possible, use a "buddy system" to have someone back you up or call for help if something goes wrong.
- 6) Be sure to watch an extinguished fire to ensure it does not re-ignite.

Operate a fire extinguisher by following these steps known as **PASS (AmeriCares, n.d.):**

Pull the pin at the top of the extinguisher. The pin releases a locking mechanism and will allow you to discharge the extinguisher.

Aim at the base of the fire, not the flames. This is important - you must extinguish the fuel in order to put out the fire.

Squeeze the lever slowly. This will release the extinguishing agent in the extinguisher. If the handle is released, the discharge will stop.

Sweep from side to side. Using a sweeping motion, move the fire extinguisher back and forth until the fire is completely out. Operate the extinguisher from a safe distance, several feet away, and then move towards the fire once it starts to diminish. Be sure to read the instructions on your fire extinguisher - different fire extinguishers recommend operating them from different distances. Remember to aim at the base of the fire, not at the flames.



FIRE BLANKETS

A **fire blanket** is a highly flame-resistant blanket that can be used to either extinguish a small fire or to wrap around a person to protect them from fire. Fire blankets are made from two layers of woven glass fiber fabric and an inner layer of fire retardant film. They work by cutting off the oxygen supply and smothering the fire.

How to use a fire blanket:

- Turn off the gas or electricity supply.
- Roll up your sleeves so they do not catch in the flames.
- Remove the fire blanket from its container and hold it by the fabric straps.
- Wrap the top edges of the blanket around your hands to prevent burns on your hands and arms.
- Carefully cover the flames with the fire blanket, making sure that you cover the whole area so that you can effectively cut off the airflow and extinguish the flames.
- **Do not** touch the fire blanket or anything underneath for at least one hour after the fire is extinguished.
- **Do not** attempt to put out a fire if it is larger than the blanket. **Get out and call the fire department immediately.**

FIRE BUCKETS

A fire bucket is filled with water or sand to prevent or extinguish fires. Typically, fire buckets are painted bright red and have the word 'FIRE' stenciled on them.

Fire buckets are a low-technology method of fighting small fires. Although largely superseded by more modern forms of firefighting equipment, they retain some distinct advantages and remain the preferred method for fighting small fires in certain situations.

The main advantages of fire buckets are that they are cheap, reliable, easy to use and can be quickly refilled and reinstated. Normally, they are hung on dedicated fire bucket stands and placed in prominent positions in rooms or corridors.

Oil fires are resistant to water, but small fires can be effectively extinguished when the sand in the bucket is dumped on the fire to starve it of the oxygen it needs to stay alight. The sand from a fire bucket can also be used to absorb spills of flammable liquids and render them less dangerous by reducing the risk of ignition and explosion.

4.3 EMERGENCY ACTION PLAN

Take immediate action if a fire breaks out. It is important to stay calm when confronted with fire. There are many things that can be done to prevent a fire from spreading and minimize damage and potential loss of life.

Take the following steps:

1. **Sound the alarm.** Shout for help. Activate the alarm. **Designate someone to call the fire service**, if there is one. When the fire service arrives, provide information and cooperate with them. **If there is no fire service**, raise the alarm among neighboring buildings and improvise fire-extinguishing efforts, if it is safe to do so.
2. **Extinguish the fire if it is small.** If it is possible to fight the fire without risking injury take the following steps:
 - a. Determine the cause of the fire, if possible.
 - b. Identify what is available to fight the fire. If it is an electrical fire, it is important to first turn off electricity, if possible.
 - c. Attempt to fight the fire but *under no circumstances risk injury* in the process.
 - d. If successful, continue monitoring the site to prevent flare-ups until help arrives.
3. **Evacuate all people from the building.**
4. **Avoid smoke.** Remember that smoke can kill. Crawl to stay below the smoke.
5. **Check building.** A designated person should check that the building has been successfully evacuated, without re-entering the building or risking injury.
6. **Roll call.** A roll call should be taken at the fire assembly point to ensure that all occupants are accounted for.
7. **Declared safe?** Do not re-enter the building until a qualified person announces that it is safe. If it is a large building, position staff in a cordon so that no one can re-enter until it has been officially declared safe.

See [Appendix 12: Fire Safety and Evacuation Guidelines](#) for more information.

ENSURING A SAFE EVACUATION

An Emergency Evacuation Plan and Diagram should be prepared in advance and included in staff training. Warehouse staff should leave the building using the nearest exit immediately upon hearing a fire alarm. During training, ensure that staff responsible for shutting down certain equipment understand the conditions when they should perform the task or immediately leave. All warehouse staff should know:

- Procedures for reporting incidents to management (and other appropriate emergency resources such as emergency call, fire department), including after-hours telephone numbers and what types of incidents to report.
- Procedures for accounting for all staff and visitors.
- Location of fire extinguishers, evacuation procedures and collection points outside the building for all staff.

FIRE EXITS

Follow these guidelines for ensuring fire exits are accessible in case of an emergency:

- Fire exits should not be locked or obstructed while a building is occupied.
- All buildings should maintain at least two fire exit doors.
- A minimum of 80 cm (32 in) aisle clearance should be maintained throughout all facilities exit to exit; this includes doorways into rooms.

4.4 RESPONDING TO A FUMIGANT-CAUSED FIRE

There are specific steps to follow when responding to a fire caused by a fumigant as **fumigants are highly flammable and explosive. Fires involving fumigants should be left to professionals to fight.** The following information is extracted from the Center for Disease Control's Emergency Response Safety and Health Database about fires caused by the fumigant phosphine (CDC, 2011) and should be shared with local professionals.

- For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam.
- For large fires, use water spray, fog or alcohol-resistant foam. Move containers from the fire area if it is possible to do so without risk to personnel. Only specialists should handle damaged cylinders.
- For fire involving tanks, fight the fire from a maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after the fire is out. Do not direct water at the source of the leak or at safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tanks. Always stay away from tanks engulfed in fire.
- Run-off from fire control may cause pollution.
- If the situation allows, control and properly dispose of run-off (effluent).



CHAPTER 5: FIRST AID AND MEDICAL EMERGENCY PLANNING

Several steps can be taken to ensure staff is well prepared to respond in case of a medical emergency. First, staff must have first-aid training and access to a well-supplied first-aid kit. Next, management must define what procedures should be followed in case of a medical emergency and ensure that staff is well aware of them. Finally, a thorough investigation should be conducted regarding any incidents to prevent future emergencies and protect the safety of its staff.

The following sample forms can be found as appendices to assist a PVO in preparing for medical emergencies:

- [Appendix 3: First-Aid Kit Inspection Log](#)
- [Appendix 6: Warehouse Safety Posters](#)
- [Appendix 11: Emergency Contact Information](#)
- [Appendix 13: Accident Investigation Report Form](#)

5.1: FIRST-AID PREPARATION

First-aid training is a cost-effective method to increase overall safety. First-aid training should be a high priority for all warehouse staff. In many cases, local Red Cross/Red Crescent offices or other medical personnel can provide the training. Trained first-aid staff should be available in the warehouse on all workdays to render appropriate first aid for injuries and illnesses. (See [Appendix 14: Staff Training and Instruction Record](#) as a sample form for tracking training received by staff.) Prior to setting up a new warehouse, the Warehouse Manager should locate the nearest preferred medical facility and establish what transportation or communications methods are available in the event of an injury. Each warehouse staff should be informed of the procedures to follow in case of injury or illness during the orientation process. The telephone numbers of the following emergency services in the area should be posted in all warehouses:

- 1) An authorized physician or medical clinic, and at least one alternate, if available
- 2) Hospitals
- 3) Ambulance services
- 4) Fire-protection services

See [Appendix 11](#) for a sample Emergency Contact Information form.

All warehouse staff should have access to at least one first-aid kit. Well maintained kits, when combined with appropriate training for their use, can minimize the effect of medical incidents. The kit should be well marked and mounted in a central location. Each warehouse should designate someone to regularly inspect and replenish the kits.

The following are suggested contents for first-aid kit:

Latex gloves	Bandage scissors
Mask	Tourniquet
Trauma dressing 20 cm	Trauma dressing 10 cm
Gauze wrap 5 cm	Gauze wrap 2.5 cm
Gauze square 4X4 cm, sterile	Gauze square 4X4 cm, non-sterile
Gauze, petroleum 4X4 cm	Sling/cravat
Elastic bandage 10 cm	Elastic bandage 15 cm
Splint, roll type	Tape, waterproof 2.5 cm
Tape, waterproof 1.2 cm	Tape, cloth 2.5 cm
Providone iodine (wipes, ointment, swabs)	Band-Aids, plasters (assorted)

Note: Include additional items, as needed based on local situations.

5.2: MEDICAL EMERGENCY PLAN

Accidents may require immediate medical or hospital treatment. Medical emergency procedures must be clearly understood by all warehouse staff to ensure a safe and efficient response to medical emergencies. These procedures should be written in a plan, rehearsed and updated at least annually or more frequently depending on the operating environment. The plan should include:

- Inspected and approved medical facilities
- Emergency contact information for senior staff and all staff
- Procedures to follow when cash payment is required to begin treatment
- Medical evacuation (Medevac) procedures and contact information. Medevac is used when there is an injury in an area where local medical assistance or emergency/hospital care is unavailable or inadequate.

In the event of an accident, follow these procedures:

- Call for an ambulance if the injury requires a hospital or clinic visit. Arrange for alternate transportation if an ambulance is not immediately available to save time and, possibly a life.
- Warehouse staff must report all accidents to their line managers.
- The Warehouse Manager, staff involved and the first-aid person should determine whether or not outside medical attention is needed.
- The Warehouse Manager must submit an *Accident Investigation Report* (see [Appendix 13: Accident Investigation Report Form](#)) for all incidents whether or not such incidences require medical attention.

5.3: FIRST-AID TREATMENT FOR FUMIGATION-RELATED INCIDENTS

If a person is affected by fumigant, take him/her to fresh air immediately and keep them quiet and warm. Rescuers must take care not to become poisoned themselves. Seek immediate medical attention and show the product label and MSDS to the doctor/paramedic. The more seriously poisoned the victim, the more important it is to get them to hospital as quickly as possible. If breathing stops, or shows signs of failing, administer artificial respiration using oxygen and a suitable mechanical device such as a bag and mask. **Do not use mouth-to-mouth resuscitation** (even with a resuscitation device).

See the information and procedures below if a person is exposed to one of the following fumigants:

SULFURYL FLUORIDE

Sulfuryl fluoride is a gas that has no warning properties, such as odor or eye irritation. Contact lenses should not be worn when working with this chemical. Repeated exposure to high concentrations can result in significant lung and kidney damage. Single exposures at high concentrations have resulted in death.

- *In all cases of overexposure:* seek medical attention immediately. Call medical emergency services or take the person to a doctor or emergency treatment facility and show the fumigant's label and the manufacturer's MSDS.
- *If inhaled:* Get the exposed person to fresh air. Keep warm and at res. Make sure the person can breathe freely. If breathing has stopped, give artificial respiration. **Do not use mouth-to-mouth resuscitation.** Do not put anything in the mouth of an unconscious person. Seek medical attention immediately.
- *If liquid is on the skin or clothing:* Immediately apply water to the contaminated area of clothing. Once the area has been flushed, remove contaminated clothing, shoes, and other items covering the skin. Wash the contaminated area thoroughly or shower. Seek medical attention immediately.
- *If liquid is in the eyes:* Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, and then continue rinsing the eye. Liquid sulfuryl fluoride in the eye may cause damage due to freezing. Seek medical attention immediately. (Dow AgroSciences LLC)

PHOSPHINE

Phosphide fumigants release toxic phosphine gas when they come in contact with the air. The gas can be odorless or have the smell of decaying fish or garlic. Depending on the level of exposure the symptoms of phosphine poisoning may be immediate or take several hours to surface. Symptoms include fatigue, ringing in the ears, nausea, breathing difficulties, gastrointestinal issues, disequilibrium, vomiting and diarrhea. People exposed to phosphine run the risk of pulmonary or brain edema, and liver and kidney failure even if a person does not appear to be seriously affected.

- *If a person is exposed,* seek medical attention immediately and keep the person under medical supervision for several days.
- *If eyes are exposed,* wash eyes with large amounts of tepid water for at least 15 minutes.
- *If ingested,* make that the patient/victim has an unobstructed airway. Do not induce vomiting.
- *If inhaled,* evaluate respiratory function and pulse and ensure the patient/victim's airway is clear. If shortness of breath occurs or breathing is difficult (dyspnea), administer oxygen. Always use a barrier or bag-valve-mask device when assisting a person to breath after exposure to phosphine. If breathing has ceased (apnea), provide artificial respiration using a mechanical device. **Do not use mouth-to-mouth resuscitation.** (CDC, 2011)

CHLOROPICRIN

Chloropicrin is a colorless to faintly yellow oily liquid. It causes eye irritation and has a foul odor. Chloropicrin can be absorbed through inhalation, ingestion and the skin.

- *If skin has been exposed*, remove contaminated clothing and decontaminate with running water.
- *If eyes are affected*, flush with clean water.
- *If gas has been inhaled*, give oxygen if available or administer artificial respiration. **Do not use mouth-to-mouth resuscitation.** Anyone who has been exposed to chloropicrin should be referred to hospital for observation and monitoring. (CDC, 2011)

MEDICAL TREATMENT

Ensure that the fumigant container which contains information on treatment is available for the guidance of medical practitioners every time fumigation takes place. This information should be sent with affected staff to the doctor or hospital. Fumigant manufacturers usually supply details on their products, including advice on the toxic effects that may result from misuse or accidents with fumigants, and appropriate treatment.

5.4: ACCIDENT REPORTING AND INVESTIGATION

The Safety or Security Officer or any other designated staff should investigate all accidents in a timely manner. An accident is defined as any unexpected occurrence that results in injury to staff, damage to equipment, facilities, or material, or the interruption of normal warehouse operations. The purpose of the investigation is to determine the cause of the accident and corrective action to prevent future recurrence, not to fix blame or find fault. An unbiased approach is necessary, in order to obtain objective findings. Accident investigations also help to make first-aid trainings more effective by focusing on factors that are most likely to cause accidents. An Accident Investigation Report Form is included in [Appendix 13](#).

Investigate the following types of incidents:

- Fatalities
- Serious injuries
- Minor injuries
- Property damage
- Near misses

PROCEDURES FOR INVESTIGATING ACCIDENTS

Immediately upon being notified of an accident the Safety or Security Officer or any other designated staff must:

- 1) Visit the accident scene, as soon as possible, while facts and evidence are still fresh and before witnesses forget important details.
- 2) If possible, interview the injured staff member at the scene of the accident and verbally "walk" him or her through a re-enactment. All interviews should be conducted as privately as possible. Interview all witnesses and talk with anyone who has knowledge of the accident, even if they did not actually witness the event.
- 3) Report the accident to the Country Director and, if necessary, headquarters, who may have to report to the insurance carrier within a limited time frame.
- 4) Consider taking signed statements in cases where facts are unclear or there is an element of controversy.
- 5) Thoroughly investigate the accident to identify all accident causes and contributing factors. Document details graphically. Use sketches, diagrams and photos, as needed. Take measurements when appropriate.

- 6) Focus on causes and hazards. Develop an analysis of what happened, how it happened and how it could have been prevented. Determine what caused the accident itself, not just the injury.
- 7) Every investigation must also include an action plan. How can such accidents be prevented in the future?

QUESTIONS TO ASK DURING THE INVESTIGATION

When investigating accidents, open-ended questions will provide more information than closed-ended questions. Examples include:

- How did it happen?
- Why did it happen?
- How could it have been prevented?
- Who was involved?
- Who witnessed the incident?
- What was the staff member doing?
- When did it happen?
- When was the accident reported?
- Where did it happen?

The single most important question that must be answered as the result of any investigation is: "What do you recommend be done (or have you done) to prevent this type of incident from recurring?"

Once the accident investigation is completed, take or recommend corrective action. Be sure the corrective action is well documented. Keep a log of all accidents and periodically review the log to analyze trends.



CHAPTER 6: WAREHOUSE STAFF SAFETY GUIDE – FACILITATOR'S TRAINING TOOL

The Facilitator's Training Tool was developed to help organizations plan for and conduct warehouse staff safety training. It is recommended that the training be conducted annually and when new staff is hired. The Facilitator's Training Tool was designed to be used in tandem with the **Warehouse Staff Safety Guide**, Posters, and Appendices and includes a PowerPoint presentation (see **Appendix 15**). The guide is a tool that should be modified and adapted to meet the local context as well as local staff needs. It is best if the training is conducted in a warehouse.

Overview: 2-day Warehouse Staff Safety Training

Day 1

- Code of safe practices, compliance and enforcement
- Safety committee and correct communication
- Tools and equipment as well as correct warehouse management
- Common injuries and preventative safety measures
- What are fumigants and signs of illness
- Preparing for fumigation
- Recommendations for employees and management to avoid injury related to fumigation
- Safe disposal of canisters
- Use of pesticide sprays

Day 2

- Fire prevention and emergency action plans
- Causes of fires
- Evacuation training, fire exits and extinguishers
- First-aid preparation
- Procedures in the event of an accident, reporting and fumigation-related accidents

The facilitator is encouraged to use the following checklist as a guide to ensure that proper planning for **Warehouse Staff Safety Guide** training is completed prior to the workshop. The list is not conclusive and meant only as a reminder to facilitator(s).

General Materials:

- 1) Flip charts
- 2) Magic markers
- 3) Name tags
- 4) Projector
- 5) Note pads
- 6) Pens
- 7) Copies of the ***Warehouse Staff Safety Guide*** for all participants
- 8) Copies of warehouse safety posters
- 9) PowerPoint presentation

Session Materials:

- 1) Attendance list
- 2) Copies of the workshop agenda
- 3) Participant interview exercise for session one
- 4) Group contract for session one
- 5) Warehouse tools
- 6) First-aid kit
- 7) Fire extinguisher
- 8) Daily evaluations
- 9) Pre-test/post-test
- 10) Extra copies of appendices that can be marked up during training

WORKSHOP AGENDA – DAY 1

Session #	Topic	Chapter Covered in Session	Methodology	Materials	Facilitator	Time	Notes
1	Workshop overview and participant introduction and group contract	N/A		<ul style="list-style-type: none"> • Pre-test • Daily evaluation sheets • Paper and pens for ice breaker • Flipchart for group contract 		60 min	
2	Introduction and Purpose	Chapter 1	<ul style="list-style-type: none"> • PowerPoint • Reference guide 	<ul style="list-style-type: none"> • PowerPoint • Guide 		15 min	
3	Safe practices, compliance and enforcement codes	Chapter 2	<ul style="list-style-type: none"> • Introduction • Reference guide 	<ul style="list-style-type: none"> • PowerPoint • Guide 		15 min	
4	Safety Committee and communication	Chapter 2	<ul style="list-style-type: none"> • PowerPoint • Reference guide 	<ul style="list-style-type: none"> • PowerPoint • Guide • Safety Committee reports, if any 		30 min	
5	Tools and equipment and warehouse management	Chapter 2	<ul style="list-style-type: none"> • Have participants review list of tools and equipment and conduct warehouse safety inspection using Appendix 1 • Come back and discuss findings. 	<ul style="list-style-type: none"> • PowerPoint • Guide • Appendix 1: Warehouse Tools and Equipment 		1.5 hr	
6	Common injuries and preventative safety measures	Chapter 2	<ul style="list-style-type: none"> • Share experiences related to accidents in the work place, cause and prevention of recurring. • Try some demonstrations of 	<ul style="list-style-type: none"> • PowerPoint • Guide • Past accident reports, if 		1 hr	

Chapter 6: Warehouse Staff Safety Guide - Facilitator's Training Tool

Session #	Topic	Chapter Covered in Session	Methodology	Materials	Facilitator	Time	Notes
6 (cont.)			<p>safe and unsafe procedures</p> <ul style="list-style-type: none"> • Link experiences to the guide 	<p>available</p> <ul style="list-style-type: none"> • Props – bags, pallets, ladders, posters etc. 			
7	What are fumigants and signs of illness	Chapter 3	<ul style="list-style-type: none"> • PowerPoint • Reference guide 	<ul style="list-style-type: none"> • PowerPoint • Copy Guide 		15 min	
8	Preparing for fumigation	Chapter 3	<ul style="list-style-type: none"> • Go through the FMP step by step 	<ul style="list-style-type: none"> • PowerPoint • Guide • FMP 		1 hr	
9	Recommendations for employees and management to avoid injury related to fumigation	Chapter 3	<ul style="list-style-type: none"> • PowerPoint • Reference guide and FMP • Demonstrations in the use of equipment 	<ul style="list-style-type: none"> • PowerPoint • Guide • FMP template • Safety posters 		45 min	
10	Safe disposal of canisters	Chapter 3	<ul style="list-style-type: none"> • PowerPoint • Reference guide • Go through a demonstration if possible 	<ul style="list-style-type: none"> • PowerPoint • Guide • Empty canisters and material to dispose of canister • Safety posters 		30 min	
11	Use of pesticide sprays	Chapter 3	<ul style="list-style-type: none"> • PowerPoint • Reference guide 	<ul style="list-style-type: none"> • PowerPoint • Guide 		20 min	
12	Wrap up	Chapter 1-3	<ul style="list-style-type: none"> • Summarize material covered 	<ul style="list-style-type: none"> • Post-test 		20 min	

SESSION 1 – WORKSHOP OVERVIEW AND PARTICIPANT INTRODUCTION

OBJECTIVES

By the end of Session 1 participants will:

- 1) Fill out the pre-test
- 2) Receive evaluation sheets to fill out throughout the day
- 3) Know one interesting fact about each other
- 4) Have shared their expectations for the workshop and generated a list of common challenges faced related to warehouse safety
- 5) Have established workshop norms
- 6) Understand the use of a “parking lot” for writing issues that come up throughout the workshop. Parked issues can be reviewed at the end of each day

TIME

45 minutes

MATERIALS

- 1) Paper and pens
- 2) Pre-test
- 3) Daily evaluation sheets

STEPS

- 1) Create a “parking lot” on chart paper and its purpose will be explained to the group
- 2) Introduce the exercise and ask participants to find someone they do not know (it might be the person next to them, but doesn't have to be)
- 3) Explain that each pair will have ten minutes to conduct pair interviews and to fill in the CHALLENGE handout. Using the colored paper provided, they should also make a name card for their partner. Note to participants that the challenges will be posted on the wall so they should be written clearly.
- 4) Participants should find out the following about their partner:
 - Name or nickname that participant wants to be called in the workshop
 - Participants should make a name card with their partner's name
 - Organization
 - Type of work

- One interesting point about the person, i.e., one good thing that happened in the last year, their favorite food, etc. Be creative
 - List ONE challenge and ONE expectation for the participant during the workshop. The challenge should be one related to warehouse safety. This sheet doesn't need to have the person's name.
- 5) After the exercise, each pair will introduce each other to the larger group

SESSION 1 CONTINUED – GROUP CONTRACT

TIME

15 minutes

MATERIALS

- 1) Newsprint/flipchart paper
- 2) Markers

STEPS

- 1) Ahead of time, prepare a flipchart with the heading “Group Contract” or “Workshop Norms” or another appropriate heading.
- 2) In plenary, explain to participants that this workshop is based on participatory approaches and that each participant is expected to respect the others. Ask participants to provide ideas for the contract. This can be added to throughout the workshop, if necessary.
- 3) Tape the Group Contract on the wall where it can be easily seen (and referred to) throughout the workshop. A good place for it is by the door which participants use to enter and leave the workshop space. Then they can look at it whenever they pass by.

SESSION 2 – INTRODUCTION AND PURPOSE OF THE *WAREHOUSE STAFF SAFETY GUIDE* AND WORKSHOP

OBJECTIVES

By the end of Session 2 participants will:

- 1) Know the results of the participant needs assessment (PNA) from the pre-test and how these results will be applied to the workshop
- 2) Discuss the participatory approach that will be used throughout the workshop
- 3) Compare the objectives for the workshop (which should be based on the PNA) with the challenges and expectations expressed by participants in Session 1

TIME

15 minutes

MATERIALS

PowerPoint slides 1 - 2

STEPS

- 1) Use the PowerPoint presentation to highlight the key points in Chapter 1 of the guide
- 2) Link the introduction to the challenges and expectations of participants

SESSION 3 – SAFE PRACTICES, COMPLIANCE AND ENFORCEMENT CODES

OBJECTIVES

By the end of Session 3 participants will:

- 1) Understand the purpose of the *Warehouse Staff Safety Guide*
- 2) Understand and be able to describe the roles and responsibilities related to warehouse safety

TIME

15 minutes

MATERIALS

PowerPoint slides 4-6

STEPS

Use the PowerPoint presentation to introduce the participants to the roles of staff and management when it comes to warehouse safety

SESSION 4 – SAFETY COMMITTEE AND CORRECT COMMUNICATION

OBJECTIVES

By the end of Session 4 participants will:

- 1) Understand the roles and responsibilities of the Safety Committee
- 2) Understand the role of communication to maintain a safe work environment

TIME

30 minutes

MATERIALS

PowerPoint slides 7 - 8

STEPS

- 1) Explain the role of the Safety Committee and how it functions
- 2) Ask participants to share their experiences if any on safety committees

SESSION 5 – CORRECT TOOLS AND EQUIPMENT AS WELL AS CORRECT WAREHOUSE MANAGEMENT

OBJECTIVES

By the end of Session 5 participants will:

- 1) Be familiar with tools and equipment required in a warehouse
- 2) Understand why each tool or piece of equipment is necessary and how to use it
- 3) Understand the importance of proper warehouse management

TIME

90 minutes

MATERIALS

- 1) PowerPoint slides 9 - 11 and 13 - 15
- 2) Posters – tools, equipment and warehouse layouts
- 3) Props – actual tools
- 4) Pen and paper
- 5) Flip chart/whiteboard

STEPS

- 1) Give participants warehouse inspection checklists
- 2) Take participants on a walk around the warehouse and have them complete the checklist
- 3) Have participants make a list of tools and equipment they feel are missing from their walk around the warehouse
- 4) Have them report back as a group and compile a comprehensive list
- 5) Compare the group list with the list in the guide and posters

SESSION 6 – COMMON INJURIES AND PREVENTATIVE SAFETY MEASURES

OBJECTIVES

By the end of Session 6 participants will:

- 1) Be able to describe common injuries that occur in the warehouse
- 2) Know what preventative measures need to be followed to avoid common injuries

TIME

60 minutes

MATERIALS

- 1) PowerPoint slide 12
- 2) Posters
- 3) Props - pallet, bag of food, ladder

STEPS

- 1) Begin with participants sharing their experiences of accidents in the warehouse
- 2) Discuss how each accident may have been prevented
- 3) Go through the chart of common accidents listed in the guide on pages 9-11
- 4) Use props to emphasize safe lifting techniques

SESSION 7 – WHAT ARE FUMIGANTS AND SIGNS OF ILLNESS

OBJECTIVES

By the end of Session 7 participants will:

- 1) Be familiar with the safe use of fumigants
- 2) Be able to identify the signs and symptoms of illness caused by fumigants

TIME

15 minutes

MATERIALS

PowerPoint slides 16-20

STEPS

- 1) Go through PowerPoint slides describing fumigants
- 2) Highlight the signs of illness caused by fumigants

SESSION 8 – PREPARING FOR FUMIGATION

OBJECTIVE

By the end of Session 8 participants will:

- 1) Be familiar with and understand how to use the Fumigation Management Plan (FMP)

TIME

60 minutes

MATERIALS

- 1) PowerPoint slides 21-22

- 2) FMP template
- 3) Posters

STEPS

- 1) Have the participants get into groups and review the FMP template, filling out the sections with the information they have available from their current project and developing a list of questions or action items required based on the discussion
- 2) Return to larger group and discuss any questions or action items that result from the group discussions

**SESSION 9 – RECOMMENDATIONS FOR EMPLOYEES AND MANAGEMENT
TO AVOID INJURY RELATED TO FUMIGATION**

OBJECTIVES

By the end of Session 9 participants will:

- 1) Know the equipment necessary during fumigation
- 2) Know how to safely use fumigation equipment to prevent injury

TIME

45 minutes

MATERIALS

- 1) PowerPoint slides 23 - 28
- 2) FMP template
- 3) Posters
- 4) Props – fumigation equipment

STEPS

- 1) Use the FMP to highlight minimum equipment requirements
- 2) Use posters and guide to highlight equipment listed in the FMP

SESSION 10 – SAFE DISPOSAL OF CANISTERS

OBJECTIVES

By the end of Session 10 participants will:

- 1) Know how to safely dispose of fumigation canisters

TIME

30 minutes

MATERIALS

- 1) PowerPoint slides 29 - 30
- 2) FMP template
- 3) Posters

STEPS

- 1) Use the FMP to highlight the disposal process to empty fumigation canisters
- 2) Use posters, PowerPoint and guide to highlight process listed in the FMP

SESSION 11 – USE OF PESTICIDE SPRAYS

OBJECTIVE

By the end of Session 11 participants will:

- 1) Be familiar with the equipment necessary to prevent injury from fumigating with pesticide spray
- 2) Know how to read pesticide spray labels
- 3) Be familiar with the PEA fumigation guidelines found within the Phosphine Fumigation PEA at: <http://www.usaidgems.org/fumigationPEA.htm>

TIME

30 minutes

MATERIALS

- 1) PowerPoint slide 31
- 2) Pages 18 and 19 in the *Warehouse Staff Safety Guide*
- 3) FMP

STEPS

Go through the steps outlined in the FMP

SESSION 12 – WRAP UP

OBJECTIVES

By the end of Session 12 participants will:

- 1) Be able to summarize the day's discussions
- 2) Review the parking lot
- 3) Have completed the post-test
- 4) Have filled out and returned daily evaluation sheets

TIME

20 minutes

MATERIALS

- 1) Flip chart
- 2) Post-test
- 3) Evaluation sheets

STEPS

- 1) Review parking lot
- 2) Hand out and have participants complete post-tests
- 3) Collect daily evaluation forms

WORKSHOP AGENDA – DAY 2

Session #	Topic	Chapter Covered in Session	Methodology	Materials	Facilitator	Time	Notes
13	Recap on previous day's content	Chapters 1-3	<ul style="list-style-type: none"> • Question and answers – open discussion 	<ul style="list-style-type: none"> • Pre-test • Daily evaluation form 		30 min	
14	Fire prevention and emergency action plan	Chapter 4	<ul style="list-style-type: none"> • Use the guide and fire safety section of Appendix 1 to do a fire prevention inspection 	<ul style="list-style-type: none"> • PowerPoint • Guide • Appendix 1 		1 hr	
15	Causes of fires	Chapter 4	<ul style="list-style-type: none"> • Use the guide and PowerPoint • Share experiences on fires and causes 	<ul style="list-style-type: none"> • PowerPoint • Guide 		30 min	
16	Evacuation training, fire exits and extinguishers	Chapter 4	<ul style="list-style-type: none"> • Go through the warehouse explaining safe procedures, if possible • Reference guide • Use posters • Demonstrations • Conduct simulation of evacuation • Get a trained fire fighter to assist in the training, if possible 	<ul style="list-style-type: none"> • PowerPoint • Posters • Actual fire extinguishers 		2 hr	
17	First-aid preparation	Chapter 5	<ul style="list-style-type: none"> • PowerPoint • Reference guide • Use actual first-aid kit to show what should be there and inspection procedure 	<ul style="list-style-type: none"> • PowerPoint • Guide • First-aid kit 		30 min	

Chapter 6: Warehouse Staff Safety Guide - Facilitator's Training Tool

18	Procedures in the event of an accident, reporting, and fumigation-related accidents	Chapter 5	<ul style="list-style-type: none"> • PowerPoint • Reference guide • Question and answer • Use of instructions on fumigation labels 	<ul style="list-style-type: none"> • PowerPoint • Guide • Posters • Labels on fumigant containers • Appendix 13: Accident Investigation Report Form 		45 min	
19	Wrap - up	Chapters 1-5	<ul style="list-style-type: none"> • Discussion • Question and answers 	<ul style="list-style-type: none"> • Post-test • Daily evaluation form 		30 min	

SESSION 13 - RECAP OF PREVIOUS DAY

OBJECTIVES

By the end of session 13 participants will have:

- 1) Reviewed topics covered Day 1
- 2) Completed the pre-test
- 3) Received the daily evaluation form to fill out throughout the day

TIME

30 minutes

MATERIALS

Flip chart – parking lot list

STEPS

- 1) Assign various participants to give a two-minute overview of what was reviewed during each session on Day 1. Ask if any of the participants still require further clarification
- 2) Review the day's agenda
- 3) Hand out and have participants complete the pre-test
- 4) Hand out the daily evaluation form

SESSION 14 - FIRE PREVENTION AND EMERGENCY ACTION PLANS

OBJECTIVE

By the end of Session 14 participants will:

- 1) Be able to identify fire hazards in the warehouse
- 2) Understand how to complete the Warehouse Safety Inspection Checklist

TIME

60 minutes

MATERIALS

- 1) PowerPoint slides 33 - 34
- 2) Appendix 12: Fire Safety and Evacuation Guidelines

STEPS

- 1) Have participants complete Warehouse Safety Inspection Checklist in pairs
- 2) Have each pair present their checklist to the group. First group should present all items in the checklist and following groups should mention additional items they identified that were not mentioned by previous groups

SESSION 15 - CAUSES OF FIRES

OBJECTIVE

By the end of Session 15:

- 1) Be able to identify different causes of fires and how to prevent fires from occurring

TIME

30 minutes

MATERIALS

- 2) PowerPoint slides
- 3) Flip chart/white board

STEPS

- 1) Have participants list on flip chart paper as many causes of fire they can think of
- 2) Compare the list the participants compiled with the list in the guide
- 3) As a group, develop a list of all the causes of fire. Beside each cause of fire, write the fire prevention activity required to prevent the fire from occurring

SESSION 16 - EVACUATION TRAINING, FIRE EXITS AND EXTINGUISHERS

OBJECTIVES

By the end of Session 16 participants will:

- 1) Be familiar with evacuation procedures and understand how to follow them
- 2) Understand how to use fire extinguishers

TIME

120 minutes

MATERIALS

- 1) PowerPoint slides 39 - 48
- 2) Posters
- 3) Fire extinguisher

STEPS

- 1) If possible walk participants through the warehouse and show them fire exits, locations of fire equipment and alarms where applicable
- 2) Do a practice evacuation following the steps indicated on the "What to do in Case of a Fire" poster
- 3) If it's not possible to do a physical visit to a warehouse, use a schematic layout of the warehouse to emphasize why exit points and equipment are located in certain places
- 4) Demonstrate the use of a fire extinguisher, using the "Fire Extinguisher Usage" posters and actual fire extinguisher

SESSION 17 - FIRST-AID PREPARATION

OBJECTIVES

By the end of Session 17 participants will:

- 1) Be aware of the importance of first-aid kits
- 2) Know what to look for when inspecting a first-aid kit

TIME

30 minutes

MATERIALS

- 1) PowerPoint slide 49
- 2) First-aid kit
- 3) Appendix 3: First-Aid Kit Inspection Log

STEPS

- 1) Go through the first-aid box checklist
- 2) Demonstrate what is in a typical warehouse first-aid kit and what it looks like

SESSION 18 – PROCEDURES IN THE EVENT OF AN ACCIDENT, REPORTING AND FUMIGATION-RELATED ACCIDENTS

OBJECTIVES

By the end of Session 18 participants will:

- 1) Be familiar with the procedures to be followed in the event of an accident occurring in the warehouse
- 2) Be familiar with the accident report forms
- 3) Understand the importance of reading fumigant labels

TIME

45 minutes

MATERIALS

- 1) PowerPoint slides 54-56
- 2) Fumigant labels
- 3) Appendix 13: Accident Investigation Report Form

STEPS

- 1) Go through the PowerPoint presentation and fumigation labels highlighting the importance of following the instructions
- 2) Demonstrate what a typical accident report should include

SESSION 19 - WRAP UP

OBJECTIVES

By the end of Session 19 participants will:

- 1) Be able to explain the purpose of the *Warehouse Staff Safety Guide* and how to use it
- 2) Have all issues from the 'parking lot' resolved
- 3) Complete and return the post-test
- 4) Complete and return the daily evaluation form

TIME

30 minutes

MATERIALS

- 1) Flip chart
- 2) "Parking lot" list
- 3) Daily evaluation form
- 4) Post-test

STEPS

- 1) Review the various sessions covered during the day and ask if participants require any clarification
- 2) Go through the "parking lot" and ensure all items listed have been adequately resolved
- 3) Collect daily evaluation forms
- 4) Hand out and then collect post-test

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APPENDICES

APPENDIX 1: WAREHOUSE SAFETY INSPECTION CHECKLIST

WAREHOUSE: _____ ADDRESS: _____ DATE: _____

Potential Hazards	Satisfactory		Location within warehouse? Who might be harmed and how?	What is being done? What further action is needed?	Who is responsible?	Date to be Completed
	Yes	No				
FLOORS						
No wet/slip hazards						
No trip hazards						
No falling hazards						
No electric cords across walkways						
Floors are swept/clean						
Other:						
STAIRS and RAMPS						
Lighting is adequate						
Non-slip surfaces in good condition						
Handrails - installed and secure						
Other:						

Appendix 1: Warehouse Safety Inspection Checklist

Potential Hazards	Satisfactory		Location within warehouse? Who might be harmed and how?	What is being done? What further action is needed?	Who is responsible?	Date to be Completed
	Yes	No				
LADDERS						
Safe condition (safety feet, rungs, bracing)						
Non-slip surface on rungs						
Correct type and size						
Step stools in safe condition						
Other:						
PALLETS/RACKS/STORAGE PRACTICES						
Warehouse capacity guidelines followed to avoid overcrowding						
1-meter space around stacks						
Stacks are well constructed using the bonding method						
Pallets in good condition (i.e., no splinters, protruding nails)						
Empty pallets correctly stored						
Heavier materials on lower shelves						
Frame supports and shelving correctly sized						
Frame supports and shelving correctly secured						

Appendix 1: Warehouse Safety Inspection Checklist

Potential Hazards	Satisfactory		Location within warehouse? Who might be harmed and how?	What is being done? What further action is needed?	Who is responsible?	Date to be Completed
	Yes	No				
No non-food items (NFIs) are stored on site						
Warehouse is free of chemicals, lubricants, fuels, vehicle tires or hazardous materials						
Other:						
FORKLIFTS						
Forklift trucks correctly maintained and operated						
Safe charging area for forklift trucks						
Forklift operators have been tested for proficiency in last 5 years						
Other:						
FIRE SAFETY						
Fire extinguishers accessible						
Fire extinguishers tagged, serviced						
Fire exits correctly marked and illuminated						
Exits clear and unobstructed						
Fire exits are unlocked while a building is occupied						

Appendix 1: Warehouse Safety Inspection Checklist

Potential Hazards	Satisfactory		Location within warehouse? Who might be harmed and how?	What is being done? What further action is needed?	Who is responsible?	Date to be Completed
	Yes	No				
At least two fire exit doors are accessible						
Minimum of 80cm (32 in) aisle clearance maintained throughout warehouse exit to exit, including doorways into rooms						
No smoking is allowed in the warehouse						
Other:						
ELECTRICAL						
Extension cords used only for temporary work						
Permanent wiring correctly installed						
Electrical panel has a 90 cm clearance						
Electrical panel clearly marked						
Electrical wires and cords in good condition (i.e., no exposed wires or frayed cords)						
Other:						

Appendix 1: Warehouse Safety Inspection Checklist

Potential Hazards	Satisfactory		Location within warehouse? Who might be harmed and how?	What is being done? What further action is needed?	Who is responsible?	Date to be Completed
	Yes	No				
ELECTRICAL EQUIPMENT						
<i>Is in safe working condition with no exposed wires/frayed cords</i>						
Machinery Type: Type: Type: Type:						
Battery chargers						
Fan						
Stitching machine						
Kettle						
Heater						
Other:						
MANUAL HANDLING OF COMMODITIES						
Personal protective equipment (PPE) available:						
Helmets						
Gloves						
Back support belts						
Protective footwear						

Appendix 1: Warehouse Safety Inspection Checklist

Potential Hazards	Satisfactory		Location within warehouse? Who might be harmed and how?	What is being done? What further action is needed?	Who is responsible?	Date to be Completed
	Yes	No				
Carrying aids available i.e., hand trucks, dollies, pallet jacks, carts						
Other:						
SAFETY POSTERS						
Safety posters are posted or available when needed:						
'How to Safely Lift & Carry'						
'Avoid Common Warehouse Hazards'						
'Proper Pallet Usage and Stacking'						
'Fire Safety Rules & Fire Extinguisher Use'						
'What to do in Case of Fire'						
'Preparation for Fumigation'						
'Procedures After Fumigation'						
'No Smoking'						
'Danger: Do Not Enter' poster available for use during fumigation						
Other:						

Appendix 1: Warehouse Safety Inspection Checklist

Potential Hazards	Satisfactory		Location within warehouse? Who might be harmed and how?	What is being done? What further action is needed?	Who is responsible?	Date to be Completed
	Yes	No				
BUILDING AND YARD						
Roof is leak-free						
Warehouse yard is clean, free of trash and grass/plants are cut short						
Warehouse walls are free of cracks or holes						
Water flows effectively to drains						
VEHICLES						
Separate loading and unloading areas designated						
Traffic movements (deliveries etc.) are safe and well signed						
Vehicle exhaust minimized and well-ventilated						
GENERAL SAFETY						
First-aid kit available (check logbook)						
Emergency phone numbers posted						
Emergency procedures posted						
Emergency lighting functions						
Lighting is adequate						

Appendix 1: Warehouse Safety Inspection Checklist

Potential Hazards	Satisfactory		Location within warehouse? Who might be harmed and how?	What is being done? What further action is needed?	Who is responsible?	Date to be Completed
	Yes	No				
Tools/equipment are in safe condition						
Number of employees in warehouse are posted near door each day (i.e. on chalk or white board)						
Hazardous substances safely stored in separate storage area and away from food (i.e., bleach, cleaning fluids)						
Area free of potential falling objects						
Sinks and restrooms are accessible and well maintained						
Soap and water are available for hand washing						
Other:						

Warehouse Safety Inspection Checklist conducted by Warehouse Manager

Signature: _____ Date: _____

Reviewed and Approved by Program Manager

Signature: _____ Date: _____

APPENDIX 2: WAREHOUSE TOOLS AND EQUIPMENT

It is important that warehouse staff have access to proper tools and equipment. The following tools and equipment should be on hand and in working order. Many of these items are important for ensuring staff safety.

Personal Protective Equipment (PPE)

General	
	Mask/goggles/safety glasses
	Gloves - cotton and plastic
	Coveralls
	Footwear - close-toed shoes, boots, or other protective footwear
	Helmets with a chin strap
	Back support belts
	Reflective when heavy machinery or trucks are present
For Staff Supervising Fumigation:	
	Phosphine gas monitor
	Protective clothes (long sleeve shirt and pants or overalls)
	Rubber Boots
	Safety glasses (with solid side shields or goggles to protect eyes if contact with phosphide pellets is likely)
	Gloves
	Rubber boots
	Rubber hat or helmet to protect head and repel fumigant
	Respiratory equipment
	Cartridge or canister type respirator rated for protection/filtration from phosphine or air respirators with self-contained breathing apparatus (SCBA)
	Full-face mask (to be worn with any type of respirators)

Supplies Required for Fumigation

	Non-permeable tarps
	Duct tape
	Sand snakes
	Red or yellow ribbons for marking area

Fire prevention/fighting equipment

	Fire extinguisher - quantity to be determined based on national fire department equivalent standards
	Fire alarm - quantity and location to be determined based on national fire department equivalent standards
	Fire blankets
	Fire buckets

Commodity Management and Reconstitution Tools and Equipment

	Platform weighing scale
	Pallets or dunnage
	Crowbar
	Ladder
	Hammer
	Nails

Appendix 2: Warehouse Tools and Equipment

Carrying aids

	hand truck
	dolly
	pallet jack
	cart

Reconstitution materials for bags storing commodities

	stitching machine
	funnel
	sieve
	stitching twine
	plastic jerry cans
	Pest Control
	Rattraps - glue or snap traps

General warehouse

	Communication equipment (cell phone or radio)
	Back-up generator
	White Board
	First aid kit
	Clean water
	Flashlights (torches) - at least two large flashlights
	Spare batteries for flashlights
	Brooms
	Small brushes for floors and cobwebs
	Wastebaskets
	Shovel
	Handcarts
	Wheelbarrow

APPENDIX 4: VEHICLE MOVEMENT HAZARD

LOADING AND UNLOADING

Vehicles moving in and around the warehouse have the potential to cause injuries and possible fatalities to warehouse staff. Reversing, loading, unloading and pedestrian movement are the activities most frequently linked with vehicle accidents. Traffic and pedestrian movement within the warehouse premises should be controlled so that pedestrians and vehicles can circulate safely.

Warehouse vehicle movement hazards include:

- People moving around the warehouse premises
- Reversing vehicles
- Arriving and departing vehicles
- Loading or unloading vehicles
- Hitching or unhitching trailers
- Mounting or dismounting from vehicles
- Securing loads
- Maintenance work

Traffic routes within warehouse areas should be:

- Safe for both vehicles and pedestrians
- Wide enough for the largest vehicle using them
- One-way if possible, with drive through loading and unloading bays and adequate space for passing around stationary vehicles
- Clearly signposted to indicate restricted parking, headroom, speed limits, pedestrian crossings, blind corners, vehicle movement and other route hazards
- Free from steep gradients as much as possible
- Designed and controlled to ensure safe vehicle movement
- Well maintained
- Immediately cleaned or cleared following substance spills or falls from vehicles
- Adequately lit, particularly junctions, buildings, walkways and vehicle routes
- Designed to avoid extreme light variation (e.g. drivers moving from bright sunlight into dull light or vice versa)

Protect pedestrians in warehouse premises by:

- Providing separate pedestrian footpaths or walkways
- Eliminating pedestrian traffic where vehicles maneuver
- Installing pedestrian barriers (e.g. inward opening gates) at building entrances and exits to prevent pedestrians walking in front of vehicles
- Making shared traffic routes wide enough when separate pedestrian and vehicle routes are not possible
- Marking traffic routes (e.g. paint directional lines on the floor or ground)
- Providing separate access ways for vehicles and pedestrians into buildings or enclosures
- Providing vision panels in pedestrian doors entering vehicle areas

Staff and customers who bring private vehicles to workplaces should be provided with and comply with:

- Specified safe routes
- Clear safety signs at parking areas
- Clear speed limit signs

Appendix 4: Vehicle Movement Hazard

- Information and instructions on safe driving on workplace premises

REVERSING

Reversing accidents are a major cause of warehouse injuries and fatalities, as well as damage to vehicles, equipment and premises.

Most reversing accidents can be avoided by:

- Removing the need for reversing (e.g. with drive-through loading and unloading systems)
- Minimizing the need for reversing (e.g. by reorganizing loading and unloading procedures)
- Providing clearly marked reversing areas visible to drivers and pedestrians
- Excluding non-essential staff from reversing areas
- Ensuring signalers wear high-visibility clothing and their signals can be clearly seen
- Using radios and other communication systems
- Ensuring drivers have another person to direct them if they cannot see clearly behind before reversing
- Ensuring visiting drivers are familiar with workplace routes and reversing areas
- Providing larger reversing areas
- Placing fixed mirrors at blind corners
- Fitting refractive lenses on rear windows to help drivers see 'blind spots'
- Using flashing reversing lights on vehicles, especially if workplace noise is too loud for reversing alarms to be heard

KEY LOADING BAY HAZARDS

The following are the key loading bay hazards:

Drive-away

A drive-away is when a vehicle or trailer is moved away from the loading bay too early, before the loading/unloading operation is complete. The vehicle loader, machinery or goods can fall from the vehicle, posing a danger to the loader or anyone working in the vicinity.

Control measures

Place large wedges of hard material or chocks against the wheels to prevent the vehicle from moving.

Vehicle Creep

Vehicles can move (or creep) away from the edge of the loading bay as loading equipment jolts the vehicle or compresses its suspension when moving between the bay platform and the vehicle. This can widen the gap between the bay and the vehicle, causing the dock plate/leveler, which provides a platform between them, to suddenly slip. The vehicle loader, machinery or goods can fall from the vehicle.

Control measures

The plate that forms a bridge between the vehicle bed and the loading bay should provide enough overlap to allow for a certain amount of vehicle creep, without the plate falling and creating a risk of injury. The larger the overlap, the more vehicle movement can be withstood.

Appendix 4: Vehicle Movement Hazard

Trailer tip

When a trailer is uncoupled and the landing legs lowered, the trailer can be prone to tipping forward from the landing legs if too much weight is placed towards the front of the trailer. This can be caused by a heavy load or the use of heavy equipment, such as a forklift truck, within the trailer.

Control measures

Ensure the tractor unit remains coupled to the trailer whilst the vehicle is being loaded, thus avoiding the potential 'see saw' effect around the landing legs. Alternatively, trailer props or trestles can be used to stabilize the trailer.

Water entry

Water entering the dock loading area can create a slip hazard for both pedestrians and those using mechanical equipment. Most loading bays have canopies, curtains or shelters to create a weather shield. However, this may be compromised by ill-fitting seals or different vehicle and trailer designs, such as trailers designed to improve aerodynamics. The sloping design may mean that water will naturally run backwards into the loading area. (Some trailer manufacturers have eliminated this problem by designing rainwater diverter systems such as rainwater deflectors or gutters.)

Control measures

There are a number of adjustable types of canopies, seals or shelters available for bays that aim to protect the vehicle, trailer and dock interface from the weather and in particular from water entry, which creates a slip hazard.

APPENDIX 5: CHARACTERISTICS OF AN IDEAL WAREHOUSE

An ideal warehouse is well managed to provide a safe, secure place for working, and storing food and non-food items (NFIs).

An ideal warehouse is:

- Situated in a secure area to protect against theft.
- Surrounded by a secure fence or wall, with a gate fitted with standard padlocks.
- Protected by 24-hour security guards who monitor people entering and exiting the site, and manage crowds.
- Easily accessible by road or rail to allow for easy receipt and dispatch of food.
- Secure with strong doors to protect from theft and rodents.
- Safely and adequately ventilated.
- Shielded from rain by a safe and intact roof.
- Built on a strong concrete or packed-earth floor to protect against rodents burrowing under stacks.
- Supplied with the necessary warehouse tools and equipment.
- Administered with complete files and books for record keeping.
- Located in a site/compound with sufficient space for trucks to maneuver for smooth loading and unloading operations.
- Positioned on higher ground to its surrounding area or there are drainage ditches around it to prevent flooding.
- Surrounded by a yard cleared of weeds, bushes and trash, to discourage rodents and insects.
- Located in an area free of contamination from industrial pollution.
- Hygienically clean.
- Adequately lit inside the building and outside in the compound.

WAREHOUSE ACCESS

Access to the warehouse during normal working hours should be restricted to the main entrance of the building and limited to those staff whose duties require it. Custody of keys should be controlled.

No person should be allowed to enter or receive food if they are not on the warehouse authorized receiver list. The Warehouse Manager must submit to the Program Manager a list of authorized receivers of food with their sample signatures. The list must be updated whenever there is a change in staff.

Each day, a list with the names and number of staff in the warehouse should be kept on a white board or chalkboard to assist in accounting for personnel in case of an emergency.

Unauthorized staff will not be permitted to enter the warehouse or to receive items from the warehouse.

All staff receiving food commodities must show a valid ID card to verify their identity.

All staff requiring access to the warehouse after business hours should be admitted only with the permission of the Warehouse Manager. The Warehouse Manager should contact the Program Manager prior to authorizing after-hours access to the warehouse.

The Warehouse Manager must be in the warehouse when food is loaded and dispatched after normal business hours.

Appendix 5: Characteristics of an Ideal Warehouse

Procedures established for documenting the receipt and dispatch of food must be followed to ensure that all items are accounted for.

SECURITY GUARDS

Security guards will be permanently stationed at the warehouse entrance gate.

Security guards will record in a logbook the following information for all visitors who enter the warehouse premises:

- Visitor's name
- Identification number
- Contact telephone number
- Purpose of visit
- Name of the person they are visiting
- Vehicle registration number
- Time of entry and exit
- Signature of the visitor

Security guards will maintain a logbook including incidents that take place and routine checks they conduct of warehouse premises.

KEY CONTROL

The strategic and systematic control of keys is critical. Knowing the identity of authorized key holders, which keys they have or have access to, and when they are used is essential information to help ensure a safe and secure environment.

A key control plan includes:

- 1) Taking inventory of the facility to identify all access points and installed locks.
- 2) Ascertaining the operational needs of staff including the need of third party services to access the facility, for example cleaning crew, security guards.
- 3) Establishing a policy with procedures for key control.

INVENTORY OF WAREHOUSE PREMISES

Take a physical inventory of the warehouse. This may be done using a map of the warehouse in cases where the warehouse is very large. The inventory should catalog:

- building access points
- every piece of door hardware
- the keys that fit each of the locks
- which keys people have and what doors they access

Taking a physical inventory can alert management to any shortcomings in the security system. For instance, a closet that was once used for storing office supplies may now be used for holding more valuable items and should be protected with a lock and key.

OPERATIONAL NEEDS REVIEW

Operational needs are reviewed to develop a full understanding of how the warehouse works on a day-to-day basis. This information can be used to minimize disruptions to operations when a key control plan is implemented.

Appendix 5: Characteristics of an Ideal Warehouse

This review includes documenting warehouse staff movements, and discussing with warehouse management policies and procedures for accessing sensitive documents or areas within the warehouse. A comprehensive grasp of daily warehouse activities will help in developing an effective key control plan and minimize the trade-off between security and convenience.

DEVELOPING A KEY CONTROL SYSTEM

An effective key control system is reliable and easy to use, including the use of keys and accurate, detailed information reporting. A key control system should define areas of responsibility to enable better key control with fewer keys being lost or compromised.

Key control systems should include recording the access history of each key including the user, and the date and time of checkout and return of keys. Keys should only be released to users with the correct authorization code to ensure adherence to established policies and procedures.

SAFETY FIRST!

WAREHOUSE SAFETY GUIDELINES

HOW TO SAFELY LIFT & CARRY

To prevent injury, always lift and carry safely by following these instructions. Use hard hat, gloves, protective shoes and back brace if available.

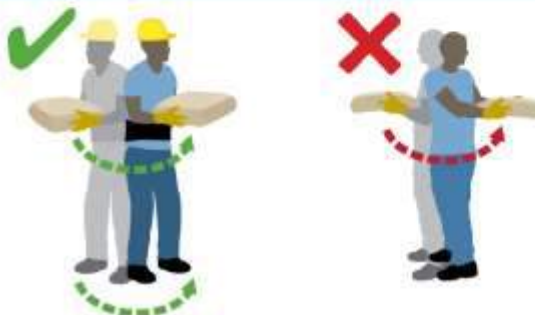
HOW TO LIFT A LOAD

1. Bend your legs.
2. Keep your back straight.
3. Lift with your legs.
4. Keep load close to your body.
5. If the load is too heavy, get help.



HOW TO CARRY AND MOVE A LOAD

1. Keep your back straight.
2. Move your feet when you move or shift a load.
3. Don't twist or bend your back.



HOW TO LIFT AND MOVE A PALLET

1. Always use 2 people.
2. Always lift and carry an empty pallet, never a loaded one.



Electronic copies of the Warehouse Staff Safety Guide and posters can be found at www.hornetwork.org/warehouse-staff-safety-guide.



SAFETY FIRST!

WAREHOUSE SAFETY GUIDELINES

AVOID COMMON WAREHOUSE HAZARDS

Follow these preventative safety measures to avoid common warehouse hazards and to ensure the safety and health of everyone.

SPILLS

1. Stay alert, avoid distractions and watch your step.
2. Ensure all spills, especially oil, are cleaned up immediately.



ORGANIZE AND STACK MATERIALS

1. Never use a broken pallet.
2. Do not overload pallets.
3. Keep empty pallets in proper stacks.



STORING HAZARDOUS MATERIALS

1. Do not store non-food items with food items.
2. Never store chemicals, lubricants, fuels and hazardous material in a food warehouse.



Electronic copies of the Warehouse Staff Safety Guide and posters can be found at www.humanitix.org/warehouse-staff-safety-guide.



SAFETY FIRST!

WAREHOUSE SAFETY GUIDELINES

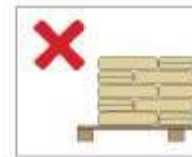
PROPER PALLET USAGE & STACKING

Use pallets to keep all items off the floor. Pallets should be clean, level and free of projecting nails or splinters. When pallets are not available, such as at the beginning of an emergency operation, try to place food commodities on wooden planks, woven mats or tarp/plastic sheeting.

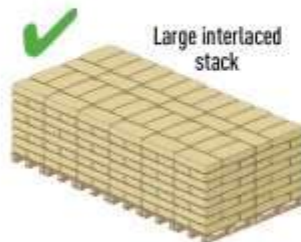
BAG STACKING ON PALLETS



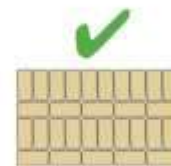
Line up bags to the edge of the pallet



BAG STACKING SEQUENCE



Large interlaced stack



Sequence as seen from above

STAIRCASE STACKING

DANGER: When working on or around large stacks wear a helmet for safety.



An option for large stacks is to interlace stacks by laying the entire first layer lengthwise, the entire second layer crosswise, the next layer lengthwise and so forth.

BAG STACKING BELOW EAVES



Do not stack above eaves



Electronic copies of the Warehouse Staff Safety Guide and posters can be found at www.hornetwork.org/warehouse-staff-safety-guide.



FIRE SAFETY

WAREHOUSE SAFETY GUIDELINES

FIRE SAFETY RULES & FIRE EXTINGUISHER USE

Follow these general fire safety rules to eliminate fire hazards and to prepare for a fire emergency.

GENERAL FIRE SAFETY RULES

1. No smoking in the warehouse.
2. Do not put burning materials such as cigarettes and ashes into trash cans.
3. Keep storage areas clean and tidy.
4. Never block fire exit doors.
5. Fire extinguishers shall remain accessible.
6. Check the emergency evacuation route map.
7. In case of fumigant-caused fire, immediately tell fire fighters that fumigants are present and provide **Material Safety Data Sheet** and/or product label.



HOW TO USE A FIRE EXTINGUISHER

1. Pull the pin at the top of the extinguisher to release the locking mechanism, allowing you to discharge the extinguisher.
2. Aim at the base of the fire, not the flames. **IMPORTANT:** to put out the fire, you must extinguish the fuel.
3. Squeeze the lever slowly. This will release the extinguishing agent in the extinguisher. If the handle is released, the discharge will stop.
4. Using a side-to-side sweeping motion, aim the nozzle back and forth until the fire is completely out. Operate the extinguisher from a safe distance, several feet away, and then move towards the fire once it starts to diminish.

BE AWARE: A typical full fire extinguisher will only contain about 10 seconds of discharge.



Electronic copies of the Warehouse Staff Safety Guide and posters can be found at www.hornerwork.org/warehouse-staff-safety-guide.



FIRE SAFETY

WAREHOUSE SAFETY GUIDELINES

WHAT TO DO IN CASE OF FIRE

Follow these safety guidelines for proper fire safety and evacuation procedures.

1

SOUND THE ALARM

Shout for help, activate the alarm and have someone call the fire service.



2

EXTINGUISH FIRE

Use a fire extinguisher if the fire is small.



3

EVACUATE

Evacuate all people from the building, closing doors and windows if possible.



4

AVOID SMOKE

Remember that smoke can kill. Crawl to stay below smoke.



5

CHECK BUILDING

Check that the building has been successfully evacuated, without re-entering the building or risking injury.



6

ROLL CALL

A roll call should be taken at the fire assembly point to ensure that all occupants are accounted for.



7

DECLARED SAFE?

Do not re-enter the building until a qualified person announces that it is safe.



Electronic copies of the Warehouse Staff Safety Guide and posters can be found at www.hometeam.org/warehouse-staff-safety-guide.



SAFETY FIRST!

WAREHOUSE SAFETY GUIDELINES

PREPARATION FOR FUMIGATION

Fumigation is a dangerous process: staff may be poisoned, injured or killed if used incorrectly. Follow the step-by-step *Fumigation Management Plan* to ensure the safety of warehouse staff, fumigators and nearby residents. **WARNING:** Fumigants are highly flammable and explosive. Follow all procedures carefully to prevent the risk of fire or explosion.

IMPORTANT PROCEDURES BEFORE FUMIGATION

1. Notify people and staff in buildings within 100 meters of the warehouse.
2. When supervising fumigation, staff should be familiar with procedures outlined in the *Warehouse Staff Safety Guide*.
3. Only properly trained and equipped contractors shall conduct fumigation procedures.
4. Warehouse staff near fumigants must wear the proper equipment (listed below).



X DO NOT ENTER



SETTING UP FOR FUMIGATION

Fumigators must always use the following personal protective equipment when fumigating:

1. Respirator
2. Goggles
3. Gloves
4. Coveralls
5. Boots

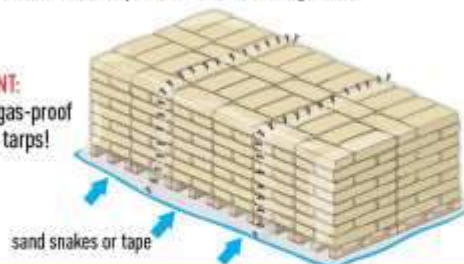


IMPORTANT:
Use gas monitoring equipment.

Sheeting a stack:

1. Place the gas-proof sheet over the entire stack with 1 meter of sheet lying on the ground.
2. If more than one sheet is used, join the sheets [1 meter overlap, tightly rolled and then clipped or weighted].
3. Use sand snakes or tape to secure sheet to ground.

IMPORTANT:
Only use gas-proof sheets or tarps!



See Chapter 3 in the *Warehouse Staff Safety Guide* for more details or for more information on fumigation safety refer to USAID's Fumigation PEA at <http://www.usaidgems.org/fumigationpea.htm>.

Electronic copies of the Warehouse Staff Safety Guide and posters can be found at www.forestwatch.org/warehouse-staff-safety-guide.



SAFETY FIRST!

WAREHOUSE SAFETY GUIDELINES

PROCEDURES AFTER FUMIGATION

Fumigation is a dangerous process: staff may be poisoned, injured or killed if used incorrectly. Follow the step-by-step *Fumigation Management Plan* to ensure the safety of warehouse staff, fumigators and nearby residents. **WARNING:** Fumigants are highly flammable and explosive. Follow all procedures carefully to prevent the risk of fire or explosion.

SAFETY & ILLNESS AFTER FUMIGATION

1. Do not re-enter building until a qualified person announces that it is safe.
2. **EMERGENCIES — Fumigation related incidents:**
 - a) If you are affected by fumigant, go to fresh air. When able, seek medical attention.
 - b) For a more seriously poisoned victim, it is important to get them to a hospital as quickly as possible.



DO NOT ENTER



PROPER DISPOSAL AND CLEANUP OF PHOSPHINE

Prior to completing the following steps ensure that all pellets are used up during the fumigation event.

1. Using a leak-proof drum, add deactivation solution or 2% solution of a low-sudsing detergent. Wearing a respirator, slowly pour in deactivated material or submerge empty containers and let stand for 36 hours.
2. Puncture all deactivated, empty containers.
3. Dispose of containers in landfill or proper receptacle.
4. Dispose of deactivated mixture into a disposal pit.
5. Cover disposal pit with dirt.
6. Wash drum, equipment, clothing, gloves and hands thoroughly after disposal.
7. **WARNING: DO NOT dispose of mixture in a toilet.**



For more information about safe fumigation practices see USAID's Fumigation Management Plan at: <http://www.usaidgems.org/fumigationpea.htm>.

Electronic copies of the Warehouse Staff Safety Guide and posters can be found at www.hometek.org/warehouse-staff-safety-guide.



APPENDIX 7: HOW TO BUILD A STACK

Whenever possible, use pallets to keep items off the floor and keep stacks at least one meter away from the eaves of the warehouse. This allows air to circulate and helps reduce the risk of spoilage and/or infestations. Pallets should be clean, level, and free of projecting nails or splinters. When pallets are not available, such as at the beginning of an emergency operation, try to place food commodities on wooden planks, woven mats or gas-proof tarpaulin/plastic sheeting.

General guidelines for stacking:

- Set the first layer of the stack carefully on the pallets — this layer is fundamental for maintaining uniform stacks. (See Figure 1a and 1b below.)
- Bond or interlace layered bags of grain or processed food to construct the stack. (See Figure 2 below.)
- Line up bags or containers of items with the pallet edge. (See Figure 3 below.)
- Place the same number of bags or containers on each level to make counting easy.
- Leave at least 1 meter between each stack, and between the stacks and walls to facilitate inspections, inventory counts, fumigations and ventilation. Leave at least 1 meter of circulation space between the top of the stack and the eaves. (See Figure 4 below.)
- Stack cartons or tins of oil in their upright position.
- Limit stack heights to avoid crushing items on the bottom and excessive floor loading. Do not stack bags of grain or processed food higher than 20 layers, or containers of oil higher than 10 layers. (See Figure 5 below for an example of a well-constructed stack, which also can be used like a staircase to add and remove layers.)
- Lift bags and containers. Do not throw them.
- Create separate stacks for original packages, damaged packages, repackaged food, food suspected and/or declared unfit, and sweepings.

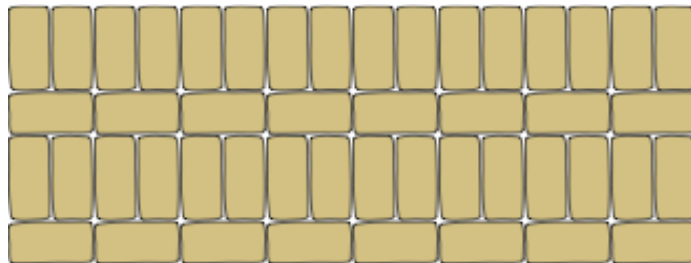


Figure 1a: Correct stacking sequence — bottom layer as seen from above

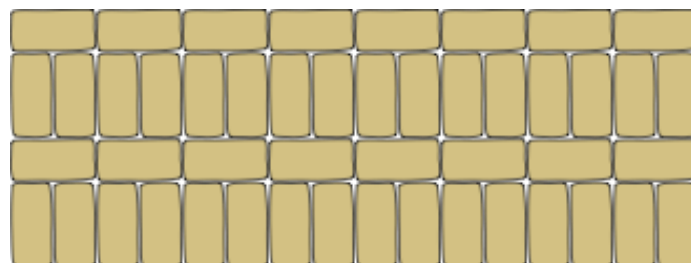


Figure 1b: Correct stacking sequence — top layer as seen from above



Figure 2: Bonded or interlaced stack

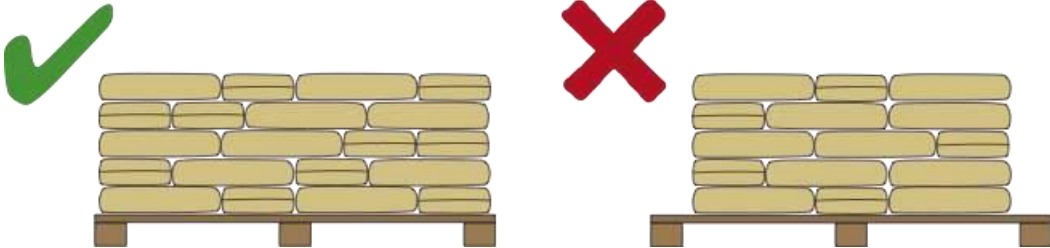


Figure 3: Stacking on pallets

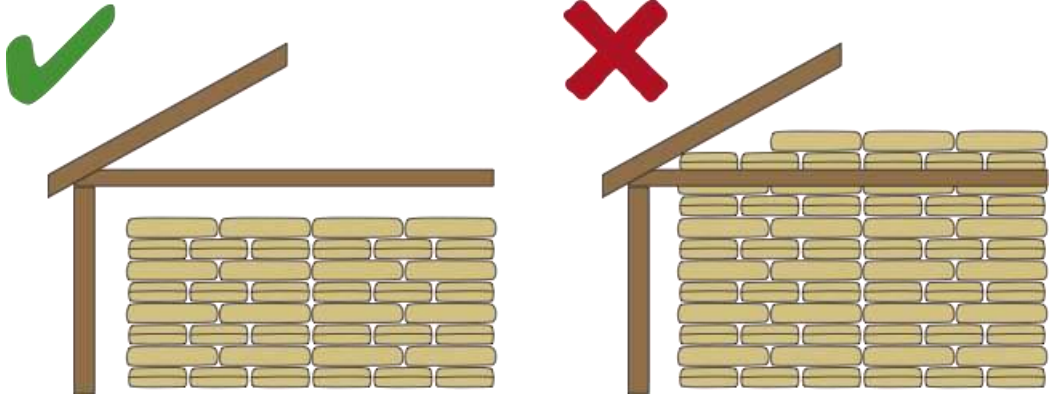


Figure 4: Stacking items to eaves



Figure 5: Staircase Stack

It is also acceptable to interlace stacks by laying the first layer lengthwise, the second layer crosswise, the next layer lengthwise and so forth.



Never do this!

SAFETY WHILST REMOVING FOOD FROM STACKS FOR LOADING

To prevent any loss of commodities, warehouse staff should inspect trucks before loading food to ensure that the vehicles are in good condition.

Depending on the size of the stack, a forklift can pick up a block of food commodities from the stack and transport it to the delivery trucks. When the stacks are a reasonable height warehouse staff can correctly carry bags/containers to the trucks.

To prevent lifting-related injuries, warehouse staff should correctly carry bags and containers.

The Warehouse Manager should suspend all other warehouse operations while commodities are loaded or unloaded to ensure an efficient and accident-free loading process.

APPENDIX 8: FUMIGATION MANAGEMENT PLAN

An online version of this document can be found at:

http://www.usaidgems.org/Documents/FumigationPEA/Phosphide_FumigMangmtPlan_August%202014.docx



USAID Food Assistance Program Name:

PHOSPHINE FUMIGATION MANAGEMENT PLAN (FMP) (sheeted stacks only)

This FMP template provides a step-b-step process to ensure safe and effective fumigation and train fumigation personnel

Commodity and Ownership

Planned Fumigation Dates:	
----------------------------------	--

A. OVERALL PROGRAM & CONTACT INFORMATION	
Lead Awardee	
Program Name	
Fumigation Compliance Lead	
Information	

ATTENTION:
To ensure full safety and efficacy, completion of this FMP is mandatory for each fumigation event.*
 *Some information may remain the same across fumigation events.

B. FACILITY INFORMATION	
Name of Facility	
Location	
Responsible Manager <i>(Name, Organization & Title)</i>	
Information	

C. FUMIGATOR INFORMATION	
Lead Fumigator	
Organization	
Contact Information	
Expiration Date <i>(if any)</i>	

Appendix 8: Fumigation Management Plan

D. COMMODITY TO BE FUMIGATED	
Commodity(ies) & Amount in tons (est) <i>(e.g. maize 200mt)</i>	
Owner of Commodity	
How Commodity is Packaged	
# of Stacks & Size <i>(e.g., 4 stacks 3m X 2m X 2m)</i>	
Last Fumigation	<i>Enter date if known. Otherwise, enter "unknown"</i>
Condition	<i>Moldy? Visibly infested?</i>
Moisture %	
Purpose of Fumigation	

E. FUMIGANT PRODUCT INFO & DOSAGE	
E1. Fumigant (product name/description)	
E2. Ambient Temp <i>(expected indoor temp range)</i>	
E3. Quantity Req'd	
E4. Required Time @ Concentration* <i>(e.g. 7 days @ 200ppm)</i>	
E5. Planned Downtime* <i>(days + hours, includes aeration.)</i>	

***REQUIRED:**
Document calculations E3, E4 & E5 in Annex #A. note that effective phosphine fumigation typically requires 7-10 days.

Emergency Planning and Safety

F. CONTACT INFORMATION: MEDICAL FACILITY, EMERGENCY RESPONSE AUTHORITIES		
	LOCATION	TELEPHONE
Police		
Fire Service		
Clinic/Hospital		
Other Local Authority <i>(specify Port Authority, District Council, Chieftancy, etc.)</i>		

Appendix 8: Fumigation Management Plan

Pesticide Regulatory Authority		
Chief of Party (or commodity point of contact)		

G1. ADVANCE NOTIFICATION PLAN FOR ABUTTERS

Specify the procedures for notifying those living and working within 100m of the facility. The fumigation team needs to alert relevant entities, particularly households, about fumigation activities.

G2. ADVANCE NOTIFICATION PLAN FOR LOCAL AUTHORITIES

Specify the procedure for notifying local authorities, as required or agreed with these authorities.

H. EMERGENCY RESPONSE PLAN

Describe the procedure to be followed if phosphine concentrations exceed (1) 0.3ppm (or local TLV, if more stringent), or (2) 1 ppm (or local STEL, if more stringent) (TLV= threshold limit value; STEL = short term exposure limit. See PEA Annex T-9).

Appendix 8: Fumigation Management Plan

I. FUMIGATION PLAN & EXCLUSION ZONE			
REQUIRED ACTION:	Y	N	Confirming Initials
I1. Obtain plot or make scale sketch map of facility and surroundings. (note grid paper is provided as final page of this template)			
I2. Mark locations of stacks to be fumigated.			
I3. On plot, mark exclusion zone that maintains at least a 6M perimeter from stacks to be fumigated, and which INCLUDES buildings or rooms with walls common to the room in which the stack is being fumigated. An exception must be requested if the exclusion zone cannot be maintained.			
I4. Determine if a watchman or watchmen will be required to maintain the exclusion zone. If yes, inform the facility manager immediately.			
I5. On plot, mark shut-off points for electricity, water, gas, if any.			
I6. On plot mark doors/gates to be secured to enforce exclusion zone and locations of warning signs to be posted.			
I7. On plot, mark locations of hazard monitoring (at least 3 locations just outside exclusion zone, where gas is mostly likely to accumulate).			
I8. On plot, mark locations of phosphine trays and monitoring lines.			
I9. Attach plot to this Fumigation Management Plan as Annex #F			

J. COMMUNICATION AND TRAINING			
REQUIRED ACTIONS	Y	N	Confirming Initials
J1. Fumigation team reviews product label , MSDS, and applicator/product manual. Lead applicator provides detailed verbal briefing if required.			
J2. Lead applicator briefs the team regarding the symptoms of phosphine poisoning and first aid. (See Fumigation PEA Annex T-10)			
J3. Lead applicator briefs the team regarding the planned fumigation process with reference to the site plot (I10) WITH FACILITY MANAGER PRESENT			
J4. Lead applicator briefs the team & facility manager on EMERGENCY RESPONSE PLAN (H1) & roles and responsibilities for implementing the plan are agreed.			
J5. All employees engaged in fumigation instructed on the use, impact, and mitigation measures of phosphine fumigation.			

Appendix 8: Fumigation Management Plan

Equipment and Supplies

K. NUMBER OF SHEETS, SAND SNAKES AND TRAYS REQUIRED	
REQUIRED ACTION:	Quantity Required
K1. Determine number of fumigation sheets required (note that joining sheets requires a <u>1(one) meter</u> overlap, tightly rolled & then clipped or weighted. If clips are used, they must be applied every 20cm.) <i>(Indicate number & size of sheets, standard 18meterX12meter sheets preferred)</i>	
K2. Determine length of sand snakes required (double rows must be used) <i>(in meters)</i>	
K3. Determine number of phosphine tablet trays required	

L. CONDITION, QUANTITY & ADEQUACY OF EQUIPMENT & SUPPLIES			
FUMIGATION MAY NOT PROCEED UNLESS ALL ANSWERS ARE "YES"			
CONFIRM THAT:	Y	N	Confirming Initials
L1. Required quantity of sheets (K1) meeting specifications (M1) are available			
L2. Required length of sand snakes (K2) are available			
L3. Required number of tablet trays (K3) are available			
L4. Respiratory equipment and protective gear meeting specifications (M2) are available FOR THE FULL TEAM and all personnel can achieve a complete face seal. No one enters the fumigation area without protective gear.			
L5. (1) <u>Dry, clean cotton gloves</u> in good condition; (2) rubber boots; (3) liquid-tight coveralls are available FOR THE FULL TEAM			
L6. Detection (monitoring) equipment meeting specifications (M3) is available to monitor HAZARD			
L7. Detection (monitoring) equipment meeting specifications (M3) is available to monitor EFFICACY			
L8. Warning signs (placards) IN APPROPRIATE LANGUAGES and WITH APPROPRIATE PICTOGRAMS and compliant with host country regulations (if any) are available in quantity required by plot (I6)			
L9. Required quantity of fumigant (E3) is available			

M. SPECIFICATIONS FOR SHEETS, RESPIRATORY & DETECTION EQUIPMENT
M1. FUMIGATION SHEETS
<p>Sheets must be:</p> <ul style="list-style-type: none"> resistant to ultraviolet light tear-resistant along BOTH length and width of material impermeable to phosphine (gas loss must be less than 1 mg/day/m²) in good condition with ALL holes and tears mended with material-specific adhesive and patch. light enough to carry (200-250g/m²) a full standard-size (18mX12m) sheet <p>250-micron (0.25mm) thickness PVC sheet, PVC on a nylon or terylene scrim, or multi-layer thin-film laminates are all acceptable.</p> <p>Thin coatings on widely woven materials and annealed polypropylene sheets NOT acceptable.</p>
M2. RESPIRATORY PROTECTION
<p>Properly maintained canister-type full facemask respirator. The canister must (1) be rated to protect against phosphine, (2) not expired, (3) not damaged, and (4) canisters previously used must not be opened more than 6 months ago & not have exceeded their rated time-in-use.</p> <p>OR</p> <p>Properly maintained self-contained breathing apparatus.(SCBA)</p> <p>Other varieties of respiratory protection may be acceptable, see PEA Annex T-9. <u>NOTE. Canister/cartridge type respirators are NOT adequate to enter a fumigation enclosure (e.g. go into a sheeted container)</u></p>
M3. MONITORING EQUIPMENT
<p>All equipment must be properly calibrated and maintained. Detector tubes, if used, must NOT be expired. Efficacy monitoring equipment must be able to read in the 200-500ppm + range. Hazard monitoring equipment must be able to accurately read in over the 0.3-3ppm + range.</p> <p>See PEA Annex T-9 for more information</p>

N. RESPIRATORY AND DETECTION EQUIPMENT			
Required Action: Complete log of all Respiratory and Detection Equipment.			
DESCRIPTION <i>e.g., Canister Respirator</i>	Manufacturer & Model #	Manufacture Date (If Known)	Serial Number

Appendix 8: Fumigation Management Plan

*Note: advance notice of 24 or more hours may be required by country laws or regulations.

Application and Monitoring

O. SUITABILITY OF FACILITY, STACKS AND TEAM FOR FUMIGATION			
By following these steps, mandatory fumigation will be safe and effective. FUMIGATION MAY NOT PROCEED UNLESS ALL CRITERIA ARE MET.			
MANDATORY STEPS. CONFIRM THAT:	Criterion Is...		Confirming Initials
	Met	Not Met	
O1. Commodities being fumigated are not required for use before the end of the planned down time (E5) + 1 day			
O2. Expected temperature during the fumigation period will be 15° C or above.			
O3. Stacks are NOT built around pillars or against walls, and that there is sufficient clearance (1m) around each stack to effectively sheet and seal.			
O4. Surface issues: EITHER (1) the floor under and for 1 (one) meter around stack is crack-free concrete OR (2) the stack is placed on top of intact fumigation tarps. (If multiple tarps are used, they must be joined by tightly rolling a 1m overlap & weighting or clipping the join).			
O5. The marked exclusion zone (see I3) can be maintained for the duration of the fumigation (7-10 days or more). (Exclusion = no people EXCEPT for fumigation personnel with proper breathing equipment in this zone.)			
O6. A <u>trained</u> 2-person (or larger) team is available for application of fumigant and aeration and the team holds any required country licenses.			
O7. If watchmen are required to maintain the exclusion zone, they will be available over the entirety of the fumigation period, including aeration time.			
O8. The warehouse contains only the commodity to be fumigated.			

Appendix 8: Fumigation Management Plan

P. WARNING SIGNAGE AND SECURITY			
REQUIRED ACTIONS	Y	N	Confirming Initials
P1. <u>Notify Abutters</u> per Notification Plan (G1). In particular, ensure that nearby residents have been informed of activity,			
P2. <u>Notify Workers</u> and any others with customary access to the exclusion zone. Brief on emergency response plan (H1)			
P3. If applicable, execute Local Authorities Notification Plan (G2)*			
P4. Post <u>warning signage</u> at all points indicated by fumigation plot (I6)			
P5. Assure that doors are ready to be locked. (Locks and keys available)			
P6. Assure that watchmen are on-site, if required to maintain the exclusion zone.			

Q. PLACING SHEETING AND COVERING STACKS			
REQUIRED ACTIONS IN EXACTLY THIS ORDER	Y	N	Confirming Initials
Q1. <u>Position sheets</u> . Carry, do not drag the sheets into position			
Q2. <u>Cover stacks</u> . Unfold the sheets towards the stack. Place the sheet over the stack and position with 1 (one) meter of sheet lying on the ground. Unroll the sheet to cover the entire stack. If more than one sheet is used, join the sheets. Joins require a 1(one) m overlap, tightly rolled, and then clipped every 20cm or weighted.			
Q3. <u>Set sand snakes</u> . Smooth out any wrinkles and folds in sheets, and then place two rows of sand snakes on the sheets along the sides of the stack. Ensure that a good seal is achieved along the whole length and take special care at the corners.			
Q4. <u>Place monitoring lines</u> . Place two monitoring lines from the top and one from the bottom of each stack for efficacy monitoring. Cut small holes to insert tubes and seal holes in gas sheets with tape. Gas monitoring lines should extend outside of the exclusion area. Place duct tape over the free tube ends, except when measuring gas concentrations. Tubes MAY NOT be located near placement positions for phosphine tablets.			

Appendix 8: Fumigation Management Plan

R. APPLYING FUMIGANT			
ATTENTION: phosphine gas begins forming as soon as the air-tight packaging of phosphide pellets/tablets is opened. It is a deadly poison. It is flammable. Contact of phosphide with water will cause fire or explosion. Smell is <u>NOT</u> a reliable indicator of danger.			
REQUIRED ACTIONS IN EXACTLY THIS ORDER	Y	N	Confirming Initials
R1. Watchmen go on duty (if required to maintain the exclusion zone) & remain OUTSIDE the zone until aeration is complete (W9)			
R2. Verify ONLY personnel involved in fumigation are in the exclusion zone			
R3. Turn off electric lights & any sources of sparks			
R4. Ensure that all fumigation personnel are wearing PPE, <u>including respirators</u> , as per L4 & L5			
R5. Lay out the trays for aluminum phosphide tablets/pellets around the stack. Remove the sand snakes that hold down the sheets next to the trays.			
R6. Distribute UNOPENED tablets/sachets next to the trays			
R7. Position tablets/pellets in a single layer on each tray. To avoid fire risk, do not pile tablets or pellets. Slide trays under the sheets and replace the sand snakes. To minimize worker exposure to gas being released, placement of trays should be completed within 15 minutes. Work from the back of the stack towards the exit doors. Pellets may NOT touch bagged commodities.			
R8. Assure all opened tablets/pellets are used			
R9. Leave the warehouse and lock ALL doors			

S. MONITOR GAS CONCENTRATIONS FOR EFFICACY AND HAZARD & LOG RESULTS			
REQUIRED ACTIONS	Y	N	Confirming Initials
S1. <u>Hazard Monitoring</u> . 1 hour, 2 hours, 4 hours & 24 hours after applying fumigant, and every 24 hours thereafter, monitor for hazard at all points designated on the fumigation plot (I7). Record results on attached log (#D).			
S2. <u>Hazard Monitoring Response</u> . If concentrations exceed 0.3ppm (or the local TLV,* if more stringent), assure that individuals move through the area only in passing. If concentrations exceed 1.0ppm (or the local STEL, if more stringent) evacuate the area. NOTE ANY SUCH ACTIONS IN EXCEPTIONS LOG (#C).			
S3. <u>Efficacy Monitoring</u> : Monitor EACH monitoring line 24 hours after fumigation application; every 24 hours thereafter. Monitor within stacks to confirm it was an effective fumigation application. Record results in attached logsheet (#E). NOTE ANY EXCEPTIONS IN LOG.			

Appendix 8: Fumigation Management Plan

S4. <u>Efficacy Monitoring Response</u> . If concentration does not reach or falls below 200ppm before additional fumigant may be added <u>IF SCBA apparatus are used</u> . NOTE ANY SUCH ACTIONS IN EXCEPTIONS LOG (#C).			
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**threshold limit value. **short-term exposure limit see PEA Annex T-9.*

T. CERTIFY FUMIGATION COMPLETE OR ABORTED		
REQUIRED: CERTIFY WHICH OF THE FOLLOWING APPLIES.	✓	Req'd Time @ Concentration e.g. 200 ppm @ 7 days
T1. Efficacy monitoring results show that the required phosphine gas concentration was sustained over the required period in each stack		(Copy from E4)
T2. Efficacy monitoring results show that the required concentration was NOT sustained over the required period in one or more stacks.		

U. AERATE			
REQUIRED ACTIONS IN EXACTLY THIS ORDER	Y	N	Confirming Initials
U1. Fumigation team puts on respirators and other PPE per L4 and L5 before entering exclusion zone.			
U2. Open all doors and ventilators. Turn on fans, if any.			
U3. Remove sand snakes from the corners of up to 2 stacks so that sheet covering each can be lifted. (If the stacks are large relative to the size of the room, ONLY 1 stack can be opened at a time.)			
U4. Pull the free corner of each sheet up to the top of the stack with a rope. Team leaves exclusion zone immediately.			
U5. Allow gas to leave stack and warehouse for a half-day to 1 day			
U6. Repeat U1, U4 & U5 until remaining stacks are opened			
U7. Repeat U1. Then completely remove all sheets covering stacks.			
U8. Monitor inside warehouse and directly next to stack until phosphine gas concentration is less than 0.3 ppm (or local TLV value, if more stringent.)			
U9. ONLY AFTER CONCENTRATION IS LESS than 0.3 ppm (or local TLV value, if more stringent), lead fumigator informs facility manager that the area is safe to enter.			

Disposal and Cleanup

V. ALUMINUM PHOSPHIDE RESIDUE REMOVAL & DISPOSAL			
ATTENTION: Residues contain 3-5% unreacted materials and are hazardous to breathe and touch!			
ATTENTION: Never dispose of unused tablets/pellets with these methods. Never place unused pellets/tablets in a drum with or without detergent as a fire or explosion may occur.			
REQUIRED ACTIONS	Y	N	Confirming Initials
V1. Personnel involved put on respirators and other PPE per L4 & L5.			
V2. Collect residue from trays in bucket or drum. Do <u>not</u> allow any residue to touch food commodity			
V3. Remove residue to a safe outdoor area			
V4. Remove warning signs & stand down watchmen			
V5. Standing upwind to avoid any evolved phosphine, mix residue slowly into soapy water, assuring the residue is fully reacted.			
V6. After any reaction is complete, dispose of mixture in a 0.5m deep disposal pit, at least 100m away from warehouse structures. Fill in hole.			

W. CLEAN-UP			
ATTENTION: Dead animals should be considered a biohazard & must be disposed as soon as possible after aeration is complete			
REQUIRED ACTIONS	Y	N	Confirming Initials
W1. Crush empty phosphide tablet/pellets containers and dispose per host country requirements. If none, bury.			
W2. Inspect entire warehouse with flashlight, including under pallets and under-roof area for dead rodents and birds			
W3. Collect all dead animals wearing disposable gloves (if available). If not available, pick up with shovel or inside-out plastic bag.			
W4. Dispose of carcasses by (1) burying, wrapped in newspaper or plastic bag 0.6-1.2m deep and at least 60m from any shallow well or surface water; OR (2) burning, where it will not cause a public nuisance and in accordance with local laws; or (3) otherwise in accordance with local laws.			
W5. Wash hands thoroughly with soap.			

Appendix 8: Fumigation Management Plan

#D. PHOSPHINE CONCENTRATION LOG: HAZARD MONITORING												
Per S1, log phosphine gas concentrations taken at designated locations outside the exclusion area, in ppm.												
LOCATION*	MONITORING TIME (TIME 0 = APPLICATION OF FUMIGANT)											
	1 hr	2 hr	4 hr	24 hr	2 days	3 days	4 days	5 days	6 days	7 days	8 days	9 days
A												
B												
C												
D												

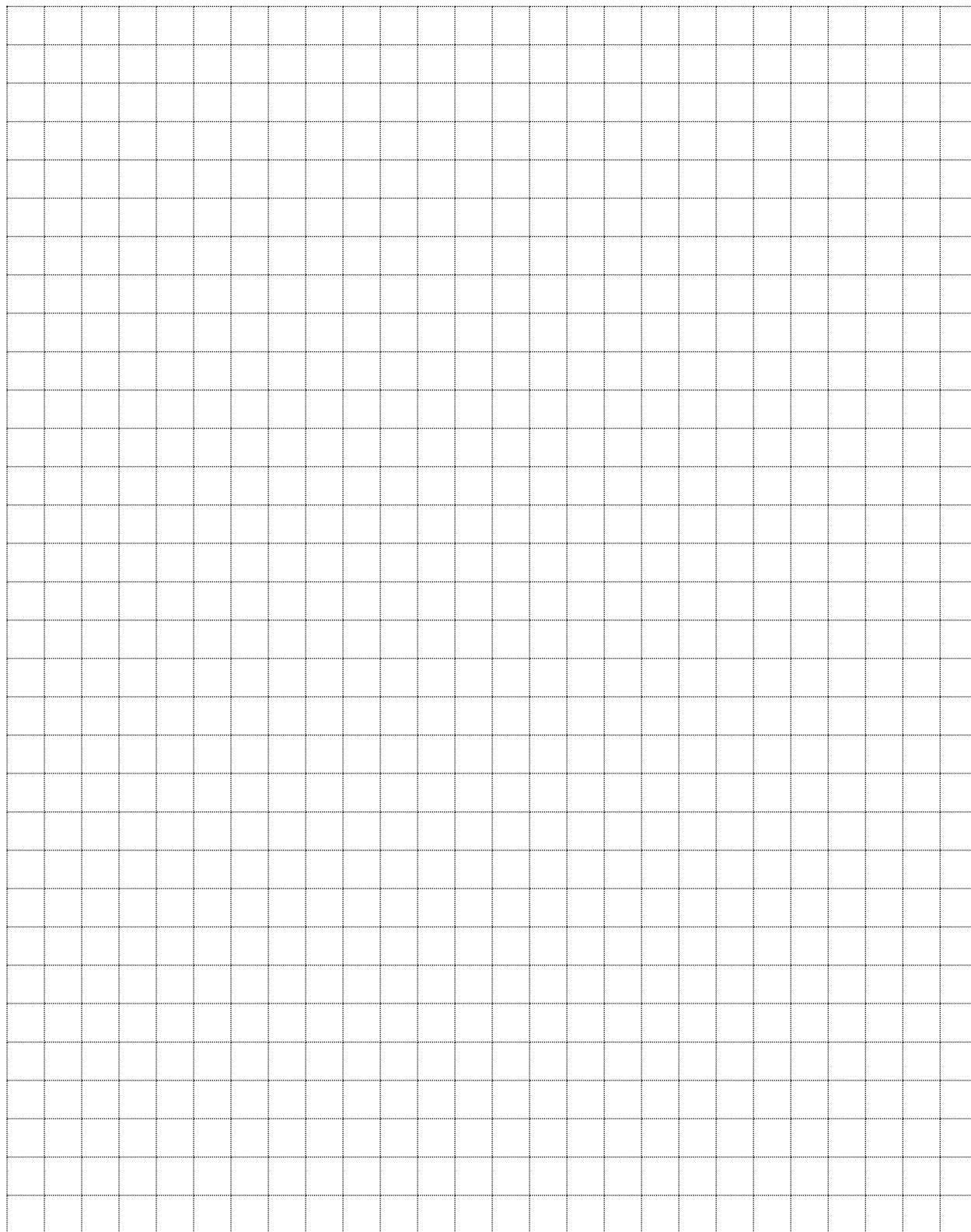
*As designated on plot map, Annex #F. Add locations as needed.

#E. PHOSPHINE CONCENTRATION LOG: EFFICACY MONITORING										
Per S3, log phosphine gas concentrations taken from monitoring lines, in ppm.										
MONITORING LINE*	MONITORING TIME (TIME 0 = APPLICATION OF FUMIGANT)									
	24 hrs	2 days	3 days	4 days	5 days	6 days	7 days	8 days	9 days	10 days
1										
2										
3										
4										

*As designated on plot map, Annex #F. Add lines as needed.

#F. SCALE MAP/PLOT OF FACILITY AND SURROUNDINGS, SHOWING EXCLUSION ZONE

(use this grid for a sketch map, if a more formal site map is not available. See section I for requirements)



APPENDIX 9: OFFICIAL NOTICE OF FUMIGATION

Warehouse name:

Address/location:

Fumigant/pesticide being used:

Date when fumigation will begin:

Date when fumigation will end:

Date when aeration will begin:

Date when aeration will end:

Certified applicator in charge:

Phone #

Cell #

In case of an emergency, please contact:

Name

Phone #

Cell #

Receipt of notification:

Fire Chief/Authorized Official (Name)

(Signature)

(Date)

APPENDIX 10: FUMIGATION MARKING POSTER

****DANGER****



DO NOT ENTER

THIS UNIT IS UNDER FUMIGATION

WITH* _____ APPLIED

Date: _____ Time _____

Applicator Name, Address, Phone: _____

Emergency Contact #: _____

APPENDIX 11: EMERGENCY CONTACT INFORMATION

EMERGENCY CONTACT	INDIVIDUAL (if relevant)	PHONE NUMBER	ADDRESS
Hospital			
Commodity Operations Manager			
Warehouse Manager			
Local Fire Unit			
Local Ambulance			
Local Police Unit			
Main Office			
Field Office			
Local Council			

APPENDIX 12: FIRE SAFETY AND EVACUATION GUIDELINES

- 1) Familiarize yourself with evacuation routes (primary and secondary), the first-aid station or kit, each fire alarm, each fire extinguisher, the nearest public telephone and the location of the stairway (as indicated on the Emergency Evacuation Diagram).
- 2) Activate the nearest fire alarm pull box and call the fire department if you discover fire anywhere in the building. State your name, location and type of fire.
- 3) Attempt to extinguish a fire if it is very minor and you have been trained in the correct operation and use of portable fire extinguishers.
- 4) Immediately leave the area using the designated evacuation route when the fire alarm sounds.
- 5) Walk — do not run — when evacuating. Keep to the right and remain calm but take immediate action.
- 6) Stay single file on stairways, as fire department personnel may be using them as well.
- 7) Obey the directions of your building Emergency Response Officials.
- 8) Contain a fire by closing all doors behind you as you exit the building. Small fires can spread rapidly and overwhelm an area.
- 9) Feel a door first to see if it is hot before opening it.
 - a) If the door is not hot, open it slowly.
 - b) Then if conditions allow, proceed to the nearest stairway or exit and follow the evacuation plan.
 - c) If smoke is too heavy, do not enter a hallway.
 - d) Close the door and place a towel or article of clothing along the bottom edge of the door.
 - e) Open the windows for fresh air and hang a sheet, or other similar article, out the window to let the fire department know you are still inside.
- 10) If all exits from a floor are blocked or if for any reason you must remain in a room or office during a fire or other emergency, remain calm, call the fire department, and advise of your location and situation. Wait for the fire department to assist you.
- 11) Notify your supervisor in the event of any injuries to yourself or others.
- 12) Periodic fire drills will be conducted throughout the year; however, treat every alarm as if there were an actual fire.
- 13) After exiting the building, all staff must assemble at the fire assembly point for accountability. You should remain outside the building until the fire department or management informs you that it is safe to return to the building.

APPENDIX 13: ACCIDENT INVESTIGATION REPORT FORM

Date and time of accident:
Location:
Accident/injury description including how and why the accident happened:
Full names of all staff members involved: Full names of witnesses, if possible:
Additional details on the accident such as what the staff member was doing at the time of the accident? When was the accident reported?
Preventive action recommendations:
Corrective action taken:
Manager Responsible

NOTE:

The Warehouse Manager and a member of the Safety Committee should complete this form.

Copies should be distributed as follows: 1) Warehouse files, 2) Project Commodity Manager's office, 3) Safety Committee and 4) Human Resources Department.

